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Cooperative Effort

Two recent workshops for citrus and grape producers are examples of cooperative efforts to present information on developing more profitable, environmentally sensitive production systems. The workshops were organized by farm advisors, extension specialists, faculty researchers, farmers and ranchers, University Extension and the UC Sustainable Agriculture Research and Education Program. Both gatherings were sold out.

Participating UC farm advisors, extension specialists and faculty researchers offered existing information, added new material and presented a "state of the art" approach to the changing environment in which farmers and ranchers find themselves. Surveys of growers at the workshops show that almost all learned new information about their commodity, and almost all indicated they want more information on cover crops and green manures, and alternatives to chemicals for managing weeds, insects, mites, nematodes and diseases. At the workshops growers expressed interest in production systems that reduce costs, address consumers' changing tastes, enhance environmental quality and protect human health.

The interest is there. Growers do not want to be left behind when changing regulations eliminate some of their tools. Clearly, we will not always have all the answers necessary to help them. But research is catching up with agriculture's challenges. Our program is trying to make the information that already exists available to anyone who needs it, and we are committed to supporting new research-based information.

If your workgroup or commodity group is interested in a workshop integrating existing and new information about these issues, the Sustainable Agriculture Research and Education Program will work with you to make it happen. We are here to help address the concerns of both growers and the public about the production and marketing of crops and animals in California.

- **Bill Liebhardt**, *director, UC Sustainable Agriculture Research & Education Program.*

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Tomatoes? Data Base is Underway

Review of management practices for tomato cropping systems in the last year has revealed the importance of soil maintenance, and significant research gaps in that area. As a result, a tomato cropping systems data base is being developed by the University of California Sustainable Agriculture Research and Education Program (SAREP). The data base will be useful in guiding research, producing extension bulletins and organizing workshops. Dave Chaney, SAREP farming systems analyst, has focused information gathering efforts on soil management for tomato-based crop rotations. A 15-member Tomato Cropping Systems Advisory Group made up of farm advisors, farmers, faculty, specialists and processors met in October to evaluate and give direction to the data base.

The advisory group discussed the literature search and the process of interviewing farmers, researchers and specialists. Both activities are emphasizing tillage, crop rotations, irrigation, soil fertility and organic matter, and weed management. Despite the tremendous range of growing areas for this crop (Imperial to Colusa counties in the interior, Orange to Monterey counties along the coast), several common themes have emerged during the initial stages of information gathering. These are: soil compaction and crusting, the need for more precise and efficient water management, crop rotations that are governed more by short-term economic considerations than by long-term soil health, nightshade weed control, urbanization pressures and increasing costs of production.

The advisory group will be reviewing information about the solutions to these and other challenges facing processing tomato growers in California. If you have information you would like to share (literature, experiences, ideas) about soil quality issues in tomato or other annual cropping systems, please contact Dave Chaney at (916) 752-7556.

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"Chemicals in the Human Food Chain" Study Group Results

Two complete study group reports, five videotapes and proceedings from the UC Agricultural Issues Center's 1987-88 study on "Chemicals in the Human Food Chain: Sources, Options and Public Policy" are now available. They are:

"Agricultural Chemicals in California Plant Production: Are There Alternatives?" The report considers five case studies: tomatoes (all pesticides), almonds (navel orangeworm), grapes (botrytis bunch rot), rice (herbicides), and citrus (all pesticides). Information is given on each cropping system, providing background for evaluating the appropriateness of the alternatives considered. The current conventional cropping system is described, integrated pest management principles that apply are discussed and, where possible, the level of adoption of IPM practices is presented. Finally, within the framework of the IPM strategy, an overview of other alternatives being practiced or considered by growers and researchers is reported. The goal is to explore how California farmers can make the transition to production systems that meet consumer demands, are profitable, and are environmentally sound. ($15.00)

"Regulating Chemicals: A Public Policy Quandary" The study group on public policy was concerned with society's mechanisms for dealing with chemicals, including criteria for food safety, risk assessment, and the regulatory environment. It solicited the different perspectives of participants in the policy process. Workshops and interviews were conducted with consumer groups, food producers, processors, retailers, chemical manufacturers, risk assessors, and regulators. Areas of common ground were identified including: universal concern about food safety standards, the need to improve the scientific data base used in assessing benefits and risks from chemical technology, and the need for more effective, less costly regulations. Underlying these common objectives are different perspectives about the source of the problems and possible solutions. The report contributes to a better understanding of these differing views, which can help us to set priorities in allocating our scarce regulatory resources and provide new insights into achieving compromise. ($10.00)

Proceedings of the June 1988 Sacramento symposium on "Chemicals in the Human Food Chain: Sources, Options and Public Policy" Includes shorter versions of the study group reports. ($15.00)

Five professionally produced videotapes of highlights of the June 1988 Sacramento symposium "Chemicals in the Human Food Chain." Designed for informational meetings and classrooms, the tapes feature scientists, farmers, and others discussing sources of chemicals in food, alternatives to chemical use, and regulatory policy issues. Each tape is 30 minutes in length. They are:

(1) Sources of Chemicals in the Human Food Chain; (2) Regulating Chemicals in Food: A Public Policy Quandary; (3) Alternatives to Chemical Use: Plant Products; (4) Alternatives to Chemical Use: Animal Products; and (5) Alternatives to Chemical Use: Postharvest Handling/Processing. Prices are $50 for 3/4-inch tapes (professional broadcast size) and $35 for 1/2-inch (standard VCR).

Reports and proceedings may be ordered through the UC Agricultural Issues Center at Davis, (916) 752-2388 or the Publications Dept., UC Division of Agriculture and Natural Resources, 6701 San Pablo Ave., Oakland, CA 94608. Tapes are available through the UC Ag Issues Center. Three additional reports from the study will be available in March.

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Citrus, Grape Meetings Attract Large Audiences

New Directions for Citrus at UCR

Seventy-five growers, managers, consultants and researchers convened at UC Riverside November 16 for a one-day session on "New Directions in Citrus Production and Management" co-sponsored by the UC Sustainable Agriculture Research and Education Program (SAREP), Cooperative Extension and University Extension. Organized by John Freeman of UC Riverside and the SAREP, the program emphasized changes in citrus management that can help growers maintain production and increase profits despite increasing water prices, new restrictions on agricultural chemical use, and the challenge of operating on the expanding urban fringe.

Bill Liebhardt, director of the SAREP, began the day with an overview of the statewide program. **Peter Stoddard** and **Mark Pepple** of the California Department of Food and Agriculture explained how CDFA is implementing environmental regulations, particularly the Groundwater Contamination Prevention Act (AB2021). The regulations will lead to new restrictions and increased record keeping on the use of pesticides that have been detected in groundwater. Although the increased record keeping is a nuisance, the development of specific use restrictions has enabled CDFA to maintain use of chemicals that would have been banned completely in the past.

For the rest of the day, speakers described ways in which citrus production could become more environmentally and economically sound. Conserving water and improving crop health are the two goals of the Department of Water Resource's six Mobile Irrigation Labs, according to **Margarita Engels**, who described the Fallbrook lab's services to growers. Irrigation efficiency of groves studied varied from 27 percent to 95 percent. She noted that improving efficiency can increase crop yield, conserve water and energy and save up to $20-30,000 per year for a 100 acre grove.

Floor management is moving away from total weed control toward a managed cover, said UCR Professor **Lowell Jordan**. This will require more careful monitoring. Future management of citrus grove vegetation is likely to involve the use of cover crops, herbicides, cultivation and bio-control.

The principles of manures and composts as fertilizers and soil amendments were described by **Bill Liebhardt**. He said the primary benefits are in soil structure and

result in increased infiltration of water and the boosting of P and K. Macro and micro-nutrients are more evenly available due to the slower time-release nature of manure, he said. He was joined by emeritus Professor **Tom Embleton** who drew upon his years of research in citrus nutrition. "Nothing

beats organic matter for improving soil structure, but you must keep adding to it," said Embleton.

Nick Sakovich, Ventura County Farm Advisor, discussed the characteristics of rootstocks that might affect their ability to be managed with reduced inputs. The increased availability of a wide range of rootstocks makes it possible to choose one that is adapted to soil, pest and climatic conditions in a specific grove.

Area Integrated Pest Management Advisor **Phil Phillips** provided an extensive overview of IPM and biological control topics. Re said the key consideration in pest management is "does it pay?" Detailed studies of pest infestations have show that pest levels previously used for control decisions have often been set much too low and much money has been wasted on control when toleration of some damage and protection of existing checks and balances would provide increased profits.

A diverse panel of growers and grove managers wrapped up the program. **Bill Jessup**, a small organic grower in Coachella, said that irrigation and vegetation management are key issues. He would like to switch from flood to minisprinklers, but doesn't want to use herbicides. **Steve Moore** wanted to reduce his costs and didn't intend "go completely organic" when he began changing his practices in 1982. He said he believes his white clover cover crop is the key to his success, and said researchers should look at the whole system, including nutrients, soil health, and pest dynamics "from the top of the tree to three feet down in the soil." **David Pommer**, manager of 500 acres of citrus, described his use of chemicals that don't create secondary pest problems, and his use of manure to improve soil tilth. **Chuck Badger** drew upon his experience in the grove management business since the 1920s for several observations, including: irrigation is the key to tree health; pest management must be locally adapted; and applied research has been badly neglected in recent years. **Dave Matias** described the changes since 1911 in Corona Foothill Ranch's 1500 acres of citrus, including the move from furrow to drip to minisprinklers. "People call us crazy," he said, for skirt pruning, topping, and hedging, chopping the brush and leaving it in the middles. Six or seven inches of mulch have built up in their lemons in this way in seven years, however, and as a result they use herbicides only under the trees, and not at all in the middles.

The range of old and new ideas involved in "new directions" is as diverse and exciting as those who gathered to discuss them. The UC SAREP thanks our co-sponsors, as well as moderator **Paul Moore**, retired director of University research operations.

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Small Farm Resource

Are you a small farmer or are you a farm advisor with small farmer clients? The Small Farm Center at UC Davis is an excellent resource organization designed for farmers, farm advisors, researchers, organizations, and consumers who need research results, publications and educational programs aimed at small farm topics. The Center helps organize and co-sponsor major statewide events including the "Farm Conference" and the "Tasting of Summer Produce". Staff members cooperate with local organizations to sponsor regional educational activities. It has co-sponsored conferences and workshops on transitional farming, organic farming methods, marketing and specialty crops.

The Center maintains a library of books, magazines, reports and slides. Numerous publications, including a free bimonthly newsletter "Small Farm News" are available from the Small Farm Center, University of California, Davis, CA 95616. (916) 752-6690.

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Visalia Conference Addresses Reduced Inputs in Grapes

In spite of thick San Joaquin Valley fog, it was standing room only for 200 people who attended a one-day conference December 6 in Visalia, California, sponsored by Cooperative Extension, University Extension, and the UC Sustainable Agriculture Research and Education Program.

Bob Sheesley, Fresno County Cooperative Extension Director, ran the morning session, which began with Extension Viticulture Specialist **Pete Christensen** describing site, variety and rootstock considerations from a low-input perspective. This information is not just important for new vineyards, but also for established growers who want to reduce their inputs and need to know what problems they may or may not be up against**. Bill Peacock**, Tulare County Farm Advisor, discussed floor management from the perspective of reducing in-puts in order to improve profitability, reduce chemical inputs, reduce energy use and labor costs, and maintain the integrity of the soil. "In middles management, reduced tillage probably best meets these objectives," he said, along with re-seeding cover crops such as Blando brome, certain fescues, bur clover, and rose and crimson clovers. Along the vine rows, French plows or down-the-row tillers can be used instead of herbicides.

Pete Christensen then expanded on the use of cover crops as a nitrogen management tool. A legume can add nitrogen, whereas a cereal can manage excess nitrogen and prevent it from leaching into the groundwater. Many cover crops, particularly legumes, can cause nematode build-up, cautioned **Mike McKenry**, nematologist at UC's Kearney Agricultural Center in Parlier. Blando brome and Cahaba white vetch are two that look good so far, but not all data are complete. **Bill Barnett**, Area Integrated Pest Management Advisor at Kearney, discussed his experiences with insects and cover crops. Advantages of cover crops include reduced summer temperatures and reduced dust, both of which reduce mites and other pests, and increased diversity which makes it less likely that one pest will dominate and cause problems. Nectar can increase hymenopterous parasites (which help control Omnivorous Leaf Roller, and Grape Leaf Folder) and pollen can help support prey that, in turn, keep western predator mite populations high enough to control damaging spider mites. Some damaging insects may also build up with cover crops, but management practices such as timing of mowing can help. Overall, he said he believes cover crops have more good than bad effects on insects. **Bill Liebhardt**, UC SAREP director, concluded the morning with a discussion of manures and composts. While the principles of posting are clear, he said we really don't have much research-based information in California.

After lunch, Tulare County Director **Curt Lynn** took over as moderator, when pest management became the focus. Fresno County Farm Advisor

Harry Andris discussed control of powdery mildew with wettable sulfur and sulfur dust, and the control of worms with sodium fluoaluminate and the virus *Bacillus thuringiensis,* which fit well into a program of reduced inputs as they are non-disruptive and host-specific. **Bill Barnett** discussed the control of other insects and mites through cultural methods and the use of least disruptive materials carefully applied. **Jim Marois**, of UC Davis's Plant Pathology Department, described his research on leaf removal for bunchrot control, and the striking observation that leafhoppers are also reduced by leaf removal. As a pathologist, he said he wouldn't have noticed this effect, but the growers he was working with discovered that they didn't have to spray for hoppers after the canopy management experiments began. "Every time you do one thing differently, it changes the whole story," he said. **Don Luvisi**, Kern County Farm Advisor, gave the final UC presentation, describing various trellising schemes and noting that the effect of trellising on vine vigor and health is important in reducing inputs.

A four-person panel of growers and packers concluded the day-long event by describing their own transition to reduced-input methods. Raisin grower **Gerald Swanson** recounted how he made an abrupt transition from chemicals when he suffered economic hard times, and got a good crop the first year although his vines "looked terrible." **Chris Steggall** of Bonner Packing said that growers making the transition should monitor pests for one or two years before the transition and release beneficials until natural levels are reestablished. Stone fruit and table grape grower **Paul Buxman** and his colleague in the new "California Clean Growers Association", **Fred Smeds**, emphasized the central role of the cover crop in their vineyards. Buxman and Smeds agreed that, while there are many advantages to farming without so many chemicals, the best one is that "farming is fun again" and their children want to stay involved in farming.

Reactions to the program were positive from the diverse audience, ranging from growers with a few acres to those managing thousands. Plans for follow-up publications and/or a repeat of the workshop are under discussion, to reach the 75 people who had to be turned away from this workshop, and the many more who may be interested as they hear about it. **Bill Peacock, Pete Christensen, Mike McKenry**, and University Extension's **Dennis Pendleton** who planned the day's program, and their colleagues who participated, have set a high standard for UC's response to growers' needs during this time of transition.

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World Green Front Report

"The International Green Front Report" is a 194 page review of periodicals, books, organizations, projects, and people involved in worldwide reforestation. Compiled and edited by **Michael Pilarski** of Friends of the Trees Society, this information-packed volume includes references and articles on remineralization, tropical rainforests and agriculture, arid and semi-arid agriculture, sustainable agriculture education throughout the world, permaculture and agroforestry. Also included is information on women in forestry, Chinese agriculture, agricultural practices in African countries, plant societies, fruit organizations and periodicals, rare fruits, herbs, fruit-picking, agricultural book stores, gardening sourcebooks, and profiles of international reforestation organizations and individuals. Copies are available for $7 plus $1.05 postage and handling from Friends of the Trees Society, P.O. Box 1466, Chelan, WA 98816.

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Sustainable Ag Course

Reservations are now being accepted for a summer course at the University of California, Davis that will explore the theory and practice of sustainable agriculture

Introduction to Sustainable Agricultural Systems (Agronomy 192) will be offered from June 26 through September 1. Students devote 30 hours per week to lectures, labs, discussion sessions, practical field experience and field trips.

Course topics include the ecological, social and economic implications of sustainable agricultural systems, soil and water management, weed, insect and disease management, integration of animal and crop production, economics and marketing, small farm equipment use and production techniques.

The course is open both to UC students and non-students, with instructor's consent. Enrollment for the eight-unit course is limited and space should be reserved by May 12. The fee is $370. For more information or space reservation, contact Mark Van Horn at the Student Experimental Farm, 139 Hoagland Hall, University of California, Davis, CA 95616; phone (916) 752-7645.

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Conference Reviews

UC Joins Ecological Farming Meet

University of California researchers spoke at several workshops and made up the majority of research poster presentations at the Ninth Ecological Farming Conference at the Asilomar Conference Grounds, Pacific Grove, CA January 4-6, 1989. Sponsored by the Committee for Sustainable Agriculture (CSA), the conference included sessions on farmland preservation, green manuring, biological pest control, organic farming and marketing, water and energy management, and direct marketing. As keynote speaker **Robert Rodale** noted, "sustainability is a question, not a practice," and is growing in popularity because "any person, any organization has to reckon with sustainability." For information about next year's conference, scheduled for January 12-14, 1990 at Asilomar, contact CSA at (916) *346-2777*, P.O. Box 1300, Colfax, CA *95713*.

1988 Vegetable Crops Workshop

This year's UC Davis Vegetable Crops Training Conference (held December 6-8) featured several presentations on sustainable agriculture research for vegetable crops. **Tom Lanini**, weed ecologist from the UCD Botany Department discussed drip irrigation and the use of mulches to control weeds. **Carol Shennan**, UCD Department of Vegetable Crops, outlined the value of cover crops for soil fertility management and improving soil tilth. One entire session of the conference was devoted to pest management topics in sustainable agriculture. **Ken Hagen**, UC Berkeley Department of Entomology, and **Ted Wilson**, UC Davis Department of Entomology, emphasized the importance of natural enemies and biological control agents in vegetable production Systems. Farm Advisor **Manuel Jimenez**, Tulare County, presented information on the use of pheromones and trap crops to control insect pests while **Faustino Munoz**, San Diego County farm advisor, discussed several key principles for farmers in his area who are making the transition from conventional to non-chemical production systems.

The last day of presentations highlighted the amount and diversity of agricultural research at the University of California. Topics ranged from computer applications and commodity cost studies to vegetable crop varieties and new seeder/planting machine technology. The need to integrate the vast amount of new and existing information into a form useful to farmers remains a major challenge.

Living Mulches

Cover crops that might eliminate nematodes and aphids or help in erosion and frost control were a few of the topics at the October 1988 annual meeting

of the Western Regional Coordinating Committee on Living Mulches and Cover Crops. Faculty researchers and extension specialists from throughout the West who make up the group gathered at UC Davis to report on research projects. **Mike McKenry** of the UC Kearney Agricultural Center discussed his nematode screening of cover crops and the nematicidal properties of cover crop extracts, while **Miguel Altieri** of UC Berkeley reviewed the use of cover crops which might reduce aphids in cole crops. He is examining Dutch white clover, companion mix and strawberry clover at the UC Gill Tract, Agricultural Experiment Station in Albany, CA. The hypothesis is that a cover crop interplant may reduce aphids by reducing reflection, since long-wave radiation attracts aphids.

Bill Braunworth of Oregon State discussed the use of ryegrass interplanted with service berries. **Lemar Anderson** from Utah State at Logan is investigating grasses (primarily ryegrass) in sour cherries for erosion control, water infiltration and frost protection characteristics. He is leading a federal Low-Input Sustainable Agriculture (LISA) proposal on subclovers in orchards and vineyards. **Tom Lanini** of the Botany Department at UC Davis is doing subclover variety trials with **Steve Gliessman** of the Agroecology Program at UC Santa Cruz, **Michelle LeStrange** of the Tulare County Cooperative Extension and **Walt Graves** of the San Diego County Cooperative Extension.

Clyde Elmore of the UCD Botany Department is working on a Napa Valley grape vegetation conversion project. With the use of selective spraying, the resident weed population is being converted to an annual winter cover crop beneficial to the vineyard including fine fescues (Zorro), chickweed and clovers (subclover, bur and Spanish). Elmore also reported on the almond cover crop project in Merced and Stanislaus counties, now in its fifth year. California Agriculture, the UC farming magazine published by the Division of Agriculture and Natural Resources, has scheduled a report on this project in 1989.

A new large cover crop trial funded by the statewide Integrated Pest Management (IPM) Project in San Luis Obispo county is underway. It is directed by **Jim Wolpert** of the UCD Viticulture Extension with Farm Advisor *Jack Foott* and **Mike McKenry** of the Kearney Agricultural Center.

The Western Regional Coordinating Committee on Living Mulches and Cover Crops will meet again next fall for an annual update.

Arkansas Farm Symposium

Sustainable agriculture was a major theme at the Farming Systems Research and Extension Symposium (FSR/E) in Fayetteville, Arkansas in October. This year's event, "Contributions of FSR/E Towards Sustainable Agricultural Systems," was the eighth symposium and included about 300 participants from 25 countries.

Symposium participants came with a diversity of experience in both the U.S. and overseas, and represented a variety of approaches to agricultural research and extension. Outstanding issues included soil management and conservation, different kinds of multiple cropping, crop diversification, new varieties, agroforestry, better communication systems for the dissemination of

new and existing information, more equitable distribution and control of farm resources, and a continued emphasis on farmer participation in both research and extension programs.

The 1988 FSR/E symposium proceedings will be available in June. The 1989 symposium is scheduled October 8-11 at the Center for Continuing Education at the University of Arkansas. For more information contact: International Agricultural Programs Office, 300 Hotz Hall, University of Arkansas, Fayetteville AK, 72701. Telephone: (501) 575-6727.

Ohio Sustainable Conference

Ohio State University hosted the first international conference on sustainable agriculture systems September 20-23, 1988. Invited speakers from throughout the world discussed reducing input costs and improving farm profitabilty, reducing ecological risks from farming, sustainable agriculture education, and agricultural aid and technical assistance to developing countries among other topics. University of California speakers included an invited paper by **Steve Gliessman**, UC Santa Cruz, and poster presentations by **Shu Geng**, UC Davis Agronomy and Range Science Department, and **Dean Charles Hess** of UC Davis, **Carol Shennan** and **Lee Stivers** of UC Davis' Vegetable Crops Department, and **Jill Auburn** of the UC Sustainable Agriculture Research and Education Program. **Steve Mendivil**, UC Cooperative Extension County Director for Santa Clara County and **Patricia Allen** of UC Santa Cruz's Agroecology Program also participated. Abstracts of the presentations are available for $5.00, and proceedings will be available in May and may be ordered at the preprint price of $20.00. Checks should be made out to Ohio State University and sent to Nancy Creamer, Entomology Department, Ohio State University, 1735 Neil Ave., Columbus, OH 43210.

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Sources of Funding

JESSIE SMITH NOYES FOUNDATION. Stephen Viederman, president. 16 East 34th Street, New York, NY 10016. (212) 684-6577. Since 1985, the Jesse Smith Noyes Foundation has made grants for sustainable agriculture research totalling $2.4 million (20 percent of all grants). The foundation has also made grants of more than $500,000 on related groundwater projects.

They are looking for projects which are committed to sustainable agriculture, and researchers seriously interested in change.

EDUCATIONAL FOUNDATION OF AMERICA. Richard W. Hansen, executive director. 23161 Ventura Blvd., Suite 201, Woodland Hills, CA 91364. (818) 999-0921. In the last year the foundation has funded an increasing number of environmental and agricultural projects.

THE SWITZER FOUNDATION GRADUATE SCHOLARSHIPS. Administered by the Oakland Scottish Rite Scholarship Foundation, 1547 Lakeside Dr., Oakland, CA 94612, (415) 451-1906. A program of support in California for graduate students who are dedicated to improving the quality of the natural environment.

C.S. FUND. Marty Teitel, executive director. 469 Bohemian Highway, Freestone, CA 95472. (707) 829-5444. Funding is designed to support organizations doing solution-oriented work in four areas: dissent and peace; genetics, conserving and fostering the diversity of the earth's genetic pool; and toxics, reducing or eliminating the use of toxic materials through the development of alternative policies, processes and products. The fund also supports a livestock breeding reserve as part of its genetic diversity concern. It breeds populations of endangered livestock gene pools. A small number of graduate and undergraduate internships is available. Interns work with C.S. Fund staff on research related to grants or to the conservancy project.

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