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From the Director

The Urban/Agricultural Recycle Connection

Farmers, gardeners and scientists are familiar with recycling. They know that using microorganisms such as bacteria and fungi as decomposers is key to the recycling of organic material. Linking rural and urban wastes and using the composting knowledge found on farms may be a way to help us "get out from under" the problem of our waste disposal and make society, as well as agriculture, more sustainable.

Although all systems generate waste, some wastes are easier to manage than others. The management of waste from modern industrial systems is becoming more complex and expensive as landfills reach capacity. Noting this, the California Legislature passed the Integrated Waste Management Act (AB 939) in 1989, which gave communities responsibility for waste reduction and recycling. The bill required that by 1995, 25 percent of a community's total solid waste stream must be diverted from landfills through source reduction, recycling and composting. According to officials at the California Integrated Waste Management Board (CIWMB), that goal will be met. California cities, like those throughout the nation, have increased their recycling efforts. The City of Davis last year recycled 36 percent of its waste, Lodi recycled 32 percent, while San Jose diverted 45 percent of its residential waste from landfills.

Howard Levenson, a CIWMB staff member, notes that the Integrated Waste Management Act's second goal, to reduce waste by half by the year 2000, will be a challenge for local governments, California businesses, consumers and the CIWMB. He said the focus will be on waste prevention (i.e., helping businesses reduce waste while saving money, and increasing backyard composting), and developing greater markets for materials such as yard and wood debris, paper, plastics, and construction and demolition debris. The 28 percent of the waste stream that can be composted-yard, food and wood waste-may be used on farms.

In order to stimulate composting markets for urban waste, the CIWMB has funded five two-year compost/mulch demonstration projects. Projects selected involve cooperative teams working in Fresno, Tulare, Stanislaus, Santa Cruz and Santa Clara counties on the use of composted orchard, cotton, grape and vegetable residue. Each team is comprised of farm operators, UCCE farm advisors and other technical experts, compost/mulch processors, and representatives of local government. Participating farm advisors and UC researchers include **Harry Andris,** Fresno County; **Carol Frate,** Tulare County; **Craig Kolodge,** Santa Clara County; **Jesus Valencia** and **Ed Perry,** Stanislaus County; and **Marc Buchanan,** UC Santa Cruz. The goal is to promote the use of municipally derived mulch or compost in commercial agriculture. Information from the projects won't be available until the end of 1996, but enthusiasm is high. Additionally, other farm advisors throughout

the state are involved in waste management projects funded by the California Department of Food and Agriculture.

Since California soils are characteristically low in organic material, it is hoped that these projects will show that the following benefits can be obtained from compost products: increased soil organic matter; greater numbers of soil microbes; better soil moisture retention; a decrease in the leaching of soil nutrients; and a reduced need for commercial fertilizer to sustain crop reduction.

Agriculture is also continuing to find new ways to recycle its own wastes. Until recently, for example, almond processors were able to sell most of their almond shell waste to biomass power plants. However, almond processors are now receiving lower returns from shell sales due to changing regulations in both the electrical utility and waste management sectors. Faced with this situation, processors representing a significant portion of the industry have contracted with agAccess Information Service in Davis to identify and evaluate potential alternative uses for shells. Such uses may include direct application as a mulch in orchards and vineyards, and as a compost when combined with poultry or livestock waste. On a related note, increasing numbers of farmers are leaving prunings in the orchards and chipping them on site, eliminating the need for burning.

Animal agriculture systems in California are also big contributors of organic waste material. Manure from the state's animal production totals 250 million pounds per day from approximately 300 million animals, according to UC Davis Animal Systems Management Specialist Jim Oltjen. At a recent conference on the impact of animal agriculture on California water quality, several speakers noted that California livestock operations are larger and more concentrated than in other states, and our limited water supplies make this an important agriculture waste issue (See "Agricultural Animals and California's Water," page 5.) Farmers, ranchers and regulators are working to find creative solutions for potentially valuable manure waste.

Various sectors of society will play different roles in our efforts to manage wastes. For many industries, the important component of waste management may be reducing waste. For agriculture, it may be composting its own waste, and also finding ways to use the composted organic wastes of urban dwellers. Identifying the ways each of us can best manage waste may represent the critical thin line that determines whether or not we're sustainable.*-Bill Liebhardt, director, University of California Sustainable Agriculture Research and Education Program.*

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New Grants for Biologically Integrated Farming Systems

UC SAREP will be implementing a new competitive grants program to help farmers reduce their use of pesticides and synthetic fertilizers by adopting biologically integrated farming systems. The new Biologically Integrated Farming Systems (BIFS) program is the result of legislation unanimously passed by the California Legislature and signed by Governor **Pete Wilson** last fall. Assembly Bill 3383 (Agricultural Chemical Reduction Pilot Demonstration projects) enables the University of California to award grants providing technical and financial incentives to growers.

In January 1995 the Regents of the University of California approved the implementation of this legislation. UC SAREP will be administering the competitive grants program, which will provide $585,000 in state and federal funds for pilot demonstration projects in up to five commodities in up to five counties. In 1995, $250,000 of this will come from the California Environmental Protection Agency's Department of Pesticide Regulation and $335,000 from US-EPA.

The program is based on the Biologically Integrated Orchard Systems (BIOS) model, pioneered by the Community Alliance with Family Farmers Foundation in collaboration with the University of California in the last several years. The BIOS model involves a team approach to project management. A management team is assembled of farmer consultants, UC farm advisors and researchers, independent pest control advisors and a project coordinator, all with experience in reducing agrichemical use through whole-systems management. The management team helps the farmer and his or her pest control advisor develop a customized farm and soil plan and guides them over the course of the season. The focus of the BIOS model is on-farm reduction of agrichemicals. It draws on a whole-systems approach, i.e., enhancing soil fertility and crop protection through the use of cultural practices and biological pest control, creating on-farm habitats for beneficial insects, using cover crops to meet some nitrogen needs, and reducing reliance on agricultural chemicals.

Previous BIOS projects have emphasized reliance on UC Division of Agriculture and Natural Resources research, including studies funded by UC SAREP and the UC Statewide Integrated Pest Management Project.

A BIFS program advisory committee has been assembled to evaluate a draft Request for Proposals (RFP), and to review proposals that are submitted. The RFP will be issued in April, with proposals due at the end of June or mid-July. Awards will be announced and made in August. For more information, contact **Robert Bugg**, SAREP, at (916) 754-8549.

Briefly Noted

Students Experience On-farm Research

A pilot program designed to offer high school students firsthand experience in sustainable agriculture and on-farm research has been started by Winters walnut grower **Craig McNamara**. The one year program is being coordinated by **Sandy Creighton** and **Mark Linder** of the California Foundation for Agriculture in the Classroom. It involves six students from each of four high schools from Northern California. Students will be working on projects with the assistance of four UC Davis mentors: **Chuck Ingels** and **Robert Bugg** of SAREP; **Mike Singer**, soil scientist in the Land, Air and Water Resources Department; and **Frank Zalom**, Director of the Statewide Integrated Pest Management Project. Students have been participating in the walnut harvest, planting cover crops, attaching cardboard bands to trees for codling moth control, and building and installing barn owl boxes. The program is being evaluated by **Linda Whent,** UCD agricultural teacher trainer. For more information, contact Craig McNamara at (916) 795-3824.

Study: Sustainable Ag Is Economically Competitive

A new Northwest Area Foundation publication highlighting six years of work on sustainable agriculture in seven states finds that sustainable agriculture can be economically competitive with conventional agriculture. The publication, called *A Better Row to Hoe*, summarizes the findings of $4.5 million dollars worth of research projects funded by the Foundation in Iowa, Minnesota, North and South Dakota, Montana, Oregon, and Washington. The report notes that sustainable agriculture can provide new farming and business opportunities for people in rural communities, and may be especially appropriate for beginning farmers because it depends more on skilled labor and management than on capital resources. It recommends a comprehensive rural development strategy based on sustainable agriculture. In addition, the report calls for a greater emphasis on research and education which strengthens the management systems and technology required of sustainable agriculture. Free copies of the report can be obtained by contacting the Northwest Area Foundation, 332 Minnesota St. #E-1201, St. Paul, MN 55101-1373; (612) 224-9635.

Community Food Security Coalition Active

A coalition of 20 farm, food, and agricultural policy groups is proposing that agricultural policy reform be based on the concept of community food security. The group defines food security as "all persons obtaining at all times a culturally acceptable, nutritionally adequate diet through local non-

emergency sources." They propose to append a section to the 1995 Farm Bill called *The Community Food Security Empowerment* Act. The Act identifies four strategies for reform: creating a Community Food Security Program office within the USDA to integrate the concept as a "central agency mission"; intensifying USDA direct marketing efforts which support initiatives that encourage consumers to eat locally grown food; encouraging farming and gardening in urban areas; and expanding support for federal food assistance programs, particularly Food Stamps and the Supplemental Nutrition Program for Women, Infants, and Children (see related WIC article, page 13). The coalition stresses the need for a "comprehensive food systems approach" that integrates agricultural, nutritional and environmental concerns at the local level. For more information, contact **Andy Fisher** at (310) 822-5410.

FDA Approves Seven Genetically Altered Products

The Food and Drug Administration (FDA) has given its endorsement to companies seeking to market seven new genetically altered products. Among the products are three slow-ripening tomatoes, virus-resistant squash, beetle-resistant potatoes, and herbicide-tolerant cotton and soybean plants. The manufacturers had voluntarily submitted their products to the FDA, which concluded that these plants appear to be as safe as their nonaltered counterparts. In addition to the FDA acceptance, some of these products must be approved by the USDA's Animal and Plant Health Inspection Service and the Environmental Protection Agency). For more information, contact **Brad Stone** at FDA, (202) 205-4144

Sustainable Ag Summer Course

Reservations are being accepted for a ten week long summer course "Sustainable Agricultural Systems: Principles and Practices," offered through the UC Davis Student Experimental Farm (ASE 192). The eight-unit course is scheduled five days per week from June 26 to August 31, 1995. The intensive class includes lectures, labs, discussion, field trips and 12 hours per week of practical field experience. Topics include ecological management of soil, water, crops, plant diseases, insects, genetic preservation, small farm equipment use, integrating plant and animal systems, and socioeconomic aspects of sustainability. The $620 course is open to University of California students and to non-students with the instructor's consent. Enrollment is limited and space should be reserved by May 19, 1995. Contact Mark Van Horn, Department of Agronomy, University of California, Davis, CA 95616; Tel. (916) 752-7645.

FOUND: Spanish Language Sustainable Ag Publications

UC SAREP has released a new publication for farm advisors and others who work with Spanish speaking farmers and farm workers. A guide to Spanish Language Sustainable Agriculture Publications is a collection of English abstracts of 74 Spanish-language documents about sustainable farming practices. The abstracts cover a wide range of topics, from principles of sustainability to practical information about soil and water management, agricultural machinery, field safety and learning English as a second language.

Each abstract includes the author of the original publication, a summary, its availability, cost and level of readability. Most publications were chosen so that individuals with primary or secondary education can read them.

SAREP has established repositories of the original Spanish documents at five strategic sites in California including the farm advisors' offices in San Diego and Fresno, at UC Santa Barbara, at the Rural Development Center in Salinas, and at the Small Farm Center at UC Davis. The 90-page publication was compiled by Beatriz Cabezon and published by SAREP in December 1994. To order, send a check or money order for $10 payable to "UC Regents" to UC SAREP, University of California, Davis, CA 95616. Please note on the check the name of the publication. For information about other SAREP publications, please see **Resources**.

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Agricultural Animals and California's Water-Part 2

by Lyra Halprin, SAREP

Photo by Ralph Ernst

[Editor's Note: This is the second part of a two-part article on the Oct. 20,1994 conference "Animal Agriculture Impacts on Water Quality in California, ' which reported the results of a year-long study of the same name undertaken by the UC Davis Animal Agriculture Research Center and the UC Agricultural Issues Center. Proceedings are available from both centers (See Resources, page 18). The first part appeared in Sustainable Agriculture, Winter 1995, Vol.7, No.1]

The third research team report on management practices, technologies and regulations and their effectiveness at preventing water pollution was summarized by **Valerie Mellano**, environmental issues advisor in the UC Cooperative Extension office in San Diego County. She reviewed pertinent regulations including the 1969 Porter-Cologne Act, which is California's lead water legislation, and the Coastal Zone Management Act. Her team's report includes descriptions of existing practices for confined animal operations in the state, and comparisons of four major California regions. She said monitoring of individual operations can vary from inexpensive manure application records or photographs to record the status of water bodies and vegetation, to more technical methods like laboratory analysis of water quality. She also itemized the areas where research is needed to provide new practices and technologies.

"Management options that are appropriate for one producer may not be appropriate for another, so regulations and technologies need to be flexible," she said. "You can't write a regulation or provide a technology that fits everything and expect it to working all situations-it simply won't. Therefore, the input of producers is absolutely necessary. I realize there's a need for regulations, but instead of the government specifying how it has to be done, it would have greater success if it stated the goal and let the producers come up with a way of meeting that goal."

Yolo County hydrologist **Steve Deverel** reiterated that a systems approach is necessary to truly understand the processes involved in water pollution. He said in addition to monitoring, an integrated and interdisciplinary approach to defining and responding to water pollution problems is required.

Self-Regulation

Paul Feder, an agricultural policy specialist in the US-EPA's San Francisco water management division, also urged an approach to water issues that is not "too attached to technologies, but rather is holistic." He pointed out that air

pollution, as well as water pollution, is a by-product of animal agriculture. He suggested a possible tax on nitrogen fertilizer, which he called "the most unregulated chemical out there." He noted that "it is not whether, but how we regulate" that is important. He wondered if the "top-down' approach is useful, or whether it might be better for the industry to look at self-regulation.

"The conservation ethic exists in the field," he said, "and finger-pointing hurts the small producers and taxpayers." He noted that the Sonoma Marin Dairy Waste Task Force is an outstanding example of self-regulation and success. "Strong leadership is needed," he said, "and producers have to demand accountability."

Feder said agricultural leadership also needs to put pressure on the EPA and other regulatory agencies to support more systems approaches to problem solving. He urged producers to "move beyond fear and reactivity, and base solutions on a conservation ethic. Who better to do it than the people on the land?"

Ernie Gemperle, a poultry producer with 1.5 million chickens, talked about the successful conservation efforts used in his chicken houses. He has one acre of lagoon for every 10,000 chickens, which dilutes the salt content of the waste. Automatic systems clean out the chicken houses twice daily, waste goes to holding tanks, and the chicken manure is used on Gemperle's and neighboring farms.

"We have never had a problem getting rid of 200 tons per day of (wet) manure,' he said. His new chicken house are designed so that "bone-dry manure" is under the pens. Dry manure only has to be removed and spread every one or two **years,** compared to the daily or three times a week spreading that is required for wet manure. Gemperle said that as his facilities are modernized or replaced, there will be no manure on the ground in the rainy season.

Hog Lagoons

Pork producer **Roy Sharp** talked about his 17,000 hog operation in Tulare and the triple lagoon system he has used for 18 years to handle three tons per day of manure dry matter.

"With the amount of waste that we produce, we have to do something with it," Sharp said. "With this triple lagoon system, we digest the waste materials, clean up the water, use the methane gas byproduct we produce for electricity, and we recycle the water both through a flushing system as well as through irrigation and fertilization of crop land."

The manure dry matter is flushed daily into the covered primary lagoon. The lagoon acts as an anaerobic digester on the waste materials. Sharp adds a bacterial enzyme to the primary lagoon as an enhancement for this process. The digestion byproduct is methane gas. Water used in the system is further cleaned in the other two lagoons.

The gas has been producing energy for the Sharp operation for 12 years. The system includes a 75 kw engine generator, which uses a 1/2 hp blower pump. The lagoon produces 70 to 80 percent methane, in comparison to most bio-

gas systems which only produce 50 to 60 percent methane, according to Sharp. He said he built his system in 1982 with a $90,000 loan, which he has since paid off. In 1985, the operation added a 100 kw generator to make use of the additional volume of methane from the lagoon. "The system is cost-effective and doing a sustainable job for the environment, " Sharp said. "It has been so successful that we now have four cogeneration systems in operation on different sites, and are completing a fifth system. It has been a significant savings in overhead costs."

Watershed Perspective

The fourth team report on strategies and options for sustaining animal agriculture from a watershed perspective was presented by **Wesley Wallender,** professor of hydrologic science at UC Davis. He noted the complexity of California's watersheds, and stressed that it is necessary to identify the impact of animal agriculture on each one in order to protect the long-term viability of the watersheds and the animal systems themselves.

"Without this information, the door is open for favoring short-term economic gains over long-term environmental quality, or vice versa," he said. He noted that better measurements and observations are making it easier "to estimate the flow of pollutants across boundaries and to appreciate the cumulative impacts over multiple interconnected land uses."

Wallender said "liability and regulation" are the two categories of tools which guide the management of animal agriculture systems toward both economic and environmental viability. His team's report analyzed them using a systems analysis approach. "With liability, there are penalties for polluting, and with regulation you try to prevent pollution," he said. Tools include cost internalization (producers absorbing all costs), regulation (regulators setting standards of pollution), and voluntary compliance, which combines pro-active self-regulation with other issues.

"Right now we're at regulation, and we're moving toward voluntary compliance, but the final stage should be cost internalization," Wallender said. "However, with cost internalization, the cost of the products must go up to cover production costs."

Beef Ranchers

Cattle rancher **Jack Hanson, Jr.** noted that half of California's 39 million acres of range land, which includes approximately 80 percent of the critical, water-filled riparian habitat, is in private hands. "A lot of us within our industry believe we borrow this land from our children," he said.

Hanson said that beef ranchers "are essentially 'price-takers,' and if there are additional costs added to production, we can't just pass this on to consumers." He said in California, ranchers are "ahead of the game," but fear being too far ahead.

"A California steer is the same as a Wyoming steer, " he said, "If we have regulatory costs that they don't have, it puts us at a competitive disadvantage."

Gordon Rausser, dean of the College of Natural Resources at UC Berkeley, said that regulatory agencies will encourage self-regulation in manure management by "defining the default options." He said this will create incentives for farmers and ranchers to "come together to collectively set their own regulations, which in turn, will lead to standards that will hopefully be accepted by the regulatory agencies. That's what's beginning to happen in other areas, and I expect that to happen here, too."

George Wingate, a US Bureau of Land Management watershed specialist noted that "a watershed is a system contained by a boundary, and includes lots of resources, uses, and values." He said pollutants flow through watersheds in the waterways. He said the information presented at the conference must be disseminated throughout the state.

Systems Approach

Terry Young, a senior consulting scientist with the Environmental Defense Fund, agreed that a systems approach is necessary to solve water problems. She said the function of a systems approach is to analyze the problem (i.e., animal systems and waste management) and to determine the technical options for solving the problem. The next step is the solution, "figuring out what regulatory or voluntary system will be optimal for where you want to use it."

She said the producers must be made accountable for the pollution they generate, and environmental objectives must be achieved. Ideally, however, a regulatory system can also "acknowledge that the person on the farm knows better how to solve the problem than bureaucrats." The ideal programs are therefore those that are decentralized and flexible, as well as equitable, fair and easily administered. One option for designing such a system is to use a range of financial incentives that "ease the pain of regulation." Incentives are especially attractive if the proceeds from any taxes are kept within the community and used to fund operations that the producers would have to finance anyway.

Trying to figure out if solutions should be voluntary or mandatory is asking the wrong question, Young said. "Instead, the regulatory agencies should set the goal, then let folks in a watershed consortium decide how to accomplish the goal, but hold the producers responsible for results."

Research Summary

Kenneth R. Farrell, UC Vice President for the Division of Agriculture and Natural Resources summarized the conference's research results at the program's conclusion. He noted that many of the California agriculture animal systems use non-edible forage to make food. In addition to their own value as food producers, their byproducts include manure, which can be both a fertilizer and a pollutant. The conference identified several approaches to the use and disposal of that manure. Site specificity is very important to the manure's use and disposal, as no two areas are alike. Technologies are available to turn manure's potential detriments into benefits. Priority problem areas include nitrate and salt contamination of water, runoff into surface water, and sedimentation. Regulatory alternatives include voluntary solutions,

voluntary with economic incentives, and farmers and ranchers internalizing the cost.

He noted that exporting manure from some areas of the state is necessary, and determining how to make that economically feasible with transportation is a challenge. Farrell reiterated that technologies from other states are not readily or obviously adaptable to California, thus there is a need here for research and information dissemination. Research areas include the characteristics of wastes after treatment; manures as fertilizers; information on combinations of manure and chemical fertilizers; economic feasibility of bio-gas production; and dietary means of altering animal efficiency.

He urged researchers to integrate their information well, because "holistic and systems approach solutions based on particular ecosystems will have the best chance of succeeding."

[Correction: In the first part of this series, incorrect figures were given for the amount of manure produced daily by the 300 million agricultural animals in California. The correct figure is approximately 250 million pounds of manure/day.]

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Cover Cropping in Vineyards: Grower Profiles

by Chuck Ingels, SAREP

[Editor's Note: The Grower Profile series is from a chapter in a forthcoming SAREP publication on cover cropping in vineyards. The publication includes contributions by numerous UC and Natural Resource Conservation Service researchers. It is edited by Chuck Ingels and Robert Bugg of SAREP,- Glenn McGourty, director, Mendocino Viticulture Specialist at the UC Kearney Agricultural County; and Peter Christensen, Cooperative Extension Center in Parlier.]

Zach Berkowitz is no stranger to vineyard cover cropping. The vice president of vineyard operations at

Domaine Chandon, Berkowitz has worked at the vineyard since 1974 and has tested a wide range of cover crop species and management practices. He oversees 1,300 acres of vineyards (mostly Pinot Noir and Chardonnay) in Sonoma, Napa, and Mendocino counties. The vineyards have a diverse array of conditions: Terrain ranges from flat to rolling hills to very steep hillsides; soils range from clayey to sandy, and from very deep to only one to two feet deep; rainfall varies from 20 to 45 inches; and both drip and sprinkler irrigation are used.

Domaine Chandon managers started using cover crops in vineyards prone to erosion, testing different quick-growing species. One mix that proved successful in a trial with the Napa County Resource Conservation District involved the perennial grasses meadow barley, Covar sheep fescue, and the annual forb crimson clover, which reseeds well. Now, however, the most commonly used no-till cover crop for hillside vineyards at Chandon is a mix of Blando brome and annual clovers (rose, crimson, and subterranean).

Green Manure

On less fertile sites, or where erosion control is needed in new vineyards, a green manure (plow-down) blend of common, purple, and Lana woollypod vetches, Austrian winter pea, bell bean, and either oat or barley is used. This mix is also used to build the soil in fallow areas before planting vines. On very high-vigor sites, Chandon managers have tried annual ryegrass and other aggressive grass mixes in various layouts to control excessive vine growth. The strategy that best reduced vine growth involved alternate row planting of these grasses. Berkowitz notes that grasses alone may take up large quantities of nitrogen from the soil. In most of Chandon's vineyards, he has observed that including a legume in cover crop mixes reduces competition and often results in improved wine quality. Chandon's vineyard managers are now testing California native perennial grasses and insectary blends.

Managing the cover crop has proven as challenging as selecting the right species. Like many growers, Berkowitz has found that the earlier in the fall the cover crop is planted (at least by mid-October), the better the cover crop seems to grow. But harvest is still taking place, and the only grain drill available is in high demand during this period. To avoid this conflict, cover crop seeding is started in mid-September in vineyards harvested early. After sowing, fall rains germinate the cover crop; no irrigation is applied to the cover crops in the fall or spring. The cover is mowed high (six to eight inches) once in the winter and again in the spring before vine flowering.

Berkowitz and the vineyard managers weighed the benefits of disking vs. nontillage for vetch mix described. Ultimately, they would like to avoid disking altogether. They like the biomass which vetch contributes, but the vetch frequently grows up onto trellises; also vetch dries the soil rapidly. To balance these issues, they cultivate every other row in early April and mow the alternating rows. The mowed rows are disked in May, giving more time for the cover crop to attract beneficial insects, spiders, and mites. This strategy has proved successful since it reduces the competition with the vines for water and nutrients in late spring. For the same reason, every row is disked in April during exceptionally dry springs. According to Berkowitz, this alternate row strategy has improved wine quality by reducing the green characters (lowering the malic acid level) of their sparkling wines.

Timing

As with most growers, not all Domaine Chandon's experiments with cover cropping have been successful. Berkowitz says Zorro fescue was planted in one vineyard in the fall between rows where vines were to be planted the following spring; the vineyard was to be managed without tillage. During the first year, the vines grew poorly and many of their leaves had fallen by late summer. The vines were again stressed in the second spring. Then the vineyard manger decided to disk part of the vineyard in early June, after which the vines appeared to recover rapidly. Berkowitz cautions that, if possible growers should hold off on cover cropping until about the second fall after planting the vines in order to avoid stressing them. If cover crops are used from the start, he notes, growers should consider disking alternate rows early in the spring, adding extra nitrogen and potassium, increasing the proportion of legumes in the mix, or planting the cover crop in a narrow band between vine rows.

The potential effects of Phylloxera on vines are also considered when choosing and managing cover crops. Berkowitz notes that there are two viewpoints on soil management practices in susceptible vineyards: 1) cover cropping without tillage, to avoid spreading the insects via soil cultivation tools, and 2) cover cropping with tillage to reduce competition of the cover crop with the already compromised vine root systems. As a result, tillage is used with cover crops in Domaine Chandon vineyards planted on AXR 1 rootstock. Green manure cover crops are often used to improve the root environment of susceptible blocks.

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Soil and water quality: An agenda for agriculture.

National Academy Press, Washington, DC. 1993

In 1989, the same year the National Research Council published its landmark book *Alternative Agriculture*, the Council's Board on Agriculture convened a committee to address the critical issues of soil and water quality in the U.S. Their purpose was to identify what agriculture could do to protect and improve the quality of these natural resources. The result of the committee's work is *Soil and Water Quality: An Agenda for Agriculture.* The book contains 12 chapters. The main part of the committee's analysis and recommendations are included in the first four chapters, in which they define the problems and issues. The remaining eight chapters provide the technical information that form the basis of their recommendations.

What is the Agenda?

According to the book's Executive Summary, "the committee's deliberations were based on three basic concepts of soil and water resource management: 1) the fundamental importance of the soil and of the links between soil quality and water pollution, 2) the importance of preventing rather than mitigating water pollution, and 3) the need to sustain profitable and productive farming systems to provide the food and fiber society demands." From this foundation, the report outlines four areas which hold the greatest opportunities for maintaining or improving soil and water quality. These four areas comprise the "agenda for agriculture" referred to in the title of the book.

Enhancing soil quality. The report suggests that soil quality has been defined too narrowly by erosion potential and soil

nutrient status. In fact, soil quality encompasses much more than these two areas: salinization, compaction, acidification, and loss of biological activity are also concerns. The importance of maintaining and improving soil quality is not just a productivity or yield issue. The quality of our air and water resources are also at stake since they are so closely linked to soil quality.

Improving efficiency in the use of inputs. Protecting soil quality alone will not prevent water pollution unless farm inputs are also used efficiently. Many technologies and management practices are available to farmers and ranchers to improve efficiency. In some cases efficiency may mean improving yield with the same level of inputs; in other cases it involves maintaining yield and quality while reducing inputs. The most important factor determining the success of new technologies and practices is whether or not the farmer or rancher has an economic incentive for adopting the new methods. In the absence of economic incentives, regulations will play a key role.

Preventing erosion and runoff. Much progress has been made in developing

conservation tillage and residue management systems over the last decade. These have been adopted to varying degrees, but where they have been implemented they result in dramatic decreases in erosion and runoff from farms and watersheds. To improve on these conservation practices, the report says, we need also to design farming systems that account for the infrequent and unpredictable storm events that can do so much damage. These design changes could include on-farm flood control, the use of vegetative cover, or the planting of hedgerows and windbreaks.

Use of field and landscape buffer zones. A farm-by-farm approach to conserving soil and water quality will not be adequate to protect regions where overland and subsurface movements of nutrients, pesticides, salts, and sediment occur "Buffer zones," according to the report, "to intercept or immobilize pollutants and reduce the amount and energy of runoff need to be created." Buffer zones can include riparian corridors, grass strips, wetlands, and shelterbelts.

Implementing the Agenda

To implement this agenda, according to the committee, we must first make better use of available technologies and

information. Many of these are alluded to in the four points of the agenda and include the use of cover crops and green manures, improved management and use of livestock wastes, conservation tillage, irrigation management technologies, drip irrigation, environmental monitoring on farms and ranches, improved fertilizer and pesticide application techniques, crop rotation, biological control, and hedgerows and other plantings for habitat and erosion control. These and other practices are helping us achieve some soil and water quality goals, but to make real progress will require a greater emphasis on and awareness of the interrelationships and links that exist within farming systems and watersheds. The committee recognizes this need and devotes one chapter to the subject.

A Systems Approach to Soil and Water Quality Management

The farming system includes the crops grown, and/or the livestock managed; the ecosystem and landscape in which the farm or ranch exists; the environmental and human resources involved in production; inputs and management

skills; and the policies and programs affecting the farm or ranch. The challenge for farmers and ranchers in imple- menting a soil and water quality agenda is to balance the multiple and linked objectives involved in the production system. A change in one management practice affects other components of the farm or ranch, therefore an integrated approach to the four points of the agenda is essential to meet soil and water quality goals and ensure that farms and ranches remain economically viable.

This systems-level perspective is also important for policy makers and

regulators. A broad range of local, state, and federal programs have a significant impact on farmers and ranchers. Ideally these programs should complement and reinforce one another. Without a systems perspective, however, programs may contradict and counteract each other, placing an undue burden on the farmer or rancher. The report provides an overview of many of the programs currently in place.

Use of a farming systems approach rather than emphasizing individual best management practices pays off in five ways, according to the book. A farming systems approach: 1) accounts for resource and enterprise variability, 2) provides a basis for targeting programs and financial support where improved soil and water quality is most needed, 3) encourages better coordination of local, state, and federal programs, 4) increase the likelihood of finding practices and programs that simultaneously improve financial and environmental performance; and 5) allows for greater flexibility to adapt programs, policies and practices to changing resource or market conditions.

In closing this discussion, the report builds a strong case for the current USDA emphasis on developing integrated farming system plans. This process is currently underway throughout the country, coordinated mainly through the Natural Resources Conservation Service. The success of this planning effort will be measured by farmers' and ranchers' ability to meet their own goals as well as the objectives or standards set by state and federal policies.

Soil and Water Quality: An Agenda for Agriculture can be purchased for $54.95 plus $4.00 shipping and handling from the National Academy Press, (202) 334-3313, or through your local bookseller.

Contributed by David Chaney

An evaluation of the Connecticut farmers' market coupon program.

Jean Ann Anliker, Mark Winne and Linda T Drake

Journal of Nutrition Education. 24(4): 185-191. 1992

In 1989, Connecticut was one of ten states that received USDA funding to provide some of its WIC (Women, Infant and Children nutrition program) participants with special coupons to purchase fresh produce at farmers' markets. Matching funds came from the Connecticut Department of Agriculture and the Department of Health Services. A total of 3 7,71 1 WIC participants received an additional $10 in coupons for fresh fruit and vegetables, redeemable only at farmers' markets. Overall goals of the Farmers' Market Coupon Program are to expand marketing opportunities for local farmers, while at the same time improve access to fresh, local foods for low-income residents.

This study evaluated the success of Connecticut's program in meeting these goals. The hypotheses tested were: 1) the distribution of farmers' market coupons would lead to increased utilization of farmers' markets by WIC participants, and 2) program participants would show significant increases in their frequency of consumption of fresh fruits and vegetables.

Methods

Nine WIC programs participated in the study; six distributing farmers' market coupons (treatment group) and three that did not (control group). Four of the six treatment programs had distributed the coupons in previous years. These programs were specifically selected to determine if the previous coupon distribution would influence later use. A total of 489 participants were interviewed in July and August for a pre-assessment (411 in the treatment group and 78 in the control group). The treatment group was deliberately oversampled in order to compare subjects who received and *used* coupons with those who received and *did not* use coupons.

The initial interviews included questions about participants' use of farmers' markets and consumption of fruits, vegetables and juices. About two to four months later (November/December), the same subjects were contacted by phone for a post-assessment. Questions included the participants' use of farmers' markets during the test period, their use of the farmers' market coupons (if received), factors associated with their use and a re-evaluation of fruit, vegetable and juice consumption.

Results

Post-assessments were completed with 216 of the original 489 subjects: 172

treatment subjects and 44 control subjects. This return rate (44%) is characteristic of low-income, mobile populations. Those who responded were not representative of the group that was initially interviewed. They were more likely to be white, more educated, have cars and come from larger households, but they were less likely to be heads of households.

Coupon use and use of other resources. In the treatment group, 79.1 percent said they used some of their coupons and 57 percent said they used all of their coupons. Factors that were significantly associated with coupon use included: having shopped at a farmers' market before, having received farmers' market coupons previously, having a shorter distance to travel to get to a farmers' market, and ethnicity (Black and Hispanic subjects were more likely to use their coupons). Thirty-six percent of participants said they also spent either some of their own money (33.8%) or Food Stamps (2.2%) or both (9.6%) at farmers' markets in addition to the coupons.

Repeated use of farmers' markets. Almost one-third of coupon users went back to farmers' markets after using the farmers' market coupons. Those factors associated with returning to farmers' markets included: mode of transportation (subjects who walked, drove or rode with a friend were twice as likely to return as those who depended on buses or other ways of getting to markets), and a positive perception of produce quality at the markets. Lack of information about the market was mentioned as a reason by more than half of the control group that did not go to the farmers' market in the summer. This suggests that the Farmers' Market Coupon Program can help promote the use of farmers' markets by making participants more aware of them.

Food purchasing patterns. Specific foods purchased at farmers' markets by more than one quarter of participants included corn (38.2%), tomatoes (31.3%) and apples (28.5%). Foods chosen by ten to 15 percent of study participants included peaches, peppers, cucumbers, squash and pears. Over 60 percent said that the quality of the produce was better at farmers' markets than where they usually shopped and that prices were lower. Almost one quarter of participants said they tried a new food they had never bought before. Nearly half (44.2%) of coupon users said the Farmers' Market Coupon Program caused them to make changes in their diets, particularly in eating more fresh foods and more fruits and vegetables.

Although participants praised food quality, they also had suggestions for improving the Farmers' Market Coupon Program, including: changing the hours of operation, improving the location of the farmers' market (62.5% of subjects who received but did not use any of their coupons identified the location as a barrier), making transportation available, making childcare available and offering more information.

Frequency of fruit and vegetable consumption. Interview questions in this area referred to overall consumption of fruits and vegetables, not just that from farmers' markets. Changes in the overall frequency of fruit and vegetable consumption between pre- and post-assessments did not differ significantly between control and treatment groups or

between coupon users and non-users. This result is not surprising, since the average addition of $6 worth of produce per year cannot be expected to produce major dietary changes. However, coupon users who also used their

own resources at farmers' markets did show significant increases in their overall consumption of certain fresh vegetables (i.e., dark orange vegetables, peppers, tomatoes) over those who did not use additional resources. In addition, subjects who returned to the farmers' market after using up their coupons showed significantly greater consumption of fresh dark green vegetables, cauliflower, cabbage and other canned or frozen vegetables in their diets.

The authors conclude that the Connecticut Farmers' Market Coupon Program was generally successful in meeting its goals-three-quarters of the program recipients used their coupons at farmers' markets to purchase fresh, local produce; some groups also benefited by significantly increasing their overall produce consumption; and local farmers simultaneously expanded their markets.

Reviewer's Comments

California has conducted a very successful Farmers' Market Coupon Program since 1990 (federal funds were received for the first time in 1994). Since the state was not able to provide funding for the program, monies were raised from farmers' markets associations in order to get federal matching funds. In 1994, $32,000 was raised from farmers' market "sponsors" and the federal government provided another $52,000 for a total of $84,000. These monies provided for the administration of the program as well as $20 coupon booklets for 4,368 WIC participants. Almost 85 percent of these coupons were redeemed at 34 participating farmers' markets, providing fresh, local produce to thousands of pregnant and nursing women and their children. Moreover, California farmers more than doubled their initial investment from $32,000 to more than $64,000 (including in-kind contributions). Every market that participated realized at least a 50 percent gain. The Farmers' Market Nutrition Program (as it is now called) is an opportunity to benefit both California farmers and low-income consumers. Increased funding for this program would leverage additional resources and simultaneously improve the nutritional status of California's WIC participants and the economic viability of its family farmers.

For more information write to: Mark Winne, director, Hartford Food System, 509 Wethersfield Ave., Hartford, CT 06114. Tel. (203)296-9325.

Contributed by Gail W. Feenstra

Spring 1995 (v7n2)

Summary of California studies analyzing the diet of barn owls.

Chuck Ingels

Article written for Sustainable Agriculture/Technical Reviews. 1995

Farmers and ranchers are looking closely at the benefits barn owls offer as an alternative method of controlling vertebrate pests (see *Sustainable Agriculture Vol. 5. No. 1*). The diet of the barn owl *(Tyto alba)* is relatively easy to ascertain, and several dozen studies have been conducted throughout the U.S. to determine the prey species consumed (Clark and Bunck, 1991). Barn owls swallow their prey whole and later regurgitate one to two inch pellets containing undigested bones, teeth, and fur. The owls usually produce one to two pellets per day, often dropping one at their nesting site and one at a distant roosting site (Evans and Emlen, 1947). Skulls found in these pellets can be keyed out to determine the identity of the prey species.

Over 95 percent of the diet usually consists of small mammals (mostly rodents), however in some studies substantial bird remains have been found. According to Colvin (1986), each adult barn owl may consume about one or two rodents per night; a nesting pair and their young can eat over 1,000 rodents per year. Dietary studies from California and other states show that a barn owl consumes an average 50 to 60 grams of prey per day (0.11-0.13 pounds per day, 40-48 pounds per year). The actual species consumed depends on the species abundance and availability in the area.

Overview

Table 1 shows the results of several barn owl prey studies conducted in California. In many studies, meadow voles and/or pocket gophers were consumed most often, while pocket, white-footed, and house mice were also important. One notable species missing in nearly all these studies is the California ground squirrel *(Spermophilus beecheyi).* This species ventures above ground only during the day, while the barn owl hunts almost strictly at night.

Study Findings

Berkeley 1926-27. Because each of these studies took place in Berkeley and because the results of each were very similar, the percentages of each species were averaged and combined into one column. In one study (Foster, 1926), pellets were collected on one sampling date from under a nest in Wildcat Canyon, just northeast of Berkeley. In another study (Foster, 1927), pellets were collected over a period of one and a half years from a nest located in a cave in Wildcat Canyon. Prey counts were separated by the dry season vs. the

wet season. More shrews, Jerusalem crickets, and white-footed and pocket mice were taken during the dry season than the wet season, while the opposite was true for pocket gophers. In a third study (Hall, 1927), accumulated pellets were collected on one sampling date from a location in Berkeley.

Table 1. Food Items in Barn Owl Pellets: Summary of California References

		Study							
Common Name	**Scientific Name**	**Berkeley 1926-27**	**SF Bay Area 1937**	**Central Calif. 1945**	**Davis 1947**	**Madera Foothills 1947**	**LA Co. 1960**	**Placer Co. 1974**	**Siskiyou Co. 1978**
No % of prey. Total found	**Ave. Weight of prey (g)**								
Calif. meadow vole	Microtus californicus	60	50	6	15	2	10	42	61
2,398 31	54								
Pocket gopher	Thomomys bottae	8	21	24	26	37	2	28	0
1.053 18	156								
White-footed mice	Peromyscus sp.	14	14	6	12	7	0	25	37
878 14	25								
Pocket mice	Perognathus sp.	1	0	36	0	43	0	0	0
609 10	15								
Wood rat	Neotoma fuscipes	0	0	3	0	0	65	0	0
90 8	271								
House mouse	Mus musculus	3	4	2	38	0	0	0	0
348 6	18								
Harvest kangaroo rat	Reithrodontomys megalotis	8	4	4	3	0	2	0	0
280 3	12								
Kangaroo rat	Dipodomys heermanni	0	0	6	0	7	0	0	1
112 2	65								
Roof rat	Rattus rattus	0	0	0	1	0	12	1	0
32 2	183								
Other species		6	7	13	5	4	9	4	1
388 6									
No. of individual prey found		2480	338	958	749	513	92	660	398
6,188									
Number of pellets found		796	87	NA	280	240	NA	538	143

San Francisco Bay region (Smith and Hopkins, 1937). In this study, 12 boxes were installed in trees and barns in these counties: Marin (4), Contra Costa (2), Alameda (3), and San Mateo (3). A total of 141 pellets were collected over three years. California meadow voles were found most frequently except in Marin County, where pocket gophers predominated.

Central California (Hawbecker, 1945). Pellets were collected over a wide area during the nesting seasons of several years. Three types of habitat were included in this study, ranging from a well-forested, humid region to one that is treeless and shrubless. The specific regions and important prey findings are as follows:

1. Santa Cruz and western Monterey counties (coastal Transition Zone): pocket gophers-33%, meadow voles-17%, and birds-16%.

2. Eastern Monterey and western San Benito counties (Upper Sonoran zone): pocket gophers-52%, pocket mice-17%.

3. Western Merced and Fresno counties (Lower Sonoran Zone): pocket mice-66%.

Based on rodent trapping in several of the study areas, the barn owl was found to serve as a good sampler of the small mammals of a given area. However, the author noted that the selection of species appeared to be based partially upon numbers and ease of capture.

Davis (Evans and Emlen, 1947). An average of one pellet per day was found beneath a palm tree over a one year period. The palm tree served as a daytime roost to one barn owl. Based on nighttime observations, the owl was determined to have a hunting range of about 165 acres. About 140 acres were in open fields planted largely to grain and alfalfa and 25 were in wooded areas along Putah Creek. Animals typically associated with wooded or brushy cover, including house mice, deer mice *(Peromyscus)*, harvest mice, and roof rats, comprised 57 percent of the total food items. Open field habitats, more than six times as extensive on the owl's range, contributed the remaining 43 percent of the items, which included pocket gophers and meadow voles. During the fall, the numbers of house and deer mice taken declined, while pocket gopher numbers steadily increased from winter through fall.

Madera County foothills (Fitch, 1947). This study was conducted in the blue oak-Digger pine belt of the Upper Sonoran Zone of Madera County. The region is comprised of rolling foothills broken by numerous ravines, and includes substantial grassland. Barn owl pellets were collected over four years at four sites. Computed on a prey weight basis, the pocket gopher accounted for 71 percent of the diet of the barn owls. Pellets were also collected from day roosts of great horned owls, which were far more numerous than barn owls in this area. The diet of the great horned owls consisted largely of Jerusalem crickets, woodrats, cottontails, kangaroo rats, and pocket gophers. On a weight basis, 56 percent of the diet was cottontails. For comparison, the diet of red-tailed hawks was also presented from a related study. On a weight basis, 50 percent of the diet of the hawks consisted of ground squirrels.

Coastal Los Angeles County (Cunningham, 1960). Pellets were collected once from the base of a date palm tree. Because of the abundance of wood rats and the low percentage of pocket gophers and meadow mice, the author concluded that the barn owls foraged largely in the chaparral-covered Santa Monica Mountains about two miles north of the collection site. Two samples of great homed owl pellets were also taken; their diet consisted mostly of pocket gophers, house mice, meadow mice, and wood rats.

Placer County (Clark and Wise, 1974). Pellets were collected at eight sites along the eastern edge of the Sacramento Valley, mostly from barns just northwest of Lincoln. On a weight basis, over half of the diet of the barn owl consisted of pocket gophers, while white-footed mice accounted for only about seven percent.

Siskiyou County (Rudolph, 1978). This study examined the coexistence and diets of barn owls and great horned owls at Tule Lake National Wildlife Refuge. The owls roosted on rock cliffs with a hunting range that included natural vegetation and agricultural fields. Pellets were collected at weekly intervals from the roosting sites. The diet of the great horned owls was very similar to that of the barn owls. Barn owls were found to hunt primarily on the wing, while great horned owls hunted primarily from telephone poles.

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For more information write to: Chuck Ingels, UC SAREP, University of California, Davis, CA 95616.

(CI-PEST.137) *Contributed by Chuck lngels*

Spring 1995 (v7n2)

Soil bacteria to control jointed goatgrass in integrated cropping systems.

A. C. Kennedy and C. M. Boerboom

USDA SARE/ACE Western Region Annual Report, p. 13. 1994

Editor's Note: In the fall 1994 issue of ***Sustainable Agriculture (Vol.6, No.4),*** *we included a technical review that addressed the importance of soil microfauna (mainly nematodes and protozoa) in plant disease suppression. Although these soil animals represent a significant biological control potential, it is not clear whether or not that potential can be exploited in the field. The article reviewed here provides an example of how soil-dwelling organisms might be manipulated in cropping systems. The pest in this case is a weed; the biocontrol agents are soil bacteria.*

Jointed goatgrass *(Aegilops cylindrica)* is fast becoming a major threat to fall-sown small grains. It now infests an estimated five million acres nationally and is reducing growers' income by $145 million annually. Herbicides for controlling this weed are not available. The objective of this research was to develop a biological weed control method that would provide an economic benefit to grain growers affected by jointed goatgrass. The approach taken was to isolate soil bacteria that could inhibit growth of the weed.

In initial greenhouse studies, four isolated bacteria reduced jointed goatgrass growth 30 to 70 percent. These isolates were used in field tests in 1993. In the field, two of the four tested bacteria effectively suppressed growth of the weed. These two isolates reduced weed emergence, but by June, visual differences in aboveground plant growth were not evident. The effect of the bacteria was more pronounced in the latter part of the growing season, because by August aboveground growth had been suppressed by 20 to 30 percent. Researchers noted that the bacteria delayed flowering and increased anthocyanin production by the weed. Wheat growth was not affected by the bacteria. In addition, the bacteria were found to be more effective when used in combination with low rates of a synthetic herbicide.

The ability of the bacteria to survive in different geographical regions, and from season to season, is critical if this biological control method is to be successful. The researchers have been able to select for isolates that are better able to withstand desiccation, but further studies under other types of stresses are needed.

For more information write to: A.C. Kennedy, USDA-ARS, Washington State University, Pullman, WA 99164-6421.

(DEC.524)

Contributed by David Chaney

Resources

Year-Round Farm Employment

How to Stabilize Your Work Force (and Increase Profits, Productivity and Personal Satisfaction), by **Suzanne Vaupel, Gary Johnston, Melissa Cadet, Franz Kegel,** and **Gregory Billikopf,** 44 pages, 1995, UC SAREP. This handbook shows farmers how to diversify their operations to keep employees busy throughout the year. Written by a UC Cooperative Extension county director, two farm advisors and two agricultural economists, the publication brings together the strategies, benefits and challenges encountered by farmers who keep workers employed year-round. It includes information gleaned from extensive interviews with 35 California farmers. To order please send a check or money order for $6 payable to "UC Regents" to UC SAREP, University of California, Davis, CA 95616. Please note on the check the name of the publication. **For a list of SAREP publications,** call (916) 752-7556 or send an electronic mail request to bbwetzel@ucdavis.edu.

Small Farm Handbook

The Small Farm Handbook, 170 pages, 1994, UC Small Farm Program. Coordinated by **Shirley Humphrey,** UC Small Farm Center and **Eric Mussen,** UC Extension Specialist, UC Davis entomology department. Aimed at both new and experienced farmers, this practical guide includes contributions from successful small-scale farmers, small farm specialists, farm advisors and agricultural researchers. The handbook is $24.55 (includes shipping and tax) and may be ordered with VISA/Mastercard, checks or money orders payable to "UC Regents." Send to ANR Publications, University of California, Oakland, CA 946081239, or call (510) 642-2431.

Animal Ag

Animal Agriculture Impacts on Water Quality in California, Proceedings, 80 pages, 1994. Proceedings from the Oct. 20, 1994 Sacramento conference sponsored by the UC Agricultural Issues Center (AIC) and the UC Davis Animal Agriculture Research Center. Please see story on page 5. The $l5 publication may be ordered from UC AIC, University of California, Davis, CA 9S616; (916) 752-2320 with VISA/Mastercard, checks or money orders payable to "UC Regents."

People in Sustainable Ag

The Human Face of Sustainable Agriculture: Adding People to the Environmental Agenda, by **Patricia Allen,** 12 pages, 1994. The fourth paper in the "Sustainability in the Balance" series from the Center for Agroecology and Sustainable Food Systems at UC Santa Cruz, it highlights human and social justice issues to be addressed within the sustainable agriculture

movement. All four papers in the series are available free of charge from the University of California, CASFS, 1156 High St., Santa Cruz, CA 95064; Tel: (408) 459-4140; Fax: (408) 459-2799.

Methyl Bromide Options

Options to Methyl Bromide for the Control of Soil-Borne Diseases and Pests in California with Reference to the Netherlands, by **Adolf L. Braun** and **David M. Supkoff, 55** pages, 1994. This free publication examines the use of methyl bromide in the Netherlands in greenhouse production of strawberries, vegetables and cut flowers. It describes that country's decision to phase out methyl bromide for soil fumigation use because of concern for public safety and air and groundwater quality, and its decision to adopt new pesticide policies and farming systems. To order contact: Pest Management Analysis and Planning Program, Dept. of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, 1020 "N" Street, Sacramento, CA 95814; (916) 324-4100.

Rotational Grazing

Wisconsin Pastures for Profit. A Hands-on Guide to Rotational Grazing, 36 pages, reprinted 1994 (1991) (pub. A3529). Published by the University of Wisconsin Extension (UWEX), the booklet is a rotational grazing resource. The cost is $2.25 plus $1.25 postage. Order from UWEX Publications, Rm. 245, 30 North Murray St., Madison, WI 53715; (608) 262-3346; check, money order or MasterCard/VISA.

Organic Network

Organic Market News is a comprehensive wholesale price report for more than 120 varieties of organically grown fresh fruit, herbs and vegetables published 21 times per year. Subscriptions are available in hard copy by US Mail for $65/year or by Fax within the US for $75/year. To subscribe send checks payable to Farmer's Information Network, Organic Market News, PO Box 2067, Santa Clara, CA 95055-2067; Tel: (408) 247-6778, Ext. 3; Fax: (408) 247-5823; e-mail: FarmerNet@AOL.com. Contact the above address for more information or to be added to the mailing list.

Direct Marketing

Growing for Market is a monthly newsletter for direct market farmers. Each issue includes practical articles about production and marketing vegetables, fruits, herbs and flowers. It covers selling to restaurants and florists, Community Supported Agriculture (subscription farming), farmers' markets, on-farm markets, U-pick farms, and dried flower crafting. To subscribe send a check or money order for $26 to Growing for Market, PO Box 3747, Lawrence, KS 66046.

Sources of Funding

SAREP/BIFS Grants

UC SAREP is implementing a new competitive grants program, the Biologically Integrated Farming Systems (BIFS), to help farmers reduce their use of pesticides and synthetic fertilizers. BIFS is the result of AB 3383, legislation that authorizes agricultural chemical reduction pilot demonstration projects throughout the state. SAREP will administer the grants program, which will provide $585,000 in state and federal funds for projects in up to five commodities in up to five counties. Please see "New Grants for Biologically Integrated Farming Systems," page 2. To receive the Request for Proposals, contact Robert Bugg at SAREP, (916) 754-8549, or 752-7556.

USDA SARE Grants

Producers and producer groups residing in the Western U.S. are now eligible to compete for USDA Sustainable Agriculture Research and Education (SARE) program grants of up to $5,000 each to identify, evaluate and test sustainable agriculture practices. Western SARE has issued a call for farmer/rancher research grant proposals from agricultural producers in its 13-state region (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming and the Island Protectorates). Proposals should define local sustainable agriculture problems and propose innovative solutions. On-farm tests of suggested technologies and approaches are strongly encouraged. Research proposals must be led by one or more producers, include a professional agricultural technical advisor and provide a plan for sharing information with others in the community. A majority of the review committee are producers familiar with sustainable agriculture. All funding will be awarded competitively. For information or to request application materials, write grants program manager Rhonda Miller, Western Region SARE, ASTE Building, Utah State University, Logan, UT, 84322-2300 or call (801) 797-0351. Proposals are due at the program's host institution at Utah State University by 5 p.m., May 2, 1995 (or postmarked by April 28, 1995). No faxed applications will be accepted.

Lindbergh Grants

The Charles A. and Anne Morrow Lindbergh Foundation provides grants of up to $10,580 (the 1927 cost of the "Spirit of St. Louis") to individuals whose work furthers the balance between the environment and technological progress. Award categories include aviation/aerospace, agriculture, arts and humanities, biomedical research, conservation of natural resources, exploration, health and population sciences, intercultural communication, oceanography, waste disposal management, water resource management, and wildlife preservation. Grants are directed at individuals rather than institutional programs. Application materials must be postmarked by

Tuesday, June 13, 1995. For an application, send a self-addressed, stamped (US), business-size envelope to the Lindbergh Foundation office, 708 South 3rd. Street, Suite 110, Minneapolis, MN 554151141; (612) 338-1703; Fax: (612) 338-6826.

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, and consumer education on organic farming issues. Projects should involve farmers in design and execution, and take place on working farms when possible. Proposals of $3,000-$5,000 are encouraged. Matching funds and/or in-kind contributions are recommended. Proposals are considered twice a year; the next round of proposals must be received by July 31, 1995. To receive copies of grant application procedures and the OFRF Research and Education Priorities describing target areas, write Grants Program, Organic Farming Research Foundation, PO Box 440, Santa Cruz, CA 95061; Tel: (408) 426-6606.

US-EPA

The US-EPA has announced plans for a new program of grants for environmental research to be carried out by US universities. The new program will greatly increase the Agency's existing research grants program in fiscal 1995 with approximately $17 million (an additional $5 million is committed for new graduate student fellowships). EPA's Office of Research and Development (ORD) will be soliciting applications from universities and non-profit, research-intensive institutions in June or July of 1995. EPA will work with the National Science Foundation to jointly solicit and evaluate proposals. The augmented grants program will fund research in the areas of ecosystems, environmental technologies, global change and socioeconomic issues. For more information, contact the EPA ORD at (202) 260-7473.

Funding Resource Note:

Funding-seekers may want to investigate Environmental Grantmaking Funding 1995 Directory (January 1995), published by Environmental Research Institute, 16S5 Elmwood Ave., Suite 225, Rochester, NY 14620, Tel: (800) 724-1857; Fax: (716) 473-0968. The 700-page directory with information on 600 grantmaking foundations is available for $70 plus $5 shipping and handling.
