

Spring 1994

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From the Director

Three Years of Progress

The release of our three-year progress report (see box below) is an opportunity to review and assess where we've been, and where we're going. Highlights of the past three years include:

- Establishment of competitive grants in economics and public policy. Ten grants address a range of topics including strategies for employing year-round labor, sustainable forestry management, agricultural ethics curriculum, community supported agriculture and pesticide reduction policies.
- Establishment of competitive grants for meetings and other educational events (see p.7) and for graduate student awards (1993-94 awards will be announced later this month).
- Continued strength in competitive grants for systems research, critical component research, and monitoring innovative producers (see p.6)
- Release of informational and educational materials including a 372-page comprehensive analysis of the biological, economic and social consequences of two dairy technologies (bovine growth hormone and rotational grazing); practical booklets on organic soil amendments and on citrus production; and videos on soil management, weed management, and cover crop management in annual and perennial crops (see *Resources* p. 14).
- Leadership in the development of the Sustainable Agriculture Network, a national system for sharing printed and computerized information. (see p.4)

At the time of this writing, we are planning for the next meeting of our public and technical advisory committees, who will help us set priorities for next year's competitive grants, and shape other program priorities. We are also looking ahead to the return of director **Bill Liebhardt** from his sabbatical leave. His experiences teaching extension agents in Vermont, observing agricultural policies in New Zealand, and studying the systems approach used at Hawkesbury College in Australia will give us many creative ideas for our own future. Please order a copy of our free *Progress Report*, let us know what you think about our past efforts, and share with us your own creative ideas and vision for sustainable agriculture in California.-*Jill Shore Auburn, associate director, UC Sustainable Agriculture Research and Education Program.*

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SAREP PROGRESS REPORT 1990-93

A new 52-page progress report detailing the research, competitive grants and accomplishments of UC SAREP from 1990-93 is now available free from the UC SAREP office at (916) 752-7556. It will also be available for viewing in county extension offices throughout the state. SAREP has funded more than 127 grants for over \$2.5 million dollars since the program was established in 1987. **Jill Shore Auburn**, SAREP acting director, noted that SAREP addresses many issues in the agriculture community, including sustainable soil management, farming with reduced use of chemicals and greater use of biological controls, biotechnology, and the safety of the food supply.

Getting information to the agricultural community is SAREP's primary goal. SAREP provides information from research projects and many other sources to farmers throughout the state. It produces print and electronic publications, videos, and workshops.

Building Support for Sustainable Ag Policy

by Kai Siedenburg, California SAWG

Editor's Note: Kai Siedenburg is the coordinator of the newly established California sustainable Agriculture Working Group (CaSAWG).

The California Sustainable Agriculture working Group (SAWG) is a new group dedicated to promoting sustainable agriculture through policy work. California SAWG's key goals are to build alliances among a wide spectrum of groups concerned with food and farming, to broaden public participation in agriculture policy development, and to win passage of sustainable agriculture policies, particularly in the 1995 Farm Bill. SAWGs have already been organized in the Midwest, the Northeast, the South and parts of the Western region of the U.S.

California SAWG's current emphasis is coordinating the state's participation in the National Dialogue for Sustainable Agriculture, an unprecedented organizing effort to incorporate sustainable agriculture policies into the 1995 Farm Bill. National Dialogue participants are organizing local meetings throughout the nation to generate practical policy options and build a strong coalition to support their implementation.

In addition to work on the 1995 Farm Bill the California SAWG can provide a forum for other agriculture policy work. Pending additional funding, the group hopes to organize a statewide meeting in 1994 to coordinate work on the Farm Bill and set directions for future work. California SAWG is currently supported by a start-up grant from the California Alliance for Sustainable Agriculture (CASA).

California SAWG is committed to working with diverse participants to identify common ground, including farmers, sustainable and organic farm groups, labor advocates, environmentalists, consumer groups, and others. Opportunities for involvement include inviting SAWG representatives or publicizing SAWG work at local meetings, helping write or commenting on policy options and draft legislation, cultivating support from elected officials (particularly Congressional agriculture committee members), publishing articles in newsletters or generating press coverage, and issuing action alerts and lobbying for specific policies and appropriations. For more information, contact Kai Siedenburg, California SAWG, P.O. Box 1599, Santa Cruz, CA 95061; (408) 458-5304.

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Free Hypercard Stack on BGH Available Through Internet

Hyperspace, Hypercards, information stacks: Park yourself in front of your computer and ride the Internet to find out the latest about bGH or bST, the synthetic bovine growth hormone recently approved by the FDA for injection into dairy cows to increase milk production. An educational infostack for Macintosh computers, "The Dairy Debate," has been developed by **Robert Zomer** of the UC SAREP in conjunction with SAREP director **Bill Liebhardt's** book *THE DAIRY DEBATE: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies*. "The Dairy Debate" is an interactive computer program for exploring the questions posed by genetically engineered bGH or bST: How will the product affect humans, cows, and dairy farmers? Are the genetically engineered formulations of the hormone identical to naturally occurring bGH? How much extra milk already exists in the U.S.? How much more milk is the use of bGH expected to add to the surplus taxpayers pay to stockpile? "'The Dairy Debate' gives a preview of the kinds of information computer users will be able to access about current events," Zomer says. He designed a grazing cow to traipse through the information stack, while a juggler weighs the probabilities within the carbon ring of the different formulations of the hormone. See them move! Be a player! The Hypercard application is available free through the Internet system of computer networks by sending an e-mail request to: rjzomer@ucdavis.edu. Or send a blank, high-density 3 1/2" diskette and a return label, or \$5 (checks to UC Regents) to: Dairy Diskette, SAREP, University of California, Davis, Ca 95616.

Briefly Noted

Compiled by David Campbell, SAREP

Grower Research Organization Forms

California Clean Growers Association, a San Joaquin Valley-based farmer organization promoting natural farming techniques, has recently formed the Participatory Research Institute (PRI). Its purpose is to bring farmers and researchers together in a dynamic working relationship. PRI program director **Mas Masumoto** and research director **Jeff Dlott** have started a monthly newsletter, *On Common Ground*. According to Masumoto, "Our research institute hopes to work with researchers interested not only in the farm, but also in the farmer." Projects currently underway include brown rot disease management in stone fruit, an implementation model for sustainable farming practices in stone fruit funded by the California Energy Commission, and a database of farmer indigenous knowledge and experience. For more information, contact PRI, 586 S. Reed, Reedley, CA 93654; tel: (209) 637-1405.

Cal EPA Weakens Methyl Bromide 'Right to Know'

On December 22, 1993, California's Environmental Protection Agency (Cal EPA) reversed its January 1993 decision to list methyl bromide under Proposition 65. This action means that farmworkers and other rural residents will not have the "right-to-know" when the pesticide is used in agricultural production. Under the terms of Proposition 65, growers would have been required to warn anyone living or working within four miles when methyl bromide was to be used. Applications of methyl bromide for structural fumigation will still be listed under Proposition 65, but uses for agricultural purposes will now be exempt. Five environmental and labor organizations have sued Cal EPA over the new ruling. Scientific studies required by Proposition 65 indicate that methyl bromide can cause birth defects and genetic mutations in laboratory tests. For more information, see *The Pesticide Action Network Updates Service*, January 10, 1994; tel: (415) 541 9140.

Coalition Asks Clinton to Lead Sustainable Ag

A coalition of 116 local and national organizations has written **President Clinton**, Agriculture Secretary **Mike Espy** and Environmental Protection Agency head **Carol Browner**, encouraging the federal government to take an active leadership role in promoting sustainable agriculture. The letter followed the Clinton Administration's June 1993 pledge to promote

sustainable agriculture and reduce pesticide use. Among the specific actions requested in the letter were: revising water quality and pest management programs to link them directly to sustainable agriculture initiatives; retraining and reorganizing USDA personnel so that sustainable agriculture becomes the organizing principle of the agency; and increasing funding for the USDA's Sustainable Agriculture Research and Education (SARE) program, EPA's Agriculture in Concert with the Environment (ACE), and the Organic Foods Production Act. For more information see "Coalition Asks Clinton to Lead Sustainable Ag Effort," *Nutrition Week*, Nov. 12, 1993; tel: (202) 462-4700.

Report Questions Transgenic Crops

A new report from the Union of Concerned Scientists raises concerns about the environmental risks associated with transgenic plants currently being developed and tested. Transgenic plants are crops that have been genetically engineered to contain traits from unrelated organisms. Already genes have been added to engineered crops from organisms as diverse as fireflies, fish, hamsters and chickens. The report suggests that these applications of biotechnology could threaten global crop diversity, and pose a number of known and unknown environmental risks. The agricultural biotechnology industry hopes to introduce hundreds of transgenic vegetables, grains, fruits, trees, fiber crops and ornamentals by the turn of the century. The report, co-authored by **Jane Rissler** and **Margaret Mellon**, is available for \$12 from Union of Concerned Scientists, 26 Church Street, Cambridge, MA 02238; tel: (617) 547-5552.

Sustainable Ag Consortium

A broadbased consortium is being formed among researchers, Extension workers, farmers and advocates to cooperate in building their individual and collective capacity to develop and foster a sustainable agriculture. "Effectively shaping national research and extension policy to support a more sustainable system is the principal rationale for organizing a consortium," according to the Consortium's draft mission statement. "Over 300 natural and social scientists, farmers and others have indicated interest in joining the Consortium so far," says **Elizabeth Bird**, the Consortium's executive director. For more information, contact Bird at the Center for Rural Affairs, PO Box 406, Walthill, NE 68067; tel: (402) 846-5428; fax: (402) 846-5420; e-mail: hnl721@handsnet.org.

Sustainable Agriculture Network Update

by Jill Shore Auburn, SAREP

The three-year-old Sustainable Agriculture Network (SAN), a cooperative effort by people from universities, government, business and nonprofit organizations from throughout the U.S., has made steady progress toward its goal of improving access to existing and new information on sustainable agriculture systems, techniques, and issues. The interrelated publications and databases are available and being used by farmers, Extension agents, activists and others around the world.

SAN has four publications that are available in print and computerized forms:

- The 1993 *Sustainable Agriculture Directory of Expertise*, which lists over 700 people and organizations willing to share their information and experience in soil-building, pest management, marketing, and many other areas;
- The *Showcase of Sustainable Agriculture Information and Educational Materials*, a compilation of over 300 publications, videos, and other materials, including detailed descriptions and order information;
- The first in a series of practical handbooks for farmers, *Managing Cover Crops Profitably* (a second handbook, due out in 1994, addresses tillage tools and techniques);
- The 1993 compendium of research and education projects funded by the national Sustainable Agriculture Research and Education and Agriculture in Concert with the Environment (SARE/ACE) programs, including the new farmer-initiated grants of the North Central and Northeast regions, and updated information on all projects.

Each of these publications demonstrates the SAN philosophy of organizing practical information from a variety of sources-private and public organizations as well as farmers themselves-into useful forms for farmers and the general public. Each draws upon a wide range of sources of information, both experimental and "experiential," that is, based on the practical experiences of farmers and others.

How to Get SAN Products

Nearly everything that SAN produces is available in three forms: in print, on diskette, and via the Internet system of computer networks. That way, people who use computers can have the advantage of searching, retrieving and manipulating information from the SAN databases, but people who don't use computers are not left out.

Print publications are available from Sustainable Agriculture Publications, Hills Building, Room 12, University of Vermont, Burlington, VT 05405. Prices include postage and handling: \$14.95 for the Directory, \$4.95 for the Showcase, and \$9.95 for the Handbook. The SARE/ACE project compendia are available separately through the four regional offices of the SARE program: West, **Kristen Kelleher**, USDA Sustainable Agriculture Program, University of California, Davis, CA 95616; North Central, **Lisa Jasa**, 207 Agriculture Hall, University of Nebraska, Lincoln, NE 68583-0704; South, **Gwen Roland**, c/o SARE/ACE Program, Georgia Experiment station, Griffen, GA 30223-1797; Northeast, **Beth Holtzman**, Plant & Soil Science Dept., University of Vermont, Burlington, VT 05405.

SAN information on diskette is available in Folio "Infobases" prepared by **Phil Rasmussen** at Utah state University. (Rasmussen is the new head of the Western Region USDA SARE program, see p.9.) Infobases allow you to read electronic "books" by browsing through them, jumping from section to section via hypertext links, or searching for key words anywhere in the document. Once you've found the information you need, you can print it or save it to a file, which you can then capture into your word processor or e-mail to a colleague across the country. Each of the publications described above fits on one high-density 3 1/2 inch floppy disk; also available is the complete text of the 1990 Farm Bill on an Infobase, which fits on two high density 3 1/2 inch disks. These Infobases are currently for DOS users only, but Windows and Macintosh versions are forthcoming. Each disk includes the Infobase plus the software needed to read it. To receive the DOS Infobases, send two blank, formatted, high-density 3 1/2 inch disks for EACH database you want to Phil Rasmussen, Ag Systems & Technology Dept., Utah state University, UMC-2300, Logan, Utah, 84322-2300. Please include a self-addressed label, and return AIRMAIL postage if you're outside the U.S. (or your order will travel by surface mail). Or, if you're an experienced Internet user, you can get them via ftp (file transfer protocol) from extsparc.agsci.usu.edu (129.123.13.55; Be sure to use binary transfer.)

SAN databases are posted on the Internet at North Carolina State University by **Kevin Gamble**. They can be searched and retrieved by electronic mail commands, or more interactively via the Internet search tools "gopher," "WAIS" and "WWW."

Many people associate the Internet with universities and government, but it's accessible to everyone through a variety of commercial and nonprofit computer conferencing systems such as Econet, Handsnet, Compuserve, MCI-Mail, Delphi and America On-Line. (An informative article comparing these and other systems appeared in USA Today, October 7, 1993, p. 4-D.)

SAN also sponsors an electronic mail discussion group for users of the Internet. Participants (about 600 of them at this writing) post notices of new sources of information, and request help finding information. Imagine being able to ask 600 experts for help, with the time and effort that it usually takes to contact one or two by phone or fax! A calendar of sustainable agriculture events is also at your fingertips via the Internet.

For instructions on searching the SAN databases, joining the e-mail discussion group, or retrieving the SAN calendar, contact **Gabriel Hegyes**

(Internet: ghegyes@nalusda.gov) for a copy of "Getting Started Electronically with the Sustainable Agriculture Network."

New Leadership

SAN was planned and started by a national committee of diverse individuals with funding from the SARE/ACE program. As its founding chairperson, I'm very pleased to announce that **Jim Lukens**, head of the ATTRA national information service, succeeded me as chairperson in October 1993 for a three year term. I'm looking forward to continuing involvement with SAN as a member of its executive committee. SAN continues to be staffed very ably by **Gabriel Hegyes**, who can be reached at SANlink, c/o AFSIC, Room 304, National Agricultural Library, 10301 Baltimore Blvd., Beltsville, MD 207052351, (301) 504-6425.

After three years of spending a good share of my time launching SAN, I'm particularly looking forward to reaping its benefits closer to home by sharing information about the value of SAN and how to use it with my research and extension colleagues here at UC, and with individuals and organizations throughout the state. We're working to deliver UC SAREP databases after the SAN model, in Folio Infobases and via the Internet, as well as printed publications. I would very much like to hear from Californians who are interested in electronic access to SAN and SAREP.

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Citrus Groundwater Publication Available

Citrus growers and anyone concerned with groundwater issues will be interested in a new SAREP publication, *Protecting Groundwater Quality in Citrus Production*. The 40-page book was written by **Chuck Ingels** and published by UC ANR Publications.

Preventing groundwater contamination from pesticides and nitrate has become one of the most pressing environmental problems in agriculture. The three main herbicides used in citrus production have been found in hundreds of wells in the San Joaquin Valley. As a result, the use of these herbicides is restricted in many areas. Fertilizers used in citrus production can lead to nitrate leaching, especially on the sandy soils where many citrus orchards are located. This book offers practical and economical methods for reducing the movement of agricultural chemicals to groundwater.

The book details the seriousness of the groundwater contamination problem in California, how chemicals move from farms to groundwater, and the history of nitrogen and weed management in the state's citrus industry. It presents diverse management strategies for both protecting groundwater and maintaining yields and fruit quality. Practices discussed include wellhead protection and creative techniques for managing nitrogen, weeds, and irrigation. The book also provides the most thorough coverage available about cover cropping in citrus. It examines the limitations of cover cropping and suggests strategies that can be used to overcome these drawbacks.

Protecting Groundwater in citrus Production can be ordered from ANR Publications, University of California, 6701 San Pablo Avenue, Oakland, CA 94608-1239; (510) 642-2431. The price is \$5.00.

SAREP Funds Continuing Projects

Ten continuing research and education projects focusing on production and social, economic and public policy issues in sustainable food and agricultural systems have been awarded \$117,021 in additional grant money from UC SAREP this year.

Steve Temple, Agronomy & Range Science, UC Davis: \$25,000. This interdisciplinary comparison of conventional, low-input and organic management of a processing tomato-based cropping system is entering its sixth year, funded by SAREP and the USDA's SARE program. See *Sustainable Agriculture* Vol. 5, No. 4 (Summer 1993) for a recent update.

Peter Lehman and **Susan Toms**, Engineering and International Development Technology, Humboldt State University, Arcata, CA: \$14,487. The [Arcata Farm and Education Project](#) has created a student-operated, community-supported two acre farm in the city of Arcata to be used for sustainable agriculture projects by students, community members and local farmers.

Monica Moore, Pesticide Action Network, San Francisco, CA and **Angus Wright**, Dept. of Environmental Studies, California State University, Sacramento, CA: \$9,500. This project has drafted a pesticide use reduction policy for California in consultation with 46 people throughout California, based on European and other relevant experiences. This year's funding is being used to broaden the discussion beyond the initial 46 cooperators, and to further develop approaches to financial incentives for growers, and funding mechanisms for implementing a pesticide reduction policy.

Desmond Jolly, Extension Agricultural Economist, UC Davis and **Stan Dundon**, Dept. of Philosophy, California State University, Sacramento, CA: \$7,340. This project has reviewed literature, programs and projects on applied ethics, and begun drafting a text on agricultural ethics, including case studies. Second-year funding will be used to complete the text, instructor's manual and related articles, and to hold several workshops with producers, farm advisors, and others.

Steven Koike, Monterey County farm advisor: \$4,530. Koike and his colleagues have tested several cover crop species for their susceptibility to the lettuce drop pathogen, and the effects of cover crop incorporation on subsequent lettuce plantings. Preliminary findings from the first year showed that vetch, Phacelia and Austrian pea may increase soil inoculum and disease in the subsequent crop. A second year of research is necessary to confirm or refute these findings.

Kent Daane, Laboratory of Biological Control, UC Berkeley and Kearney Agricultural Center: \$14,487. This project is studying the effects of cover crops, time of cover crop plowdown, and trellis system on spiders and other

predators of the variegated leafhopper, a critical pest in Central Valley vineyards. Pests and beneficial insects are being monitored in large, replicated plots in two commercial vineyards.

Bill Williams and **Craig Thomsen**, Agronomy and Range Science, UC Davis: \$8,700. Dryland legumes are being evaluated for pasture, range, vineyard and farming systems in Northern California. Dozens of legumes (annual medics, subterranean clovers, and others), replicated three times, are being evaluated at ten or more sites for establishment, vigor, percent cover, weed suppression, recovery following grazing, and/or regeneration.

Elizabeth Mitcham, Pomology, UC Davis: \$11,730. Postharvest hot water immersion treatments are being explored for their potential as a non-chemical alternative for control of certain diseases and physiological disorders of fruits. See p. 8 for details.

Donald Phillips, Agronomy and Range Science, UC Davis: \$15,000. Flavonoids are natural compounds which have recently been found to promote the growth of beneficial soil bacteria and fungi. This project looked for flavonoids and other natural chemical signals in soil from California, Oregon, and Great Britain where different crop and soil management practices have been in place for many years. Year Two funds will be used to identify the chemical structures of signals extracted from soil during Year One, and to develop a microbial assay to define the biological activity of plant signals in soil.

Lonnie Hendricks, Merced County farm advisor: \$5,750. Building on his previous SAREP funded research, Hendricks continues to monitor six innovative almond orchards for leaf nutrient levels, beneficial insects, pests, insect damage to nuts, soil organic matter and earthworms. Ten cover crop mixes are being evaluated in one of the orchards for effects on soil organic matter, tree nutrient status, pests and beneficials.

SAREP 1994 Educational Grants

For the third consecutive year, SAREP is awarding grants to individuals and organizations to conduct meetings, field days, and other educational events related to sustainable agriculture. This year, 14 awards have been granted for approximately \$12,800. Meetings for 1994 are listed below. For more information on a specific event, call the number listed for that meeting. To find out more about SAREP's educational grants program, call [David Chaney](mailto:David.Chaney@ucdavis.edu) at (916) 757- 3280.

Meeting Title & Contact	\$	Date	Location	Meeting Title & Contact	\$	Date	Location
Third Transitional Organic Cotton Conference <i>Will Allen</i> California Institute for Rural Studies (209) 862-0860	\$1000	TBA	Visalia	Rangeland and Environmental monitoring Meeting Series <i>Glenn Nader</i> UC Cooperative Extension, Lassen County (916) 257-6363	\$2,000	TBA	
Integrated Crop Management Grower Meeting <i>Catherine Baranek</i> North Delta Conservancy (916) 775-1049	\$530	Jan. 20	Walnut Grove	California Grazing Academy David Pratt UC Cooperative Extension, Solano County <i>Roger Ingram</i> UC Cooperative Extensions Nevada County (916) 273-4563	\$1,000	TBA	
Sustainable Agriculture Conference and Farm Tour Series <i>Mariposa Guido</i> Committee for Sustainable Agriculture (\$2,000) (916) 756-6967 Sustainable Grape Production Floriculture and Nursery Production Sustainable Livestock Production Cover Crops		Apr. 6 Apr. 13 May 12 TBA TBA	Fresno Santa Rosa Watson ville	Rotational Grazing Field Day/Tour/Workshop for Dairy Producers <i>Barbara Reed</i> UC Cooperative Extension, Glenn County (916) 865-1107	\$500	TBA	
Alternative Agriculture for Sierra County Area Kim Joos Sierra County Economic Council (916) 994-3401	\$1,000	TBA		Controlling Brown Rot in Organic Peach Orchards: An Update on Two Years of Field Research <i>Carl Rosato</i> Woodleaf Farm <i>Robert Scowcroft</i> Organic Farming Research Foundation (408) 464-9322	\$1,000	APR 16	Oroville
Producing Organic Wool				Cover Crops in Annual			

for the Sustainability of the Sheep Industry <i>Stephanie Larson</i> UC Cooperative Extension, Marin County (707) 527-2621	\$550	TBA		Rotations A Facilitated Discussion: <i>Mark Van Horn</i> Student Experimental Farm UC Davis (916) 752-7645	\$440	Mar. 15	UC Davis
Waterfowl Production in Sustainable Agricultural Environments <i>Robert McLandress</i> California Waterfowl Association (916) 648-1406	\$550	Feb. 26	Sacramento	West County Sustainable Land Management <i>Paul Vossen</i> UC Cooperative Extension, Sonoma County (707) 527-2621	\$1,000	Apr. 2, 9, 23	Santa Rosa
Innovative Cropping Systems Options for Westside Growers: Potential Roles for Cover Crops <i>Jeff Mitchell</i> Dept. of Vegetable Crops UC Davis (916) 752-9097	\$197	Mar.11	Five Points	Synergy from Solar Energy <i>George Work</i> Work Ranch <i>Bill Weitkamp</i> UC Cooperative Extension, San Luis Obispo County (805) 467-3233	\$1,000	May 14-15	San Miguel

Project Update

Fruit Decay Organisms in Hot Water

by Chuck Ingels SAREP

for an effective nonchemical method of controlling decay and physiological disorders of fruit after harvest. A team of researchers, led by Elizabeth Mitcham in the Pomology Department at UC Davis, was funded for \$11,730 by SAREP in 1993 to examine the effects of prestorage hot water dips on fruit quality. Hot water showed promise decades ago, but chemical treatments proved to be cheaper and more effective. Now, many chemicals may be unavailable for use in postharvest treatments because of public pressure to reduce chemical use and because many organisms have developed resistance to these materials. Controlled atmosphere (CA) storage, in which the carbon dioxide level is raised and the oxygen level is reduced in storage, can be very effective but is expensive.

The Experiments. The hot water treatments in this study were aimed at reducing several diseases and disorders in stored fruit: storage scald (apples), brown rot (peaches, nectarines, and apricots), mealiness (peaches and nectarines), chilling injury (stone fruits and persimmons), and Botrytis rot (kiwifruit). Results of the research on storage scald and brown rot are presented here.

Storage Scald of Apples. Apples are injured by prolonged storage at low temperatures. With apple storage scald, surface cells are killed, causing an irregularly shaped, diffuse browning of the skin. The researchers want to know if the hot water dips can effectively replace diphenylamine (DPA), a commonly used antioxidant for the control of storage scald.

In the first year of the study, 'Granny Smith' apples were immersed for 5 minutes in hot water at 46 or 50 degrees C and stored in 1/2-degree C air for three or six months. Hot water-immersed fruit had only minor scalding after three months compared to the untreated controls, which were dark brown. After six months, however, more scalding occurred and the fruit showed some yellowing. Virtually no scalding occurred on fruit stored under CA storage. Other fruit quality indicators were not adversely affected by the treatments. Interestingly, the development of bitter pit, another physiological disorder which results in brown sunken lesions on apples, was also significantly reduced by heat treatments. The most promising treatments after three months of the second year study were 48 degrees C for 15 minutes and 50 degrees C for 5 minutes. Mitcham noted that results after six months will indicate whether the technique merits promotion or further study.

Brown Rot. Brown rot is a serious disease of stone fruits in storage. To test the effects of hot water on brown rot control, the researchers dipped fruit in 52 degree C water for 2 minutes (apricots) or 2 1/2 minutes (peaches). The fruit was then stored at 5 degrees C and then at room temperature, both for varying lengths of time. With the apricots, heat treatment usually resulted in lower disease incidence and severity for both inoculated and noninoculated fruit. Similarly, brown rot on peaches was greatly reduced, however, some skin browning did occur as a result of the heat treatment.

Limitations. Mitcham acknowledges that she would find herself in "hot water" if she suggested that this method alone will replace chemicals. Unlike many chemicals, she notes, hot water treatments do not leave a residue for prolonged control. The potential for extended storage is therefore dependent on the degree of sanitation and other conditions after the dip. Hot water can also reduce storage life if fruit injury occurs, as noted above. "The challenge is that there is a fine line between control and injury," Mitcham says. Energy costs are also an issue, but Mitcham believes that some of the heat produced during the cooling process could be diverted to heat the water baths.

Mitcham and her colleagues have been awarded a second year of funding from SAREP to refine the hot water treatment techniques.

Industry Response. According to Mitcham, hot water baths are already practiced for decay and insect control on oranges, mangoes, and papayas. However, she has encountered widely varying reactions from growers and handlers of temperate zone fruits. "Responses range from great interest and excitement to extreme skepticism, mostly because growers have always been told to cool the fruit as quickly as possible after harvest," she says. "The idea of heating the fruit first takes some getting used to."

Chemicals have been the cornerstone of postharvest quality in the past. However, Mitcham believes that probably no single treatment will provide adequate control of decays and disorders in the future; it will likely take a combination of techniques. While CA storage and packaging hold the greatest promise, other methods may include biological control with yeasts, and increased sanitation and reduced injury during handling, along with hot water dips.

New Site, Director for USDA SARE West

Soil scientist **V. Philip Rasmussen** of Utah State University has been named coordinator of the USDA Western Region Sustainable Agriculture Research and Education (SARE) program. Administrative offices for the Western SARE Region will be relocated from the University of California to Utah. However, the public information office for the Western Region will remain at UC Davis; Kristen Kelleher will continue as the key contact for the public and news media at (916) 7525987. The move does not affect the UC's own Sustainable Agriculture Research and Education Program (SAREP) based at UC Davis.

The University of California has been host to the Western SARE program since its beginnings in the late 1980s under the leadership of **David E. Schlegel**, professor of plant pathology and a UC administrator. Western Region grant administration will be handled by Schlegel through 1994. USU will become the primary contact for grants approved in the spring of 1994.

The SARE program, which began as the Low Input Sustainable Agriculture (LISA) program in 1988, was renamed and authorized by Congress as SARE in the 1990 Farm Bill. SARE is a competitive grants program aimed at expanding food production and farming practices that are environmentally sound, economically feasible and socially responsible. The national program is directed regionally by four councils which consist of farmers, scientists, land use experts and administrators.

A multidisciplinary approach to evaluate and aid the transition from conventional to low-input pest management systems in stone fruits.

Kent M. Daane and R. Scott Johnson

Progress report to the USDA Sustainable Agriculture Research and Education (SARE) Program. 1993

During the past two years we have been working in four peach orchards owned by two large farming operations, assisting them in the transition from conventional to reduced chemical (RC) management systems. In each orchard, half of the block has been left under conventional management for comparison. Initially, we concentrated on insect pest management since several "sustainable" tools are available.

These tools, which replace broad spectrum pesticides, include oil sprays in the dormant season, a very specific insect bacteria spray (*Bacillus thuringiensis*) and mating disruption using pheromone confusion. We are also slowly bringing down the nitrogen level in the trees to help in insect and disease management and using composts, manures and/or cover crops to supply nitrogen where feasible. The results from 1993 demonstrated insect control in all four RC block to be as good or better than conventional blocks. There were some minor problems in one of the RC orchards with secondary insect pests.

Good progress was made toward a more sustainable approach to brown rot (the major fruit disease of peach) management. Three tools have shown promise: maintenance of moderately low tree nitrogen level, addition of organic composts to the soil and cleaning up of diseased, mummified fruits in the trees. In addition to less fruit disease, the application of compost to the soil has also shown a tendency toward better fruit quality and less fruit damage from insects.

Many side studies are being conducted to develop additional RC tools. These include cover crops for weed control on the berms, cover crops for nematode control and pheromone confusion for mating disruption of some secondary pests. Also, a new planting was established on University property where numerous RC techniques will be evaluated and demonstrated to large numbers of visitors.

For more information write to: Kearney Agriculture Center, 9249 S. Riverbend, CA 93648.

(CI-SUST.098)

Contributed by Kent Daane

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Soil quality and financial performance of biodynamic and conventional farms in New Zealand.

J.P. Reganold, A.S. Palmer, J.C. Lockhart and A.N. Macgregor

Science 260:344-349. 1993

This research compared the soil properties and financial performance of biodynamic and conventional farming systems over a four-year period (1987 to 1991) on the North Island of New Zealand. The comparisons were made among five pairs and two sets of farms of varying size (16 farms total). A farm pair consisted of two side-by-side farms, one biodynamic and one conventional; a farm set consisted of three adjacent farms, one biodynamic and two conventional. Representative farming enterprises in New Zealand were used: market garden (vegetables), pip fruit (apples and pears), citrus, grain, livestock (sheep and beef) and dairy. The combined data showed that biodynamic farms had better soil quality than the neighboring conventional farms (Table 1).

Reliable economic data from annual accounts were available for 11 of the 16 farms. Comparisons were made of the financial performance of the biodynamic farms both with that of their conventional neighbors and with that of the average representative conventional farm in each region. In comparing the gross margins of these farms (total farm income per hectare minus operating expenses per hectare), one biodynamic farm was greater, two were lower and two were similar to their conventional neighbors. The biodynamic farms usually had less year-to-year variability in gross margin than did the conventional farms. The biodynamic farms had lower total gross margins (gross margin times the effective enterprise area of each farm) than both their conventional neighbors and most of the conventional farms in the region. This difference was largely due to the smaller size and greater enterprise diversity of the biodynamic farms. Gross margin provides a comparison of financial performance of two farms under different management approaches, while total gross margins show the financial return to each whole farm or to the major farm enterprise.

For more information write to: J. Reganold, Department of Crop and Soil Sciences, Washington State University, Pullman, WA 99164.

(CI-SUST.097)

Contributed by Chuck Ingels

Table 1. Mean Values of aggregated soils data.

Soil Property	All bio. Farms	All Conv. Farms
Bulk density (Mg/m ³)	1.07	1.15*
Penetration resistance (0-20 cm)(MPa)	2.84	3.18*
Carbon (%)	4.84*	4.27
Respiration (l O ₂ /hr/g)	73.7*	55.4
Mineralizable N (mg/kg)	140.0*	105.9
Ratio of mineralizable N to C (mg/g)	2.99*	2.59
Topsoil thickness (cm)	22.8*	20.6
CEC (cmol/kg)	21.5*	19.6
Total N (mg/kg)	4840*	4260
Total P (mg/kg)	1560	1640
Extractable P (mg/kg)	45.7	66.2*
Extractable S (mg/kg)	10.5	21.5*
pH	6.10	6.29*
*p<0.01		

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Nitrates in relation to composting and use of farmyard manures.

P. Ott, S. Hansen, and H. Vogtmann

Lockeretz, W. (ed.). 1983. Environmentally Sound Agriculture; Selected papers from the 4th International Conf. of the IFOAM, Cambridge, Mass., 8/18-20/92. Praeger Publishers, NY. pp. 145-154.

This chapter presents an analysis of several experiments conducted in Europe. The research focused on the effects of organic fertilizers on nitrate leaching, and includes data from composting, lysimeter, and field plot experiments.

Manure Use on Organic and Conventional Farms

The authors make a clear distinction between the underlying reasons for using manures on farms in Europe. In the conventional system, manure is viewed as a waste which must be disposed of in the cheapest and most convenient way possible. With organic farming methods, on the other hand, manures are a valuable means for transferring nutrients from one part of the farm or region to another. According to the authors, many nitrate leaching studies have been conducted using systems based primarily on the disposal of manures. As a result, the negative aspects of such disposal are emphasized, such as runoff and nutrient accumulation within a watershed; these aspects are then attributed to the organic system as well. The organic system is viewed by many people as relying solely upon manures to supply nutrients and is therefore considered by these people to be more polluting than conventional farms.

<i>Table 1. Changes in organic matter and nitrogen (N); phosphorus (PO), and potassium (K2O) content of farmyard manure during composting (average of 16 different composting windrows).</i>					
	Length of composting period				
		(months)			
Calculation basis¹	Nutrient	0	2	4	12
Organic matter as percent of initial organic matter		100	68	46	38
Percent of current dry matter	N	2.1	2.9	3.0	2.6
	P ₂ O ₅	1.1	2.0	2.1	2.3
	K ₂ O	1.6	1.6	2.4	2.5
Percent of initial amount	N	100	95	86	76
	P ₂ O ₅	100	109	100	100
	K ₂ O	100	90	90	72

¹ figures are average of values from 16 different composting windows

Nutrient Losses During Composting

This experiment utilized four compost windrows which served as the control treatments in a larger mineral additive study. The material was composted for 8 months. The composting area was designed to allow collection of the leachates from the individual compost piles. The authors present data from a previous composting experiment showing the changes in nutrients after composting (Table 1). The organic matter content decreased substantially over the composting period; the loss of carbon led to increased concentration of most nutrients. In absolute amounts, phosphorus was very stable, while nitrogen and potassium were lost at a similar rate.

Results from the present experiment show that nitrate loss in the leachate was relatively low (Table 2). On a quantitative basis, the loss of nitrate was less than 0.1 pound of nitrate per ton of fresh manure over the composting period. Much of the nitrogen was likely lost to volatilization. Conversely, potassium escapes mainly, if not exclusively, in a water soluble form.

Lysimeter Study

Three different fertilizers, all applied on a nitrogen-equivalent basis, were tested for nitrate leaching over 2 1/2 years: stockpiled farmyard manure (FYM), composted FYM, and "NPK fertilization." The fertilizers were applied to soil in lysimeters (metal cylinders) 38 cm in diameter and 60 cm tall. The initial application of chemical nitrogen to a crop in the winter led to a much more rapid migration of nitrate in the soil than did the organic fertilizers. During the following winter fallow (after no fertilizers were applied in the fall), this trend reversed. This pattern demonstrated the slow release effect of manures and the need for cover cropping during the winter to conserve nitrate. Nitrate leaching (and availability) was usually less with composted FYM than with stockpiled FYM.

Field Study

The field experiment was designed to evaluate nitrate leaching after fertilization with an "NPK fertilizer," FYM, and composted FYM. The materials were applied at two nitrogen rates (50 to 80 kg/ha or 100 to 160 kg/ha) to plots of corn and wheat crops over three years.

Composted FYM led to the greatest increase in both soil organic matter and soil nitrate content in the top 30 to 40 cm. However, at the 120 cm depth (below the root zone), the chemical fertilizer plots had two to three times more nitrate than the organically fertilized plots. Leaching at this depth in the organically fertilized plots did not differ from each other nor from the control plots. The authors hypothesized that the high nitrate values obtained in the upper soil levels with compost were due to mineralization occurring at a time when the crop did not take it up anymore. Nitrate has the same leaching potential from mineral or organic fertilizers, however, the presence of lignin degradation products (from compost) may regulate mineralization or nitrate mobility. While nitrate levels in the root zone were highest in the composted plots, corn yields with compost were lower than yields with manure, probably because of the reduced availability of nitrate.

For more information write to: Research Institute for Biological Farming,
Oberewil, Switzerland.

	Fresh Weight basis (ppm)	Dry Weight basis ¹ (%)
Total Nitrogen	49	4.5
Nitrate	36	3.3
Phosphorus (P ₂ O ₅)	21	1.9
Potassium (K)	280	25.5

¹ Dry weight is 0.11 percent of fresh weight.

(C1-SWN.122) *Contributed by Chuck Ingels*

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Two new California farm labor studies.

Mixtec migrants in California: A new cycle of poverty

by Carol Zabin, Michael Kearney, Anna Garcia, David Runsten, and Carole Nagengast. 1993. California Institute for Rural Studies, Davis, CA. 183 pages.

California's agricultural dilemma: Higher production and lower wages

by Don Villarejo and Dave Runsten 1993. California Institute for Rural Studies, Davis, CA. 48 pages.

Just and humane treatment of farmworkers is an important component of sustainable agriculture. Despite encouraging advances toward more sustainable food and agricultural systems over the past decade, conditions for farm laborers have declined. Two recent reports by the California Institute for Rural Studies document and explain this trend.

The first report, *Mixtec Migrants in California Agriculture: A New Cycle of Poverty*, examines the living and working conditions experienced by indigenous migrants from the Mexican state of Oaxaca. The report is derived from a detailed interview-based survey of 131 Mixtec farmworkers, as well as ethnographic field work in both Mexico and the U.S.

The authors estimate that 20,000 to 30,000 Mixtecs now reside in California, representing between five and ten percent of the agricultural labor force. Having fled their homeland due to the economic crisis in Mexico during the early 1980s, the Mixtecs are among the most impoverished workers in the U.S. today. The cultural heritage of the Mixtecs poses special barriers to integration into American society. Most Mixtecs speak neither English nor Spanish, and are subject to racism even from other Mexican workers due to their distinctive appearance and language.

Because of the difficulty in defining the exact parameters of the Mixtec farmworker community, a random sample was not employed in this study. Instead, a "snowball" sample was derived by building on initial local contacts. Since this type of sampling is typically biased toward emphasizing specific social networks, the authors were careful to select representatives of 41 different Oaxaca towns.

If anything, the sample is probably biased toward better-than-average employment situations. The authors spoke only with those Mixtecs who had some Spanish or English language capability, thus missing those made particularly vulnerable to exploitation due to a language barrier. Also, workers experiencing the worst conditions were most likely to be inaccessible to the interviewers.

Among the key statistical findings of the study are the following:

- Mixtec farmworkers earned less than the minimum wage in one-quarter of the jobs in which they were employed during 1989-90, and almost one-half had worked in at least one job paying less than minimum wage.
- Mixtecs are subject to high labor standards violations, with over one-quarter of those interviewed reporting nonpayment of wages on at least one occasion.
- Mixtecs are concentrated in jobs in which payments for obligatory services such as rides to work are a condition of employment.
- Mixtecs are concentrated in jobs with short duration, and are more migratory compared to other Mexican farmworkers.

The authors argue that Mixtecs are the latest in a historic cycle of ethnic replacement in California farm labor. Farm employers have turned to successive groups—Chinese, Japanese, Filipino, "Okie," and mestizo Mexican workers—to maintain the cheap labor supply on which California's agricultural economy depends. Mixtec migrants constitute a large pool of new labor which can be hired for lower wages. The hiring of these laborers has the effect of undercutting gains in wages and working conditions made possible for mestizo Mexican farmworkers during the 1970s. As evidence, the authors cite the ten percent decline in real wages for California farmworkers over the past decade. The authors also provide a detailed case study of how ethnic replacement has impacted the farm labor market for the raisin grape harvest in the San Joaquin Valley.

The second report, *California's Agricultural Dilemma: Higher Production and Lower Wages*, is a statistical profile of how recent changes in agricultural production have combined with immigration policies and other forces to lower farm wages. Significant acreage increases in fruit, vegetable and horticultural crops have increased labor demand by some 20 percent over the past 15 years. At the same time, economic crisis in Mexico and the 1986 immigration reform law have dramatically increased the supply of labor. Rather than a labor shortage once feared by growers, a tremendous oversupply of farm labor exists. This oversupply is correlated with a large decline in real wages during the 1980s.

Among the key findings of the report are the following:

- Hired labor accounts for at least 80% of all the work performed on California farms.
- Just one-half of the farms in California are owned and operated by farmers. The other half are owned by individuals whose principal occupation is something other than farming.
- Wage reports submitted by employers identify about 881,000 different farmworkers in California. However, annual average employment is much lower, since most farmworkers experience long periods of unemployment between jobs.
- At least half of all farmworker families live in poverty, as determined by their median family income and family size standards determined by the federal government.

Reviewer Comments

Both of these reports demonstrate the deteriorating conditions for California farmworkers. Many people hoped that successful union organizing during the 1970s would reverse the historic pattern of the treatment of farm laborers as second class citizens. However, events of the past 15 years have undercut the gains made at that time and have led to conditions that in many respects are even worse than those in the early 1970s. Future organizing efforts will be extremely difficult given the current oversupply of labor, and the likely prospect of continuing immigration.

Immigration reform and more vigorous enforcement of labor regulations are clearly needed. Ultimately, however, these are only partial solutions. As the authors of the Mixtec report conclude, the long-term solution must be sustainable development in Mexico, along with sustainable rural community economic development in our own state. In the emerging global economy the structural ties linking rural Mexico and rural California are increasingly evident. Given our shared fate, it will be critical to sustain vital communities by promoting locally-controlled development projects both here and in Mexico. The work of Mixtec self-help organizations, described in the CIRS report, provides one model of how this vital work is beginning.

Both reports can be ordered from the California Institute for Rural Studies, P.O. Box 2143, Davis, CA 95617, (916) 7566555. The Mixtec migrant report is \$12.50, plus \$4.00 for shipping and handling; the second report is \$7.50, plus \$1.50 for shipping and handling.

(CI-SUST.099)

Contributed by David Campbell

Resources

Farmer Magazine Debuts

Farmer-to-Farmer, a bimonthly publication published by The Community Alliance with Family Farmers. The new magazine highlights innovative farmers and farming practices in California. Each issue features an in-depth analysis of an innovative farmer or farm couple, including information on how they made the transition to more sustainable farming practices. Detailed transition plans and economic analysis are included. The magazine also contains farmer observations and essays, and other technical information of interest to farmers and agricultural professionals. Edited by Susan Benson, the magazine is available for \$ 15 by contacting Farmer-to-Farmer, PO Box 73674, Davis, CA 95617; tel: (916) 758-7428.

Organic/Low Input Farming

The Real Dirt, 1994, 272 pages, edited by **Miranda Smith** and members of the Northeast Organic Farming Association. Funded by the Northeast Region Sustainable Agriculture Research and Education (SARE) program. The book presents basic information on organic or low-input farming methods. Aimed at farmers and Extension agents, it includes information on vegetable, fruit, agronomic crop and livestock production. The illustrated book includes a full index, a glossary and profiles of farmers, plus an extensive list of contacts. To order, send check or purchase order for \$13.95 to Sustainable Agriculture Publications, Northeast Region SARE/ACE programs, Drawer 4910, Hills Bldg., University of Vermont, Burlington, VT 05405-0082. For information on bulk discounts and rush orders, call (802) 656-0554.

Humane Animal Producers

The Humane Consumer and Producer Guide, 368 pages, 1993, edited by **Melanie Adcock, Richard M. Clugston, Don Deichman, Terry Gips, Stephen Ronan, Lathi Taylor** and **Ellen Truong**. The *Guide* is published by The Humane Sustainable Agriculture Program of The Humane Society of the United States, and The Humane Sustainable Agriculture Project of the International Alliance for Sustainable Agriculture. It is the first national listing of farmers and ranchers identified for their humane treatment of animals and sustainable farming practices. In addition to farmers and ranchers, the more than 1400 entries include research and education organizations, as well as restaurants and stores that sell products from these producers. The *Guide* includes appendices with information on humane sustainable agriculture terms and principles, labeling laws and marketing. To order, send checks for \$15 payable to The Humane Society of the United States (The HSUS) at 2100 L St. NW, Washington, DC 20037; tel: (202)

452-1100 or fax: (301) 2583081. (Members of either co-publishing organization deduct \$2 per copy.) Farmers, ranchers, businesses or organizations interested in being listed in the Guide may contact The HSUS at the above address.

Sustainable Landscape

Gray World, Green Heart: Technology, Nature, and the Sustainable Landscape, 352 pages, 1994, by **Robert L. Thayer, Jr.**, John Wiley & Sons, Inc. Thayer, a professor of landscape architecture and environmental design at UC Davis, writes that from Mall of America to CityWalk in Universal City to Disney World in Orlando, Florida to the Mirage Hotel in Las Vegas, creating and enjoying fantasy environments is an American obsession. It seems easier, he writes, to make superficial copies of the landscape rather than to save the actual landscape. But now Americans are at a crossroads, even feeling "environmental guilt" over technological changes to the landscape. Thayer argues this crossroads demands that people consider the landscape in terms of sustainability. To order the book, send \$39.95 to John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158 or call (800) 225-5945 ext. 2497. Wiley & Sons pays shipping and handling on prepaid orders.

Nitrogen Fertilizer Video

Best Management Practices for Nitrogen Fertilizer and Water Use in Irrigated Agriculture, 30 minutes, 1993, produced by the California Department of Food and Agriculture's Fertilizer Research and Education Program (FREP). Widespread use of nitrogen fertilizer has created concerns about nitrate groundwater contamination. This video is the first in a series to help growers improve the way fertilizer and water is used to reduce potential nitrate groundwater contamination and increase profitability. It includes information on how to improve timing and placement of nitrogen fertilizer, sample and analyze soils for residual nitrate content, application of organic amendments to croplands, and use of nitrification inhibitors with certain fertilizers. Water management suggestions include using drip irrigation to reduce deep percolation and runoff from croplands, using surge flow techniques with furrow irrigation, and adjusting sprinkler irrigation rates based on soil type and slope. A second video specifically for vegetable growers is scheduled for release in mid 1994. The video and study guide are available for \$20 from **Debbie Scott** or **Casey Walsh Cady** at FREP California Department of Food and Agriculture, 1220 N St., Rm. A-372, Sacramento, CA 95814; tel: (916) 643-5340 or 654-0574; fax: (916) 653-2407.

Mixtec Video

Invisible Indians: Mixtec Farmworkers in California, 43-minutes, 1993, color, produced by the Division of Information Technology, UC Davis, for **James Grieshop**, Department of Applied Behavioral Sciences, and **Stefano Varese**, Department of Native American Studies. This video provides an interdisciplinary look at the history, culture and current social and economic conditions of the Mixtec people of Oaxaca, Mexico. It examines the factors causing increasing numbers of Mixtecs to become migrants, living part of the year in Oaxaca and part in California, where they make up between five and

ten percent of the agricultural work force. The video provides an introduction to Mixtec culture and background information for understanding the role of migrant farmworkers in California and America. An instructor's guide comes with the video. The video may be purchased for \$195 or rented for \$50 from University of California Extension, Center for Media and Independent Learning, 2176 Shattuck Ave., Berkeley, CA 94704; tel: (510) 642-0460; fax: (510) 643-8683.

Draft Animal Video

Bred for the Furrow, 37-minutes, 1993, color, produced by the Division of Information, UC Davis for **William Chancellor**, Department of Agricultural Engineering. Winner of Gold Award at San Mateo County Fair, Best Documentary at Solano County Fair. This three-part video shows that draft animals remain a viable alternative to tractor-powered farming. It covers the use of draft oxen, horses, mules, hinnies, and donkeys. Part One explains why draft animals are still used worldwide and shows the fitting and care of the harness and yoke. Part Two demonstrates how to evaluate draft animals and conduct a basic physical examination. Part Three examines the selection, fitting, and maintenance of harnesses, yokes, and other equipment. It also shows basic precautions that will prevent injuries to work stock. Available for \$125 (rental \$45) from University of California Extension, Center for Media and Independent Learning, 2176 Shattuck Ave., Berkeley, CA 94704; tel: (510) 642-0460- fax- (510) 64.R-8683.

Dairy Book

THE DAIRY DEBATE: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies, 1993, 372 pages, UC SAREP. Edited by **William C. Liebhardt**, UC SAREP director Other authors include **Gail Feenstra**, SAREP nutritionist and food systems analyst; **David Campbell**, SAREP economic and public policy analyst; **Leslie "Bees" Butler**, UC Davis Extension dairy economist; **Gerry Cohn**, UC Davis Agricultural economist; Kathleen Byrnes, sustainable systems writer; **David Kronfeld**, the Paul Mellon Distinguished Professor of Agriculture and professor of veterinary medicine at the Virginia Poly technical Institute and State University, Blacksburg, VA; **William Murphy**, professor of agronomy, University of Vermont; **John Kunkel**, veterinarian, West Virginia University; and **Edward B. Rayburn**, Extension forage agronomist, West Virginia Extension Service. The multidisciplinary team of re searchers compare how bovine growth hormone and rotational grazing, a flexible system of pasture management, affect a wide range of factors-individual cows, farms, farmers, farm families, rural communities and consumers. To order, send \$31.50 (includes postage, handling and applicable taxes) to ANR Publications, University of California, 6701 San Pablo Ave., Oakland, CA 94608-1239; tel: (510) 642-2431; fax: (510) 642-5470. Checks are payable to UC Regents; MasterCard and VISA may be used for fax orders.

Cover Crops Videos

Creative Cover Cropping in Perennial Farming Systems, 1993 (V93 W) and *Creative Cover Cropping in Annual Farming Systems*, 1993 (V93-V), produced by **Robert Bugg**, UC SAREP. Cover crop ping is a key tool in

sustainable agriculture, and is especially useful in orchards and vineyards. The video covering perennial farming systems explains how to use cover crops to protect and improve soil fertility, enhance pest control, and provide other benefits. Cover cropping presents special challenges when used with annual row and field crops. The annual cover crop video depicts both opportunities and constraints in using cover crop with annual crops. Both videos present a wide array of plant materials and management options. The videos are \$20 each (VHS format, includes postage, handling and applicable taxes). Checks should be made payable to UC Regents. Checks, VISA or MasterCard payment should be sent to UC Visual Media, University of California, Davis, CA 95616-8748; fax: (916) 757 8991. The videos may be rented for \$ 7 in California and \$ 10 out of state. For other tape formats call (916) 757-8980.

Soil Management Proceeding

Proceedings: Sustainable Soil Management Symposium, April 22, 1993, UC Davis. 90 pages. Co-sponsored Soil Management Proceedings by UC SAREP and the UC Small Farm Program, the symposium addressed the rationale and methods for improving soil quality through periodic additions of organic matter. Two research projects comparing conventional and alliterative production systems were also presented. The proceedings includes articles submitted by symposium speakers as well as selected articles from peer-reviewed journals. To receive a copy, send a check for \$10 to UC SAREP University of California, Davis, CA 95616. Checks are payable to UC Regents.

Weed Video

Cultural Weed Control in Vegetable Crops, 1993 (V93-E), produced by **Tom Lanini**, UC Davis Botany Extension, funded by UC SAREP The 18-minute video describing sustainable weed management is narrated by **Robert Bugg**, UC SAREP cover crops and restoration analyst. it examines California organic growers' row crops weed control practices from bed preparation prior to planting through the growing seasons. The videotape's technical narration explains why and how these practices work. Although it is aimed at growers interested in reducing herbicide use, the video is suitable for a general audience. The video includes two versions of the same information: the first is a straight-forward presentation, while the second is narrated in a light-hearted "down-home" style. It may be ordered in VHS format for \$40 (includes postage, handling and applicable taxes.) Checks should be made payable to UC Regents. Checks, VISA or MasterCard payment should be sent to UC Visual Media, University of California, Davis, CA 95616-8748; fax: (916) 757-8991. The video may be rented for \$7 in California and \$10 out of state. For other tape formats call (916) 757-8980

Citizen/ Policymaker Guide to Biotech

In Our Back Yard, 1993, by The Biotechnology Working Group, Minnesota Food Association. This handbook for citizens and policy makers is designed to help those interested in enacting legislation at the state or municipal level to assure the safe introduction of genetically engineered organisms into the environment. The handbook includes principles of state regulation; the pros

and cons of state regulation; case studies; model state laws; and lists of individuals and organizations nationwide who can provide assistance on biotechnology issues. The cost is \$5 per handbook, or \$ 3.50 per handbook plus postage on orders of ten or more. Checks are payable to Minnesota Food Association, 2395 University Ave., Room 309, St. Paul, MN 55114; tel: (612) 644-2038

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Sources of Funding

Fertilizer Research Awards

Requests for Proposals from the California Department of Food and Agriculture's Fertilizer Research and Education Program are now available. Funding will be available for projects directed toward the environmentally safe and agronomically sound use and handling of fertilizer materials. Proposals are due April 7, 1994. For details and to be put on this or future proposal request mailing lists, contact **Jacques Franco** or **Debbie Scott** at CDFA, (916) 654-0574

Organic Research Grants

The Organic Farming Research Foundation is offering funds for organic farming methods research, dissemination of research results to organic farmers, and growers interested in making the transition to organic production systems, and education of the public about organic farming issues. Projects should involve farmers in both design and execution, and take place on working farms whenever possible and appropriate. Proposals of \$3,000-\$5,000 are encouraged. Most projects will be less than \$10,000. Matching funds from other sources and/or in-kind contributions from cooperators are encouraged but not required. Proposals are considered twice a year. The next round of proposals must be received by July 31, 1994. To receive copies of grant application procedures and the "OFRF Research and Education Priorities" which describes target areas, write Grants Program, Organic Farming Research Foundation, P.O. Box 440, Santa Cruz, CA 95061 or call (408) 426-6606.

'Train the Trainers' Grants

Two Calls for Proposals aimed at educational institutions, nonprofit groups and farmers are expected to be released soon from the USDA-sponsored Western Region Sustainable Agriculture Research and Education (SARE) program. Individuals, groups and educators are being sought to help the Cooperative Extension Service train its agents in sustainable agriculture. The 1990 Farm Bill mandated that Extension Service and other USDA agency personnel increase their understanding and proficiency in sustainable agriculture; in 1993, for the first time, Congress approved funding for this provision. The \$2.96 million allocated will establish training programs in each of the four USDA SARE regions. In the Western region, two CFPs will be released shortly: one for a regional coordinator of an envisioned educational network/consortium, and another for potential training projects. Development and oversight of the educational training "network," including the selection of the coordinator, will be handled by the current Western

SARE administrative council and staff. Interested individuals and groups should contact the Western Region SARE office in Oakland at (510) 987-9862 to get on the mailing list for the expected CFPs.

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Owl Box Survey- We Need Your Help!

Have you or someone you know constructed a perch or nesting box for raptors (hawks and owls) to help control rodents? If so, we would like you to complete a survey on the role perches and nesting boxes play in controlling these pests. We are interested in learning about both successes and failures in attracting raptors or controlling rodents.

Farmers and gardeners from around the country have built perches and nesting boxes to attract raptors, in part because of the success of a Merced County almond grower who achieved phenomenal gopher control after he constructed several owl boxes. His story and research highlights were featured in the Fall 1992 issue of *Sustainable Agriculture* and in several magazines. To participate in the survey, or to obtain a copy of the SAREP article which includes perch and box diagrams, write or call Chuck Ingels, SAREP Information Group, University of California, Davis, CA 95616; tel: (916) 757-3276; fax: (916) 757-3281; e-mail: caingels@ucdavis.edu.