

## *Fall 1992*

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***From the Director***

## **Life and Methyl Bromide**

Revelations about the fumigant methyl bromide's strong link to ozone depletion remind us once again that everything is connected to everything. Methyl bromide is used for both structural and agricultural pest control. It is an effective fumigant but it has also been linked to health problems and the depletion of the ozone layer.

Methyl bromide is a classic example of the way we declare war on nature in our quest to produce food. Previously I have discussed how we tend to want to dominate and control nature. I believe the systems approach, looking at the whole picture rather than at a specific issue, can help provide a strategy for dealing with the problems that have prompted us to use methyl bromide. **Will Allen**, director of the California Institute for Rural Studies rural toxics project and a farmer representative to a recent United Nations Education Program/EPA international workshop on methyl bromide, reminds us that farmers will not enhance their image with the general public when it becomes known that methyl bromide is an extremely efficient ozone depleter, 30 to 120 times more effective than the notorious chlorofluorocarbons (CFCs). Unfortunately, the United Nations guidelines for methyl bromide replacements include chloropicrin, Telone-2 and metam-sodium, all of which are in regulatory trouble in California.

Solutions to the dilemma of using methyl bromide in agriculture may lie in the adoption of new and existing cultural practices instead of looking for more acceptable chemicals. Good soil organic matter management, crop rotation strategies, cover crops, and experiments with new crop varieties may eliminate the need for soil fumigants. Providing habitat for beneficial organisms is one way to naturally solve crop pest problems. This perspective of the soil assumes that it is an ally rather than a home for pests that must be obliterated with a fumigant. There is much we don't know about soil biology; we have only begun to understand the roles and interactions of various microorganisms. When we work with nature it has a tendency to work with us-which is what we all want in the end. -*Bill Liebhardt, director, UC Sustainable Agriculture Research & Education Program.*

## Our "New" Newsletter: Fill Out Purge Form

Welcome to the first issue of *Sustainable Agriculture*. This new and expanded report from UC SAREP is a combination of the former *Sustainable Agriculture News*, our general newsletter, and *Components*, the program's journal of technical notes and reviews. This change gets our information to you four times a year, instead of spreading it out over eight editions of two publications. It's a more efficient way for you to read it, and for us to publish it. We are pleased with the mix of news, announcements, practical information and technical and research summaries. And while we have your attention, please fill out the purge form on page 15 (your mailing label should be on the back). As a Cooperative Extension program, we are required to purge our mailing list yearly to make sure we are sending publications only to people who want them. The University of California's (and the State's) extreme budget crunch makes this purge more essential than ever. We hope you'll want to continue receiving this newsletter-all you need to do is fill out the form and mail it in. And good reading!-*Lyra Halprin, managing editor, & [David Chaney](#), technical reviews editor*

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# The Promise of Pomace

by Chuck Ingels, SAREP

Viticulturists and enologists have long known of the fertilizer value of grape pomace, the seeds and skins left over after grapes have been processed in wineries. In the scanty literature on the subject, the value of pomace has been described primarily in terms of its nitrogen contribution, with less emphasis on other nutrients and characteristics. A benefit of raw grape pomace that has often been overlooked is the effect of the added organic matter on soil structure, water penetration, and enhancement of nutrient availability. Composted grape pomace, however, provides nutrients in a more concentrated and stable form than raw pomace.

Depending on the variety, for every ton of hand-harvested grapes crushed, 20 to 100 pounds of stems and 160 to 240 pounds of pomace are produced. The stems, which can be used in composted pomace, are usually removed before crushing. (Before air quality controls were in place, much of the stem material was dried and burned.)

Pomace is used in many ways. Most of the waste is spread back into vineyards. It is used as livestock feed, and in some areas (primarily the Central Valley), it is burned in cogeneration plants to produce energy. Increasingly, winegrape waste is composted for use in gardens, landscapes, vineyards, and other crops.

**Table 1. Typical moisture and nutrient contents of grape wastes.<sup>1</sup>**

Average Content (% of fresh weight)				
	Moisture	Nitrogen	Potassium	Phosphorus
Stems	65	0.9	1.2	0.1
Seeds	30	1.0	0.6	0.5
Skins	70	0.3	0.6	0.1
Wet Pomace	50	0.9	1.0	0.25
Unblended				
Pomace				
Compost	30	1.5	2.0	0.5

<sup>1</sup>These figures are derived from a very limited number of sources. Nutrient analysis of soil amendments should be determined before purchase.

Large quantities of grape seeds are usually present in both pomace and compost. According to **Greg Young**, agronomist at Y & B Agricultural Services in Redwood Valley, many growers purchasing compost question whether the material is "finished" (i.e., has undergone the high-temperature thermophilic process). To alleviate grower concerns, and to make a better

product, Young blends the raw pomace with organic wastes from mushroom production in a 1:2 ratio before composting. Weed problems could occur in landscaped areas if large numbers of grape seedlings germinate. Young notes that an application of raw pomace could result in several dozen seedlings in a ten square foot area; a similar application of finished compost of unblended pomace may yield only one or two seedlings.

**FOR MORE INFORMATION:**

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Logsdon, G. 1992. Pomace is a grape resource. *BioCycle* 33(2):40-41.

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## Forestry Workshops Succeed With Diverse Players

*by David Campbell, SAREP*

A series of three, SAREP-funded workshops on sustainable forestry management options for non-industrial landowners has resulted in proposed regulations now being considered by the California Board of Forestry. The new regulations would provide important incentives to encourage small landowners to manage their forests in a way that balances economic viability and environmental sustainability.

The workshops, which took place in Briceland, Eureka, and Dunsmuir, were coordinated by **Kim Rodrigues**, Cooperative Extension forest advisor for Humboldt and Del Norte Counties. Rodrigues brought together small landowners, professional foresters, environmentalists, and regulators to discuss the implementation of recent legislation in the California Forest Practices Act. The legislation allows non-industrial forest landowners with fewer than 2,500 acres of timberland to file non-industrial timber management plans (NTMPs) rather than the traditional timber harvesting plans (THPs). The NTMP is a long-term plan providing for sustainable forest growth and uneven-aged management practices. (Uneven-aged provides for at least three distinct age or size classes distributed throughout the forest.) The THP has a shorter-term of three to five years and does not require uneven-aged management.

There is widespread agreement in the agroforestry community that past laws and regulations have often encouraged poor management decisions, resulting in many forest lands badly in need of restoration, according to Rodrigues. Massive erosion problems, poor regeneration of desired species, and forest conversion from predominantly conifer to hardwood stands are just some of the problems that threaten fish and wildlife habitat, soil fertility, tree health, and forest productivity.

But there remain important disputes about how best to achieve sustainable forestry. The workshops provided an open forum for discussion and dialogue, resulting in greater clarity about issues at dispute, and a slow building of trust among the parties.

"Often the biggest obstacles we face are not the limits of natural resources, but conflict between individuals with economic and social differences," Rodrigues said. "The workshops succeeded in bringing together a core group that is having a significant impact in changing the existing regulations. It's not a long-term solution, but it is an important step in the right direction."

Among the changes being sought is a way to help landowners reduce the high cost of hiring a Registered Professional Forester (RPF) to complete the

NTMP. The new proposal would decrease these costs by facilitating a more active role for landowners and the Department of Forestry in developing the plans, limiting the need for the relatively costly services of the RPF. Without these and other proposed incentives, landowners seeking to be good stewards of their forest would find it economically difficult or impossible to do so.

Each of the workshops included a field day to allow participants to learn more about specific forest management techniques.

"On the ground you get at people's real concerns in a way you can't in a classroom setting," said Rodrigues. "I think we really began to foster a greater sense of stewardship among the landowners."

Rodrigues anticipates that forestry regulations and restrictions will continue to change rapidly, with an increasing emphasis on long-term sustainability. She fears that unless those regulations are accompanied by incentives for small landowners, they will be asked to shoulder too much of the cost of reversing past abuses.

"It is time we quit imposing further legislative restrictions and start fostering a sense of stewardship by providing education, incentives, and benefits to non-industrial timberland owners," Rodrigues said.

# Organic, Conventional Comparisons in Apples

by Chuck Ingels

Can organic apples be grown profitably in California? Based on two years of SAREP-funded research, the answer appears to be related to two issues: climate, and the development of more effective codling moth control. If organic apples are grown where the climate is favorable for codling moth or apple scab development and more effective methods of codling moth control are not developed, the organic crop is not profitable. If the orchard is located where there is little codling moth or apple scab, the crop is profitable. The research, conducted in three apple districts, was led by **Sean Swezey**, entomologist with the Agroecology Program at UC Santa Cruz, **Janet Caprile**, Contra Costa farm advisor, and **Paul Vossen**, Sonoma County farm advisor. At each site, organic apple production was compared to conventional production in replicated experiments for two years.

Controlling codling moth ("the worm in the apple") proved to be the overriding obstacle to profitable organic apple production in Sonoma and Contra Costa Counties. The arsenal of materials used to battle this pest included numerous sprays of Codling Moth Granulosis Virus (CMGV), ryania, *Bacillus thuringiensis* (Bt), Bt plus oil, and oil alone. Still, codling moth damage in Contra Costa County amounted to 30 percent in 1990 and 40 percent in 1991. In Sonoma County, 18 percent and 34 percent of the fruit (average of three varieties) were infested in 1990 and 1991, respectively; in 1991, 56 percent of the Red Delicious apples were damaged. In Watsonville (Santa Cruz County), however, there were no significant differences in damage between the conventional and organic systems. Damage in the conventional plots of all sites was quite low. The cool coastal climate of this region offers a distinct advantage, which usually allows only two flights of codling moth compared to three or even four flights in other regions.

Yields and net returns in Sonoma and Contra Costa Counties were inversely correlated to damage by codling moth. Average yields of the organic apples in Sonoma County were 30 and 64 percent lower than conventional apples in 1990 and 1991, respectively. Production was also affected by untimely rains, which caused apple scab damage. Costs exceeded income for organic apples. In Contra Costa County, yields in the organic treatments were about 20 percent lower than the conventional for 1990 and 1991; packable fruit was reduced by 53 and 80 percent, respectively. The organic system had an increasingly negative net return each year, while the conventional system had increasingly positive net returns. In Santa Cruz County, yields were significantly higher in the organic system in two of the three years studied, with correspondingly higher returns per acre.

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## Birds of Prey Assist Farmers

by Chuck Ingels, SAREP

Farmers seeking to reduce or eliminate are often frustrated inability to control vertebrate pests. Preventive strategies, such controlling vegetation around orchard tree trunks and field borders, can help with meadow mice and gopher control. Common non-chemical methods include shooting, trapping, and flooding. While these methods can be very effective, they are not without limitations; flooding is not always possible, and trapping and shooting can be very time-consuming and impractical where large areas are infested.

Birds of prey can contribute to vertebrate pest management, especially in fields located near riparian areas. While raptors are seldom relied upon as the primary means of vertebrate control, they can, with a little help, be more effective than many people think. This article explores the effectiveness of owls and hawks in vertebrate pest management and techniques for enhancing their populations.

### Barn Owls

There are many different species of owls, but the barn owl (*Tyto alba*) is the most helpful to farmers. It is often called "the most beneficial bird in the world" because of its hearty appetite for gophers, ground squirrels, and meadow mice. Farmers who have learned of the barn owl's virtues strive to keep this "cat with wings" in close proximity to crops. One nest of six young barn owls and two adults may consume more than 1,000 small mammals during the nesting season.

Because of their high first-year mortality, short life-span (four years maximum), and dependence upon the fluctuating nature of rodent populations, barn owls have developed a tremendous reproductive capability in order to survive. They are often referred to as "reproductive machines." This capability functions in response to availability of prey; they can quickly colonize an area if suitable habitat (prey and nest sites) is available.

Barn owls are strictly nocturnal hunters, having the remarkable ability to see their prey in complete darkness. They hunt from perched or flying positions, and have been known to spot prey from a distance of several hundred feet. Barn owls routinely fly one mile from their nests to hunt, and may venture up to three miles or more. Their preferred hunting sites are grassland and wet meadow habitats, either with a few trees or in wooded areas.

Barn owls do not build nests. They lay eggs in hollow trees, crevices in cliffs, and holes in sandbanks, and also find home sites in abandoned buildings, granaries, or barns. According to many researchers and farmers, it is fairly easy to attract barn owls to fields, orchards, or vineyards by constructing nest

boxes.

## **Grower Success**

Merced County farm advisor **Lonnie Hendricks** reported that several almond growers have drastically reduced gopher populations in orchards by installing barn owl nest boxes. One such grower, **Bill Genn** of Hilmar, had orchards so badly infested with gophers that his flood irrigation water often spilled onto neighbor's land from gopher holes at the edge of the orchard. Genn was advised to install nesting boxes for owls in trees and on poles near the orchard. Owls now live in the boxes and Genn's gopher problems have disappeared; rodent bones litter the ground under the boxes.

## **Hawks**

Hawks can also aid in vertebrate pest management. Important species include the red-tailed hawk (*Buteo jamaicensis*), and the American Kestrel (*Falco sparverius*), also known as a small falcon, sparrow hawk or kitty hawk. Hawks eat meadow mice, small birds, grasshoppers and other insects. To encourage hawks, whose presence also frightens starlings and other pest bird species, some farmers install perches and nest boxes near their crops. Perches may be especially important in winter and early spring to aid hawks in spotting food sources before the rodents' breeding season, and when many crops are either absent or provide little cover.

## **Kestrel Houses**

Kestrels prefer to nest in dead trees and other crevices, but also use secluded buildings and wood raptor houses. Open fields, meadows and fence rows are good locations for kestrel houses. Houses can be mounted on utility poles, buildings, lone trees or posts. According to a Soil Conservation Service (SCS) bulletin, the house can be made of long-lasting redwood or cedar, and should be mounted 10 to 15 feet from the ground with the entrance clear of branches. Because the house needs to be checked and cleaned periodically, it should be erected where it can be reached. Complete kestrel house plans are available from SCS. November through January is the best time to build a kestrel house. Houses should be checked weekly in the spring to make sure starlings and other pest birds are not using the box. Kestrels bring no nesting material into the house, so any material found in the box is from pest birds and should be removed. Kestrel eggs are white/cinnamon colored with spots of brown and hatch in about 28 days. Starling eggs are pale blue. Screech owls, which may also use the boxes and are desirable birds, have white eggs. Kestrel houses should face south or east, and should be located within 200 yards of a tall tree or pole because the raptors like high perches nearby.

## **Davis Survey**

How effective are perches and nest boxes, and how effective are hawks in vertebrate pest management? The data is mixed; many growers report success, yet others contend that avian predators alone cannot keep populations of meadow mice low for extended periods of time because predators leave the area when prey abundance is low. Surveys show mixed results of perch and box effectiveness.

**Shawn Smallwood**, a researcher in the agronomy and range science department at UC Davis, recently completed a two-year survey of the use of perches by hawks. His survey covered 200 miles in the Sacramento Valley, and included farms of all major crops grown in the region. He studied artificial perches, trees, telephone poles, and fenceposts.

Smallwood found that most hawks avoid the smaller perches installed by farmers (horizontal dowels or boards supported by posts or metal pipes); only occasionally did he find a small hawk using one of them. Most hawks were found using telephone poles or vertically-oriented "snags" on trees. Hawks prefer large perches which can comfortably hold their whole body, according to Smallwood. He also found that the height of a perch was not as important to the raptors as the fact that it provided a broad view of the surrounding land. Large trees are ideal roosts, Smallwood reported, but they function best as perches if the canopy is opened so raptors can get a clear view. Dead limbs sticking up above leaves are used more than branches within the canopy.

## **Washington Study**

Researchers in Washington state conducted a study examining the use and effectiveness of artificial perches and nest boxes. Three orchards in the Wenatchee area were used in the study. Researchers made direct observations and examined predator pellets.

In this study, none of the barn owl boxes and only 13 percent of the kestrel boxes were inhabited. However, more birds were attracted to the orchards where perches were placed than those without perches. The biomass and height of the understory vegetation had no bearing on the use of perches in this study. The effect of raptors on meadow mice populations was unclear; populations were reduced in one orchard only. However, the level of human activity may have played a major role. Where houses and roads were most heavily used, few birds visited the perches. Human activity was minimal near the orchard in which raptor use of perches was high and the mice population was reduced.

## **Other Studies**

In an Oregon study, American kestrels and great-horned owls showed a preference for 5-meter perches over 2.5-meter perches, but the raptors accepted the shorter perches in the absence of taller ones. Barn owls did not show a height preference.

Pest bird activity in vineyards was not affected by the presence of artificial perches, according to a Napa study. Although four hawk species were observed in the area, none was seen using the artificial perches. Pest birds were not deterred by hawk models on some of the perches.

(We gratefully acknowledge the information provided by **Paul Gorenzel**, Cooperative Extension Wildlife Unit, University of California, Davis.)

FOR MORE INFORMATION:

Askham, L.R. 1990. Effect of artificial perches and nests in attracting raptors to orchards. Proc. Vert. Pest Conf. 14:144-48.

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Hall, T.R., W.E. Howard, and R.E. Marsh. 1981. Raptor use of artificial perches. Wildl. Soc. Bull. 9(4):296-298.

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U.S. Dept. of Agric. 1984. Kestrel house plans and instructions. Soil Cons. Serv. Job Sheet CA-499. SCS, 2121 Second St., Davis, CA 95616; (916) 757-8200.

U.S. Dept. of Agric. 1985. Barn owl nest box plans and instructions. Soil Cons. Serv. Job Sheet CA-501 (Rev). SCS, 2121 Second St., Davis, CA 95616; (916) 757-8200.

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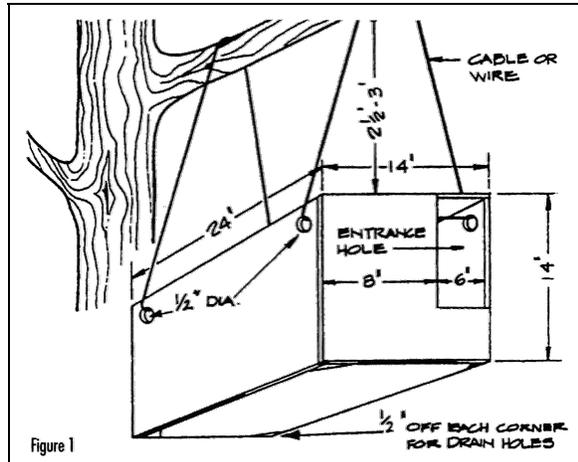
## Owl Nest Box Construction

There are many different methods of constructing barn owl nest boxes. Almost any closed box with a suitable hole in the front will suffice. Boxes can be installed in trees or on tall poles; they can even be placed inside barn walls, with a hole in the wall serving as the entrance.

### In Trees. The Soil

Conservation Service (SCS)

has produced plans and instruction for building barn owl nest boxes in trees (Figure 1). Ideal tree species include oak and sycamore. Boxes should be hung or mounted 15 to 30 feet above ground, using six boxes per square mile. The building material can be 3/8-inch or 1/2-inch plywood, assembled with marine-grade plastic resin or exterior wood glue. The top is hinged to aid cleaning. The entrance is 12 inches tall. Boxes should be painted with drab green, black and brown to reduce human disturbance. A two-inch layer of sawdust or wood chips is placed in the bottom of the box; the shavings are replaced each year.



**On Poles.** Hilmar farmer Bill Genn has mounted nest boxes 15 to 25 feet high on utility poles. His boxes are 18 to 24 inches in each dimension with a six-inch opening. He faces the open end to the east away from the sun and prevailing wind. He also uses a double west wall with a couple of inches of space between walls and a shade over the roof to keep the nests cooler. Shavings are placed on the bottom for nesting material.

**In Barns.** Barn owls, of course, like to nest in barns. The Illinois Audubon Society recommends placing nesting boxes inside barn walls, 20 to 25 feet high, with a six-inch square entrance hole cut into the wall. (See Figure 2.) The barn wall acts as the front of the box. The top is hinged but kept securely latched. The box is nailed against the interior barn wall, and if necessary, is supported with wire or additional boards.

## Barn Owl Nest Box

- A. Interior of barn wall
- B. Wire (or wood) support if beam is narrow
- C. Latch
- D. Entrance
- E. Cross Beam
- F. Entrance (6" x 6")

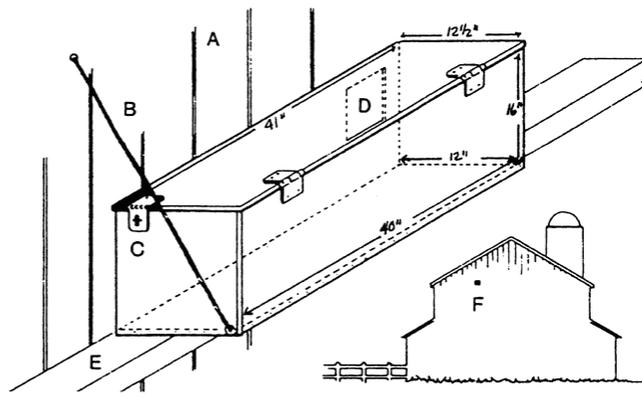


Figure 2

## First Organic Cotton Conference

*(Editor's note: This article was written by Brian Baker, with California Certified Organic Farmers. It appeared in the CCOF Statewide Newsletter, Spring 1992, Volume 9, Number 2, and was adapted for Sustainable Agriculture by [David Chaney](#), UC SAREP.)*

The first ever organic cotton conference was held in Visalia on March 11, 1992. The conference was organized by the California Institute for Rural Studies with support from UC SAREP, California Certified Organic Farmers, the Committee for Sustainable Agriculture and several other organizations and companies. It was attended by more than 250 people from every facet of the cotton and textile industry, including approximately 75 growers and 45 pest control advisers. The agenda covered all aspects of growing, processing and marketing organic cotton.

Representatives from clothing and textile manufacturers at the conference said that there is an increasing demand for organic cotton, with significant premiums going to the few growers who now raise the crop. In California, that includes two San Joaquin Valley producers certified through California Certified Organic Farmers (CCOF), Cal-Organics and **Sally Fox**, both in the Kern chapter. Several other CCOF growers have expressed interest in growing cotton on CCOF certified acreage in 1992. In addition to the limited acreage in California, four Texas growers produced organic cotton certified by the Texas Department of Agriculture on 600 acres last year.

### Growing Concerns

What are the chances for increasing the acreage of organic cotton in California? The answer to that question depends on how well growers can alter their conventional production practices to suit the requirements of organic certification and the quality standards of ginners and textile manufacturers. Some of the key areas discussed at the conference are summarized here.

**Soil fertility.** While cotton is a relatively heavy feeder when compared with other field crops, the nutrient requirements are not as high as most vegetables. Cotton could present a useful rotation crop for organic growers who also produce canning tomatoes, vegetables, grains and forage crops in the San Joaquin Valley. Presenters noted that a fertility program based on compost, manure, and the right cover crops could adequately meet the nutrient requirements of cotton.

**Pest management.** Cotton accounts for more pesticide use than any other crop in California. The principal insect pest in the San Joaquin Valley is the lygus bug. Lygus can be managed by rotation of non-host crops and by strip-cropping with a preferred host, such as alfalfa, which traps the lygus. Other

pests include mites and caterpillars such as the beet armyworm and cotton bollworm (*Heliothis zea*). These worms can be managed with beneficial insects and *Bacillus thuringiensis* (Bt).

Pest pressure is considerably greater in the Imperial and Palo Verde valleys. Pink bollworm is a significant problem in these areas, but has been mitigated somewhat by the mandatory short season that breaks the insect's reproductive cycle. Another serious cotton pest in the Imperial Valley is the sweet potato whitefly.

Once established, cotton can hold its own against weeds. A program of rotation, preirrigation and timely cultivation can keep hand labor costs to a minimum. Mechanical harvesting requires relatively weed-free fields.

**Defoliation.** The biggest question for California organic cotton producers is how to defoliate the crop prior to harvest. Under conventional production practices, this is accomplished using synthetic chemicals. In fact, almost half of the pesticides used on cotton in California are defoliants (two of the three currently registered in California are on the SB 950 list for possible suspension).

Defoliants serve three purposes: 1) they make mechanical harvest easier by eliminating the leaves that may jam the picker; 2) they prevent the staining of the cotton by chlorophyll that would still be in live leaves; 3) they reduce the moisture content of the seed cotton by stopping evapotranspiration in the canopy.

While it is possible to mechanically harvest cotton without defoliation, it is more difficult than with defoliation and can reduce quality by several grades. The presence of foliage results in a higher moisture content of the harvested cotton, which in turn requires greater care and attention during the drying and ginning process. Moreover, as the cotton is stacked into large "modules" in the field, it may actually begin to compost if the cotton is too moist. (The modules are a convenient way to transport and store seed cotton before it is ginned.) In some cases the decomposition process may produce temperatures in excess of 130 F. Additionally, San Joaquin Valley growers are required to plow down their crop residue by December 20 for pink bollworm control. This date necessitates early defoliation in order to complete harvest and land preparation. Under these circumstances, natural defoliation by frost is not a possibility.

CCOF growers have used several different naturally occurring materials to defoliate, with little success. Other possibilities explored included a machine developed in the 1960s that defoliated cotton with heat from propane gas. While the defoliation and quality were comparable with chemical defoliation, the cost of the machine and fuel made thermal defoliation uncompetitive. Variations of this machine may be economically feasible if it is linked to the power take-off or electrical system of the tractor.

Perhaps the best way to prepare a crop for harvest is to manage the nutrients and water so that the cotton plant will naturally stop growing. Cotton harvested without defoliants may have a small amount of green staining, and should be ginned immediately after harvest. If the cotton could be picked into trailers, rather than built into modules, excessive moisture and decomposition

could be reduced.

The steps in processing from the gin to finishing are largely mechanical. A few production aids may be used in spinning and weaving. Finishing and dyeing are mostly chemical processes. These stages of the manufacturing process will require the most attention if apparel manufacturers want to label finished products "organic"

Information about the organic cotton conference and future events can be obtained from **Will Allen** at the California Institute for Rural Studies, (916) 756-6555 or (209) 544-9677. For more information about CCOF Certified Organic Cotton, contact CCOF at (408) 423-2263.

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## Resources

### Organic Production Laws

*What the Farmer Needs to Know: A Summary of California & Federal Organic Production Laws*, (Second Edition) 1992. 31 pages. By **Suzanne Vaupel**, available from the Committee for Sustainable Agriculture, P.O. Box 1300, Colfax, CA 95713, (916) 346-2777. \$5.95 plus \$1.75 postage & handling. A guide to understanding new laws that affect farmers and producers of organic foods in California and the United States: the California Organic Foods Act of 1990, and the national Organic Foods Production Act of 1990. Includes information from texts of the California and federal organic production laws, conversations with administrators of the organic programs, and documents issued by the administering agencies.

### Community Gardening, Greening Directory

*East Bay Community Gardening and Greening Coalition Resource Directory*, a product of the East Bay Community Gardening and Greening Conference of May 14, 1992. 15 pages, available for \$7 from the organizers at 1417 Josephine St., Berkeley, CA 94703, (510) 524-3863 (checks payable to East Bay Community Gardening & Greening Coalition). The directory is intended to encourage communication among Bay Area organizations, groups and agencies involved in community gardening and greening projects. Lists resource centers, foundations, job training groups, farmers' markets associations, homeless gardens, native plants organizations, park and recreation departments, school gardening projects, sustainable agriculture advocacy organizations and other resources.

### Video

*Alive and Well: A Guide to Sustainable Soil Fertility*. 35 minutes, 1992. Funded by UC SAREP produced by Mendocino County farm advisor **Glenn McGourty** in association with production coordinator **Jan McGourty**, and **Oleg Harencar**. It features five different farming operations in which sustainable practices have been successfully implemented, including the **Fetzer** family of Fetzer Vineyards of Mendocino County; **Michael Maltas**, manager of a specialty market garden associated with the Fetzer operation in Hopland; **Mac Magruder**, a Potter Valley cattle rancher; **Tim and Karen Bates**, owners of the Apple Farm, an Anderson Valley apple orchard; and **Ed and Wynette Sills**, owner/ operators of Pleasant Grove Farms, a diversified farm in Pleasant Grove, Sutter County. Available for \$40 (includes tax and postage) from Visual Media, University of California, Davis, CA 95616. Make checks payable to UC Regents and include name, address, and daytime telephone number. The video may also be rented for \$5 from Visual Media, (916) 752-8980. For information about quantity order discounts, contact Jill

Auburn,

SAREP, (916) 757-3278.

## **Audio Cassettes**

Two audio cassettes on innovative farming practices are now available from the Department of Applied Behavioral Sciences at UC Davis for \$5 each. They may be ordered by contacting UC Davis Visual Media, University of California, Davis, CA 95616, (916) 752-8980. Make checks payable to UC Regents and include name, address and daytime telephone number.

*Perspectives on Solarization* is a 20-minute program on soil solarization, a non-chemical method for controlling pests and diseases and growing better crops. It features interviews with two UC farm advisors, a UC researcher, a retailer of plastics (the primary product used in solarization), and a grower who uses solarization.

*Habitat: For Diversity and Pest Control* is a 25-minute program featuring interviews with two California growers using habitat to attract a wide range of beneficial animals and insects, thereby increasing on-farm diversity and helping control pests. Recommendations for experimenting with habitat are provided by a UC Extension entomologist.

## **Beneficial Organisms Suppliers**

Suppliers of Beneficial Organisms in North America, 1992 Edition. The California Environmental Protection Agency's Department of Pesticide Regulation has published a 31-page booklet that lists 95 commercial suppliers of more than 126 different organisms used for biological control of pests. Prepared by **C.D. Hunter**, the booklet is indexed to help match suppliers with the specific natural enemies they sell. It also includes an index of beneficial organisms, with scientific names and target pests. Microbials are not listed. Free, single copies of the booklet are available from Department of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, Attn: Beneficial Organisms Booklet, 1220 "N" Street, P.O. Box 942871, Sacramento, CA 94271-0001. To order by telephone, call (916) 654-1141.

## **Weed Management Publication**

*Controlling Weeds with Fewer Chemicals*, by **Craig Cramer** et al. (Eds.), Rodale Institute, 1991. A book of practical advice on mechanical, biological and cultural weed control techniques. It features farmer-to-farmer experience with results from recent research trials. Aimed at all farmers, including those who farm row crops, small grains, pastures, fruits and vegetables. Orders Prepay orders with checks payable to "New Farm" for \$19.95, and send to Rodale Institute, 222 Main St., Emmaus, PA 18098.

## Sources of Funding

### USDA Western Region *SARE/ACE* Grants

The Administrative Council of the USDA Western Region's Sustainable Agriculture Research and Education programs are now accepting proposals for two very closely related competitive grant programs:

- 1) The first is sustainable Agriculture Research and Education (SARE), formerly known as LISA. This program is funded through the USDA Cooperative State Research Service.
- 2) The second program, with many of the same goals, is Agriculture in Concert with the Environment (ACE), funded jointly by the Pollution Prevention Office of EPA and the SARE program.

The federal funds available for these two programs are expected to be the same as the last fiscal year. Approximately \$400,000 is available to fund new SARE proposals and \$300,000 is available from the ACE program for new competitive grants for the next cycle (FY92-93). Due to the limited funds, the call for proposals is restricted to specific, high-priority projects to avoid having to deny large numbers of worthwhile proposals. Proposals are due at 5 p.m. on November 13, 1992. FAX copies will not be accepted. Proposal authors will be notified of decisions by early April 1993. To be added to the Request for Proposals mailing list or for further information contact **Denise Bodie**, University of California, Division of Agriculture and Natural Resources, 300 Lakeside Dr., 6th Floor Oakland, CA 94612-3560; phone: (510) 987-0033.

### EPA Environmental Education Grants

The Environmental Protection Agency (EPA) will allocate money for a grants program on environmental education projects at all levels, including public education. The deadline for applications will be between October 1 and December 15, 1992 (no dates confirmed at press time). In fiscal year 1992, EPA allocated \$2.5 million to the program. State and local education agencies, higher education institutions and state environment agencies are eligible. Eligible projects include designing, demonstrating or disseminating environmental curricula or field techniques; promoting understanding and assessing a particular environmental issue or problem; training education personnel in a specific geographic area; and designing and demonstrating projects that foster cooperation between the U.S. and Canada or Mexico on joint environmental concerns. Priority will be given to projects that develop environmental education practices or methods that may have wide applications, address a high-priority environmental issue, or are new or significantly improved. For more information, contact **George Walker**, Office of Environmental Education, A107, Environmental Protection Agency,

## **Organic Research Grants**

The Organic Farming Research Foundation is offering funds for organic farming methods research, dissemination of research results to organic farmers and growers interested in making the transition to organic production systems, and education of the public about organic farming issues. Projects should involve farmers in both design and execution, and take place on working farms when ever possible and appropriate. Proposals of \$3,000-5,000 are encouraged. Most projects will be less than \$10,000. Matching funds from other sources and/or in-kind contributions from cooperators are encouraged by not required. Proposals are considered twice a year. Proposals received by January 31, 1993 will be awarded by April 30, 1992. To receive copies of grant application procedures and the "OFRF Research and Education Priorities" which describes target areas, write Grants Program, Organic Farming Research Foundation, P.O. Box 440, Santa Cruz, CA 95061 or call (408) 426-6606.

## **\$1000 Organic Article Award**

The Organic Farming Research Foundation will award \$1,000 to the author of the best article published in 1992 aimed at educating the general public about organic farming. Articles must be published between January 1, 1992 and December 31, 1992 in a regularly published newspaper journal or magazine. Applications should include 15 copies of the article, including date published and page numbers; name address and telephone number of the author(s); and information about the periodical in which it was published, including exact title, how long it has been in publication, purpose and audience, and circulation (15 copies). Applications must be received by January 10, 1993 at Organic Farming Research Foundation, P.O. Box 440, Santa Cruz, CA 95061. For more information contact the Foundation at (408) 426-6606.

## **Field Research Money**

University Research Expeditions Program (UREP) provides funds and field assistance to University of California researchers worldwide. Applicants need not qualify for principal investigator (PI) status. Support is provided by selected members of the public who subsidize research costs through tax-deductible donations and contribute their own skills and time as short-term field assistants. UREP funds can be used for short or long-term field research, as seed money for new research, to extend continuing projects, supplement other grants and support graduate students or additional staff. Proposal deadlines: October 5, 1992 (for projects during June-October 1993), and April 9, 1993 (for projects during November 1993-May 1994.) For more information, contact University Research Expeditions Program, Desk DO6, University of California, Berkeley, Ca 94720, (510) 642-6586, FAX (510) 642-6792.



# International conference on the assessment and monitoring of soil quality

*Rodale Institute*

Proceedings of a conference hosted by the Rodale Institute, July 11-13, 1991. Emmaus, PA. 1991

*"Our responsibility is to return to the soil the vitality it so generously shares with us and to ensure that vitality for generations to come."*

-John Haberern, president of Rodale Institute

This conference report documents the first steps of a national effort to define and describe methods of enhancing soil quality. The premise of the conference is that soil is a vital resource for human survival, and as such, we must manage it to ensure long-term agricultural productivity. As summarized in the conference conclusions, any definition or discussion of soil quality issues should address the three major functions that soil serves on our planet:

- soil is an essential link in the cycle of life
- soil is a medium for the growth of plants and animals
- soil acts as an environmental buffer.

## The Scientific viewpoint

From a scientific viewpoint, the purposes of the meeting were (1) to determine how soil quality can be characterized, (2) to establish the key indicators of soil quality, and (3) to discuss how these indicators can be monitored in the field and reported in the form of an index. To accomplish this, a working group session was organized to develop an operational framework for addressing soil quality issues. This session led to the formulation of a multi-level structure for defining which soil properties to use in monitoring soil quality. The hierarchy that was developed can be summarized as follows:

A. First define the target area or agroecosystem in which you are working.

B. Next, assess how soil quality affects three key components of the agricultural system:

- plant and animal productivity,
- the environment, and
- human health.

C. Determine which "meso-level" components of soil quality (e.g. tilth, fertility, nutrition, presence of toxics) have the strongest influence on each of

the above components.

D. For each component (productivity, environment, human health), examine the related "first order" soil properties.

1. Chemical: electrical conductivity, pH, site-specific toxicities.
2. Physical: soil texture, water holding capacity, bulk density, infiltration rate, soil depth.
3. Biological: soil organic matter, microbial biomass, earthworm abundance, vegetation.

E. Continue with a closer assessment of "second order" properties such as aggregate stability, amount of dispersable clay, and the numbers and diversity of key soil fauna and flora.

Conference participants were challenged to take the next step of integrating the many components into a useful index. It was proposed that the index be expressed in equation form as a function of the various factors outlined above. The index would therefore be based on standard soil property analyses and soil survey methods to establish a base line measure for soil quality. It would also be dependent on continuous monitoring and comparisons with long-term research sites in order to identify the direction of soil quality change (particularly the risk of soil degradation), and estimate the rate of soil quality change. Some soil quality factors would be weighted more or less depending on the particular location and conditions.

## **Broader Perspective Needed**

The working group concluded that the effects of soil quality on human health are the least studied and possibly the most complex of the three major soil quality issues. In spite of the fact that sustaining a healthy population is a fundamental goal of agriculture, we tend to focus primarily on production and usually ignore the nutritive content of food and its effects on human health. There are examples from the literature that clearly show that food nutritive content varies with soil characteristics (see *Components* 3(1):9-10). Soil factors, climate and management practices can all play an important role in determining the ultimate nutritional quality of plants. Therefore, one recommendation from the conference was that a greater effort should be made on routine testing of food quality for crops grown under various management practices. In addition to standard nutrient and mineral analyses, researchers need to develop bioassays that can replace expensive animal feeding trials.

## **Conference Recommendations**

Several other recommendations from the conference include:

1. A working task force should be established to further develop the components of a soil quality index, to assess the state-of-the-art in understanding soil quality, set research priorities, and to develop a strategy for implementing an international program for assessing and monitoring soil quality.
2. Establish a working group specifically charged with summarizing the indicators of, and approaches to, soil quality. This group would

- develop a handbook of approaches and standardized methods for measuring soil quality.
3. Establish, with adequate support, a research group dedicated to evaluating various models and approaches that assess and monitor soil quality. This group would interact closely with the working group assigned to developing the "Methods" handbook, and should also address the human health issue discussed above.
  4. The scientific community needs to promote further research on relationships between soil and crop management, soil quality, food quality and human and animal health.
  5. International research centers should be encouraged to identify research on soil quality as part of their mission.

*The need for assessing soil quality -local and regional perspectives*  
(Granatstein and Bezdicek)

*Characterization of soil quality: Physical and chemical criteria* (Arshad and Coen)

*Soil biological criteria as indicators of soil quality: Microorganisms*  
(Parkinson)

*Soil and crop management strategies for improved soil quality* (Karlen, Nash, and Unger), and

*Factors affecting the nutritional quality of crops* (Hornick).

Papers from the conference will be published in the *American Journal of Alternative Agriculture* this fall.

For more information write to: Carole Piszczek, Rodale Institute, 33 E. Minor St., Emmaus, PA 18098.

(DEC.376)

Contributed by [David Chaney](#)

# Orchard vegetation management demonstration.

*Prichard, T.L., L. Hendricks and J. Caprile*

Report to the California State Water Resources Control Board. 1992

In this demonstration project, conducted in Farmington, California, cover crops and soil disturbance were evaluated for their effect on water infiltration in a walnut orchard. The study was begun in the fall of 1990, and initially involved both walnuts and almonds. Due to poor cover crop stands, however, the almond study was discontinued. In addition, the legume cover crops in the walnut study did not survive the combined effect of the 1990-91 drought and freeze. Therefore, researchers consolidated their efforts in walnuts and all cover crops were replanted and became established in the fall of 1991.

The study contrasted three annual legumes and three perennial grass covers:

## *Legumes*

- Berseem/crimson clover mix
- Subdover mix
- Wild flower mix (trefoil, alyssum, and California poppy)

## *Grasses*

- Prairie home mix (perennial rye grass and creeping red fescue)
- Tall fescue
  
- Hard fescue

Each species or mix was planted in the aisle on both sides of an entire tree row, and each treatment was replicated three times.

## **Stand Establishment**

During the winter, broadleaf weed species were quite competitive with the grasses. After mowing in late March, both the fescues thrived and easily out-competed the weeds, while the prairie home mix was somewhat patchy. The clovers competed well before mowing, and were quite dominant after mowing. The wildflower mix grew poorly, and became established only in the very few areas where no other vegetation grew.

## **Water Infiltration**

Water infiltration characteristics were measured using a portable, rainfall

simulator-type infiltrometer. Water infiltration was first measured under three soil surface conditions-undisturbed, disturbed (raked), and disturbed re-crusted. The results indicated that mechanical stirring of both silty clay and sandy loam soils broke up a crust and improved infiltration characteristics (figure 1). Also, the presence of a crust decreased infiltration on both sites below both the raked and undisturbed treatments.

A previous study showed that infiltration into sandy soils was limited by a crust for an entire irrigation, resulting in a 50% reduced infiltrated water volume compared to undisturbed soils. Crusted clay soils were only influenced for the first 2 hours of an irrigation, after which infiltration was limited only by the soil's clay texture.

Water infiltration characteristics were measured under perennial grass compared to a soil maintained free of weeds by herbicides for an entire season. For comparison, gypsum (used to improve water infiltration) applied both through the soil and through the water was also evaluated.

A huge increase in *initial* infiltration rate occurred in the cover crop treatment compared to all other treatments (figure 2). However, the steady state, or the sustained infiltration rate, of the cover was not significantly greater. Therefore, only an irrigation system which provides water at the maximum rate of intake, such as furrow or flood irrigation, can benefit. Orchards irrigated with sprinkler systems, which apply a constant precipitation rate, will not experience increased infiltration over a typical 12 to 36 hour irrigation.

The improvement in water infiltration is a result of soil surface protection from the mixing and sorting action of water flow or water drop impact. Also, improvements are a result of an increase in soil organic matter, which improves soil structure. The net effect is a reduction in soil crust development.

For more information write to: Terry Prichard, UC Cooperative Extension, 420 5. Wilson Way, Stockton, CA 95205.

*(CJ-FMCC.074)*

*Contributed by Chuck Ingels*

*Figure 1. Accumulated infiltration of water under three different levels of soil disturbance. (not available)*

*Figure 2. Accumulated infiltration of water into soil under different management regimes. (not available)*

## **Water in California agriculture.**

*Goodall, Merrill*

Presentation at *Water in California Agriculture: Technology, Politics, and People*. A conference held June 13, 1991, Sacramento, CA.

*Reviewer's note: The following article summarizes a presentation given at a conference on "Water in California Agriculture: Technology, Politics, and People", June 13, 1991 in Sacramento, California sponsored by the National Center for Appropriate Technology and La Cooperativa Campesina de California with support from PG & E.*

Much of the farmland in California's San Joaquin Valley is dependent on water imported by the Federal Government's Central Valley Project (CVP) and the state of California's State Water Project (SWP). These multi-billion dollar projects bring water through hundreds of miles of aqueducts and canals from reservoirs in northern California to the southern and western San Joaquin Valley. Accompanying the construction of this water distribution system was the development of new political institution-water districts-to manage the water deliveries. These water districts are bound contractually to the SWP and the CVP. The nature of the relationship that has emerged between these water districts and the large landowners of the San Joaquin Valley is the subject of Goodall's presentation. Goodall argues that the large landowner has become the dominant partner in the political system, particularly in water institutions. He then documents the rise of property-weighted electoral systems and the erosion of the democratic process in the San Joaquin Valley. Finally, Goodall records the convergence of major organizations-public and private, local and state-and their influence on policy and rural communities.

### **Land Ownership**

Using data from historical documents such as James Bryce's *American Commonwealth*, published in 1888, to more contemporary studies from the California Institute for Rural Studies and the U.S. Interior Department, Goodall describes the trend toward concentration in land ownership in the San Joaquin Valley. For example, "in the five water districts that take two-thirds of all State Water Project deliveries in the San Joaquin Valley, eight owners account for 60% of the land area." Goodall then goes on to make the connection between ownership pattern, choice of enabling act for water district incorporation, and policy decision making of the districts.

### **Water Institutions and Local Control**

Water districts are legal government entities created by acts of the state legislature. Goodall points out that petitioners seeking to initiate a district are

in a position to select an act that defines the electorate in a manner likely to be supportive of the goals sought by the petitioners.

According to Goodall, there are two distinct types of political systems characterizing water districts in rural California. One tends to be democratic and the other, organized by local or absentee propertied elites, is less so. The water organizations that are likely to be democratic are located in the Sacramento Valley and the east side of the San Joaquin Valley. They were settled in the late 19th century and their water was dependent first on ground water reserves and streams from the Sierra. These districts were authorized by the Wright Act of 1887, the state legislature's first comprehensive enabling act for water district organization. Voting for directors in irrigation districts is based on one vote for each registered voter.

Toward the end of the 19th century, this irrigation district movement was resisted by owners of large properties. Their response was the California Water District Act of 1913. In districts authorized by this act, voting was weighted by property; one vote for each dollar's worth of land.

The Wright Act was responsible for the incorporation of most of the districts up to the years immediately following World War II. Since the war, the trend has been for water districts to select those enabling acts (particularly the California Water District Law) that restrict participation in district formation to landowners, and weight voting according to the amount of property owned. This trend reflects the expansion of irrigable acreage in the southern and western San Joaquin Valley due to the completion of the SWP and the CVP. Thus, Goodall concludes, "there is a simple, straightforward relationship between large corporate entities and the public agency. Concentrated landownership is a primary source of political influence and there is a stable bias in the distribution of public benefits."

Goodall then describes some of his research in which he classified water districts by the type of enabling act and collected comprehensive data on elections and financial performance. His results showed that one person-one vote districts exhibit far greater competitive electoral performance and were relatively stable, financially, compared to districts with property-weighted electoral systems. He also found that those who cannot participate in a district's decision making are frequently excluded from important benefits.

Where there is differential access to the water system and its political system, there is also differential effects on the communities in the district. Goodall cites Isao Fujimoto's work in which towns were analyzed according to their location in democratic water districts with small farm operations or undemocratic water districts with large operations prevailing. Fujimoto found that the areas characterized by small farm operations have given rise to democratic political institutions (such as water districts) and that the towns in these areas are rich and complex in character. On the other hand, areas in which large farms predominate have given rise to communities which are relatively simple (few if any services or institutions) and which tend to have undemocratic water districts. Similar findings are noted by Professor Dean MacCannell's studies of the Westland Water District-an area of extensive landholdings and property-weighted voting in water districts. Deteriorating rural communities, characterized by negative social conditions are the norm in this area (see *Components* 2(3):9-12).

Goodall then looks at the broader picture and observes that there are "social costs as well as environmental costs to the massive interbasin transfer of large quantities of water." He compares general income, poverty, employment, education, and public health statistics between eight northeastern water origin counties and San Joaquin Valley counties and finds a big difference. Goodall concludes that "In the San Joaquin counties, site of an abundant, rich agriculture, by American standards a sharply divided society has emerged. In the northeast, there is readier access to civic institutions and a more nearly even distribution of material reward."

## **Organizational Convergence**

Goodall describes the two major water organizations in California: (1) the Department of Water Resources which is responsible for protecting, conserving, developing and managing the state's water; and (2) the State Water Contractors Corporation which represents twenty-eight of the thirty water districts which have contracted for water service from the SWP. These two organizations are dependent on one another. The Department is financially dependent on the Contractors Corporation since \$711 million is drawn to it annually from the SWP. The Contractors Corporation is dependent on the Department for the water. The Department is a public organization, accountable to the governor and the people of the state. The Contractors Corporation is a private corporate entity consisting of water districts, without elected representatives. Yet, Goodall points out that despite their apparent dissimilarity, they are remarkably similar. They share personnel with similar values, interests, backgrounds and expertise. There is a general unity and sense of consensus among the people of both agencies. Thus, the distinction between these two agencies is blurred.

Goodall summarizes three trends: (1) an increase in the concentration in land ownership in the San Joaquin Valley; (2) the expansion of irrigable acreage in the southern and western Valley and an increase in water districts with property-weighted electoral systems; and (3) the convergence of the major public and private water organizations in the State. Based on these findings, he concludes that water development is fostering a new political economy in California. The tendency to weight voting by property has created new institutional arrangements in which water district priorities are less likely today to be influenced by the preferences of resident registered voters. The distinction between political and economic power and between public and private considerations of welfare has been blurred. New, private hierarchies have displaced public organizations and elected representatives so that the participation of ordinary citizens is now limited. The result, according to Goodall, is that "both environmental degradation and social inequity have come to be described as 'development.'" He ends by suggesting that the process is not complete and that we monitor these trends and their results on rural communities more closely as we plan for the future.

For more information write to: Merrill Goodall, The Claremont Graduate School, 170 E. Tenth St., McManus Hall 225, Claremont, CA 91711-6163.

(GWF.009)

Contributed by [Gail Feenstra](#)

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## The death of Rarnon Gonzalez: The modern agriculture dilemma.

*Wright, Angus*

University of Texas Press. 1990

Angus Wright's carefully documented book about agriculture in modern Mexico weaves together field observations, personal interviews, and scholarly reports to raise fundamental questions about the use and abuse of pesticides. Wright is professor of environmental studies at California State University, Sacramento. He went to Mexico seeking to understand why pesticide poisonings of migrant workers have become so common, and what could be done to prevent them. He left convinced that pesticide abuse is rooted in unjust social conditions stemming from regional inequities introduced into rural Mexico by the Green Revolution.

The book's centerpiece is the story of how the Culiacan Valley in northwest Mexico was transformed from a quiet rural hamlet into a center of pesticide-intensive agriculture devoted to exporting vegetables to the United States. Wright shows how Culiacan's new wealth was purchased at the cost of the environmental and economic decline of traditional agriculture in the Mixtec region of Oaxaca, and the exploitation of the workers who fled that region in desperation to seek out work in Culiacan's fields.

Many parts of this story have been told before, but Wright weaves them together into a complex, coherent picture which links technical concerns about pesticide practices to their cultural and political context. For example, Wright documents the recent trend toward greater use of "nonpersistent pesticides," chemicals which leave few lasting residues in food or the environment, but are still dangerous upon immediate exposure in the field. He notes that this shift has weakened the political linkages between farm workers and consumers. As he puts it, "The precise degree of linkage between consumer interests, environmental interests, and the interests of farm workers and rural residents is not a given but rather changes as the technology of pesticides changes, severely complicating judgements about what constitutes safe pesticides" (p.202).

A key theme of the book is that the problems inherent in modern agricultural production are primarily political; "not the obstacles thrown up by cruel nature, but adversities created by unresolved human conflict" (p.285). Solving pesticide problems will thus require comprehensive political changes rather than simple campaigns to educate workers and growers:

*"The problem is that ignorance and unregulated promotion of dangerous technologies are intimately tied to the political relationships and the ideological assumptions that determine how a nation is ruled. Abusive use of*

*pesticides is usually the result of a whole set of problems that indicate the loyalties and purposes of the people and groups who hold power. The problem of tens of thousands of acres of fine farmland given over to large-scale commercial production of crops through abusive use of pesticides by millionaire farmers is strongly related to the continued powerlessness of peasants and farm workers and their relative ignorance of the safeguards needed in applying modern technologies. This situation is in turn related to much broader political and economic issues involving a nation's relationship with the rest of the world. The fact that 70% of the pesticides used in the Third World are used on products for export to wealthy nations expresses the strong connection of pesticide abuse to the particular kind of relationship that predominates between rich and poor countries. In addition, the Mixtec farm workers who tie Culiacan to the collapsing traditional regions in Mexico also tie Mexico to California, Texas, Arizona and force us to ask how the unequal development of Mexico will affect the future of the United States" (pp.217-18).*

Wright's point of departure is the death of a young Mixtec named Ramon Gonzalez (the name was fictionalized for the study) while picking tomatoes as a migrant laborer in the Culiacan Valley. Though definitive evidence is hard to come by, the cause of his death was most likely pesticide poisoning. Like the overwhelming majority of workers Wright observed, Ramon worked in close contact with dangerous chemicals without having been provided with any of the recommended safety equipment. In addition, he had to bathe in an irrigation ditch that contained pesticide residues. Wright's pursuit of these details soon led him to broader inquiry into how the logic of agricultural development in Mexico led Ramon to be working under such dangerous conditions.

The family of Ramon Gonzalez was from Oaxaca in southern Mexico, a Mixtec region whose culture runs back over a thousand years. Drawing on first-hand observations, Wright offers a sympathetic portrait of this region and its people. He describes in detail their tradition of subsistence agriculture and the cultural underpinnings of that tradition. Over the centuries the Mixtec emphasis on economic security and community solidarity has come into conflict with the alternative values and practices of various ruling elites in Mexico. As Wright succinctly puts it, "Peasants dream of relatively autonomous rural communities within what is presumed to be a closed natural system. Elites dream of greater consumption, growth, and monumental undertakings" (p.186).

During the 1940s, these competing world views clashed when Avila Camacho replaced Lazaro Cardenas as President. Cardenas had instituted policies that strengthened rural regions by redistributing land to peasants, while Camacho instituted new policies to boost agricultural productivity via exports. Camacho invited Rockefeller Foundation scientists into the country, and the Green Revolution was born. Wright characterizes the results:

*"If the drive for industrialization creates severe regional inequalities, more damage is done. This is especially clear in the case that is the centerpiece of this book-the brutal exploitation of the poverty and environmental ruin of one region to promote reckless, environmentally destructive growth in another-the relationship that ties Culiacan to the Mixteca. The problems of the poorer region deepen, and the very cheapness and abundance of labor flowing out of*

*the poor region encourage a cavalier attitude toward the health and loyalty of workers. Because workers are abundant and desperate, they are considered expendable."*

Wright demonstrates how the narrow technical perspective of Green Revolution scientists contributed directly to the plan's social and environmental failures. Many of these failures were predicted by early critics of the plan who had a greater understanding of Mexico's history, culture and politics. Wright's review of this history makes a powerful case for why a systems approach to agricultural development is needed.

Wright believes that the logic of agricultural modernization in Mexico, and its dependence on pesticides, is technically and politically self-defeating. Created to boost industrialization and create a wealthier and healthier society, the modernization program has instead enriched a few rich producers while undermining the environmental and social health of the majority. The drain of rising health and welfare expenses, and social pressures resulting from massive migration into the cities, stand in the way of further economic progress. At the same time, persistent problems with pest resistance and declining soil quality make it doubtful that current levels of agricultural production can be maintained.

The root problems, says the author are flawed assumptions about the role of agriculture in making a nation prosperous. Wright concludes by raising five questions which are as relevant to California agriculture as to Mexico: "Is productivity the problem? Are traditional technologies an obstacle or a resource? Should agriculture serve as the instrument for industrialization? Is agriculture vitally linked to wild nature? Are technologies neutral?" His answers will not be shared by all readers, but are grounded in arguments that cannot be ignored.

Wright's story helps illuminate the powerful social and political forces that compel increasing numbers of Mexicans to become migrant laborers here in California. It is estimated that between 30-40% of the agricultural workforce in the San Joaquin Valley are Mixtec (see *Components* 1(4):10-11). Wright admires the capacity of the Mixtecs to band together to preserve their culture against overwhelming odds, and sees in this capacity a cultural building-block for creating a more sustainable agriculture: "I came to believe that the amazing capacity of many of Mexico's poorest people for sustained effort in a single direction and for solidarity among themselves under trying circumstances could together be a significant force toward a healthier society and a more sustainable agriculture. But those people will need allies" (p. xv).

For more information write to: Angus Wright, Department of Environmental Studies, California State University, Sacramento, CA 95819.

(DCC.001)

*Contributed by David Campbell*



## **Agricultural labor research symposium.**

*Labor Market Information Division, Employment Development Department,  
State of California*

Proceedings of a conference held June 5-6, 1991, Napa, CA.

This 164-page report highlights current developments in agricultural labor, especially the growing importance of farm labor contractors (FLCs) in California. It is an edited transcript of the Farm Labor Research Symposium held in Napa, California on June 5-6, 1991. The symposium was a project of the Labor Market Information Division of the state of California's Employment Development Department, in cooperation with the UC Agricultural Personnel Program and the Department of Agricultural and Resource Economics at UC Berkeley.

The symposium consisted of panels in three areas: farm worker studies, farm labor contractor studies, and agricultural labor management. Sixteen panelists presented findings from their recent research, and discussed with other panelists and audience members the implications of those research findings.

### **Farm Worker Studies**

In introducing the researchers on the farm worker studies panel, Don Villarejo of the California Institute for Rural Studies noted what made them unique. Until recently, most of the relatively scant information about farm workers was derived from the reports of employers. By contrast, the panelists assembled for this symposium "spend most of their time talking to farm workers."

The panelists agreed that increased production of labor-intensive commodities such as fruit and vegetables has increased labor needs in agriculture over the past 10-20 years. Despite this, and despite the Immigration Reform and Control Act (IRCA), the flow of unauthorized immigrants into the United States has contributed to an oversupply of labor. This oversupply leads to the underemployment of farm workers and exacerbates their low economic status. Existing services to workers, such as housing, health care, workers' compensation insurance, etc. are inadequate.

### **Farm Labor Contractors**

The Farm Labor Contractor panel was chaired by Ed Taylor of the Agricultural Economics Department at UC Davis. Taylor noted that "farm labor contractors are by far the most important single employer group in California agriculture." These contractors are middle men who recruit labor for growers for a fee. Most licensed contractors face intense competition, some of it from illegal FLCs, and operate with a very low profit margin. To

preserve this margin, they often charge workers excessive fees for needed services such as housing and transportation. All the panelists agreed with Taylor that, on average, workers hired by FLCs are worse off than workers hired by other types of employers in California agriculture.

While the stated intention of the IRCA reforms was to create a smaller, more legal and regular work force, Taylor's study of labor contractors suggests "a picture of a farm labor market that is still being fed by new and unauthorized immigrant workers." In this market, FLCs play an expanding and critical role. A key service to growers is the ability to avoid the employer sanctions that were part of the IRCA reforms. As Taylor puts it, "In fact, one could argue that evading employer sanctions may be an important service that farm labor contractors are a buffer between them, on the one hand, and labor laws, on the other."

## **Agricultural Labor Management**

The third panel was chaired by Howard Rosenberg, director of the UC Agricultural Personnel Management Program. Panelists focused on the role of alternative management practices in making the most productive and efficient use of labor, in order to maintain farm profitability. As Rosenberg puts it, "How workers perform is determined by what they can do and what they want to do. Personnel management decisions affect both, and through them, ultimately, business results and the quality of worklife for employees."

The search for economically viable and socially just conditions for labor remains a central task in the creation of a more sustainable agriculture here in the state. These proceedings represent a timely and insightful look at agricultural labor in California.

To obtain a copy of the proceedings, contact The Special Projects Unit, Labor Market Information Division, MIC 57, Employment Development Department, Box 942880, Sacramento, CA 94280-0001, (916) 424-7310.

(DCC.002)

*Contributed by David Campbell*