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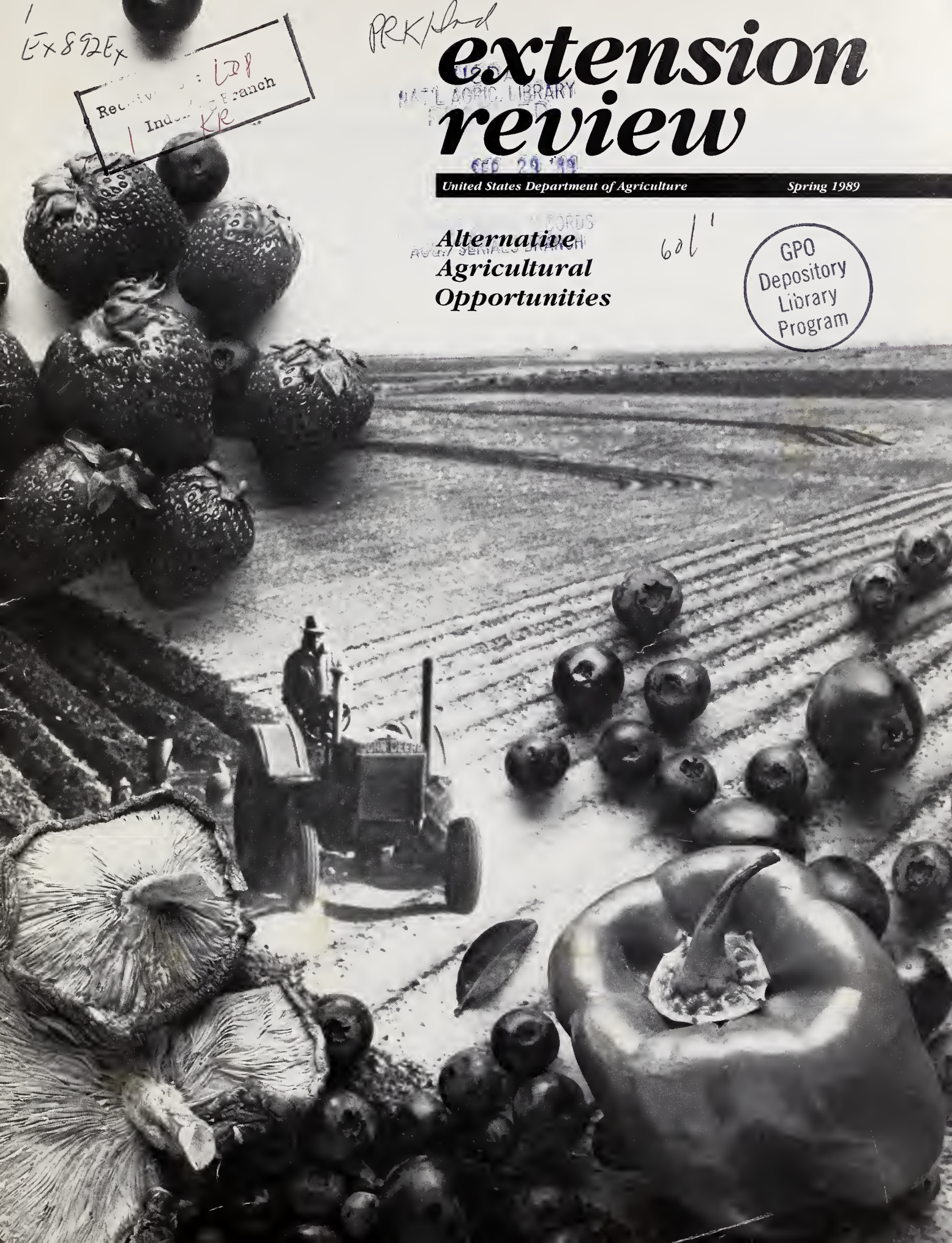
United States Department of Agriculture

Spring 1989

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Dimensions Of Agricultural Diversity



Clayton Yeutter
Secretary of Agriculture,
United States
Department of
Agriculture

Rural diversification is essential—the survival of American rural communities depends on it. Massive annual outlays for farm price and income supports are no longer defensible to the American taxpayer. We should begin now to look for a better way to ensure the economic well-being of farmers and small town businesses.

Farmers want and deserve more flexibility in planning their business enterprises. The focus on agricultural diversification by the Cooperative Extension System through its National Initiative on Alternative Agricultural Opportunities can provide an excellent frame of reference to help develop ways for farmers to earn a living in the market rather than from the government.

Every farmer, processor, truck driver, retailer, and food-service employee who deals in agricultural and food products operates in a global market place though some do not realize it. To compete successfully, American agriculture must match or better its finest competitors, whomever or wherever they may be.

Components Of Competitiveness

There are three primary components of competitiveness—price, quality, and marketing skills. Because of our remarkable production efficiencies, we can be price competitive in most agricultural products if exchange rates are reasonably stable and if we do not have to compete against the treasuries of other nations. However, we need to work creatively on quality issues and on marketing skills. We must also diversify into new value-added products with global demand potential.

In this regard, Extension conducts educational programs for farmers, ranchers, processors, and distributors to develop systems which will bring

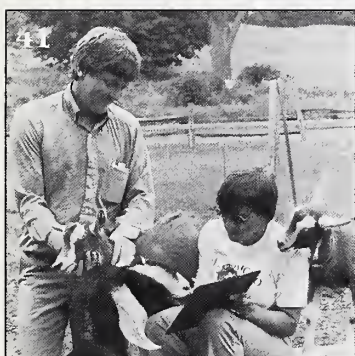
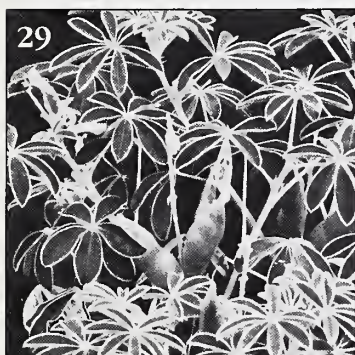
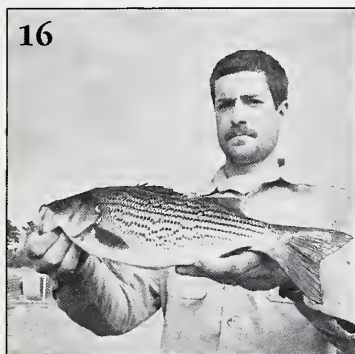
quality products into new or penetrable markets. An important role Extension can play in this process is to help these clientele think entrepreneurship, diversification, value-added, new products, global markets, and sound investment.

Mindset For Revitalization

This mindset is essential for farmers and rural businesses if we are to revitalize rural America. In addition, diversified systems that rely on renewable resources could address many of the environmental concerns confronting U.S. agriculture.

There will be many challenges to overcome in developing and commercializing alternative agricultural products. The U.S. Department of Agriculture is already working on some of them. Research is being conducted on several crop and livestock alternatives through individual and joint efforts of the Agricultural Research Service, the Cooperative State Research Service, the agricultural experiment stations, private organizations, and others.

This issue of *Extension Review* illustrates some of those efforts. The Cooperative Extension System is challenged to ensure that agriculture and rural America diversify to meet ever-changing demands and opportunities. ▲



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Variety For The Horn Of Plenty

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Our existing attitudes in American agriculture are bound by paradigms rooted in production agriculture. These paradigms rely on technologies which increase production or its efficiency. The new, desired attitudes will be entrepreneurial-based. They will address problemsolving through better management of information, superior cooperative efforts, and innovative individual actions.

In today's agriculture, enterprises and methodologies have become concentrated around a fairly small set of norms. This focus has increased the risk in economic, environmental, and social subsystems. Massive production and marketing of low-value products for food and fiber are the standard approach. A "producer mentality" reigns. Agricultural researchers, educators, regulators, and practitioners view farmers and ranchers as "growers." This attitude leads to stagnation of the entrepreneurial aspects of farming, and to excessive concentration of research and Extension resources on production systems. We use technology and information to increase yield. But we cannot simply grow our way to success in agriculture.

Risk Management

Diversification is an elementary and important risk management strategy. Diversity is recognized as a necessary condition for stability in biological, economic, and social systems. Sustaining our national and global agriculture systems may depend on increasing their diversity. People and institutions within and beyond agriculture will need to change their thinking for diversification to occur successfully.

One way to diversify is to diversify our products. We can generate products from traditional or new crop and/or livestock bases. The products may be food, feed, or fiber as we know them or they may

be completely different product groups. As research, technology, and consumer demand lead to new utilities, new wants and needs will create new markets for new products.

Alternative products from agriculture may address severe environmental problems. Use of automobile fuels derived from crops is being considered as an air pollution control strategy. Biodegradable plastics manufactured partially from crop products are available, and are being investigated for broader applications. In some cases, ideas for products which have not been economically feasible in the past may be revisited as environmental or other concerns outweigh pure economics.

Many of these products will rely on renewable resource bases. The past five decades have seen overwhelming productivity gains in American agriculture. In the fairly near future, we will see similar gains in product development from our farm and forest resource bases. It will be tremendously exciting to be involved in developing and commercializing products that come from the living environment and not from nonrenewable mineral resources.

Commercialization

A second way to diversify is through commercialization of alternative crops, processes, and products. Often, the private sector finds the risk too high, costs too inhibiting, and the time frame too long to capitalize on an emerging opportunity. In such a case, the U.S. Department of Agriculture can work directly with industry to see that new crops are ready for farm level production, that processing or extraction technologies are ready, and that the industrial market has been identified and is ready to buy the raw or processed material.

To promote commercialization, we move systematically from research to development and from development to demonstration. This latter stage is highly important. Public and private sectors work together to conduct commercial runs in existing mills or factories. Successful runs at industry's plants, by industry's people, that meet industry's standards are paramount to market acceptability and business development.

Commercialization projects allow government and industry to work directly together, sharing resources and facilities for mutual benefit. The public benefits from technology adoption because public

research, discovered and nurtured over many years is commercially applied. Industry benefits from new products and markets, and from accelerated, commercial applications of technology through risk sharing with government.

Process

We can also diversify through process. We can diversify the processes through which we manage, market, and produce the stocks and goods of agriculture. Currently, there is interest in developing low-input agricultural production systems. To succeed, they will require changes, not only of production practices and technologies, but also of overall management and marketing strategies and skills.

The term "low-input" may be confusing. These systems actually involve a kind of "redistribution." Agricultural enterprises are systems; they incorporate labor, capital, management, information, chemicals, technologies, and other input factors into an operational scheme to achieve results. There is a relativity among all these factors. They balance one another, much in the way of a thermodynamic equation. If one input is reduced, others may increase.

When farmers understand how these equations work, they can balance them in a way that improves their individual competitive advantage or satisfies their own management goals. Their choices will diversify agricultural processes, and should improve the overall stability of the agricultural system.

Diversification may be easiest to understand at farm level. If a farmer chooses to spread his or her risk by diversifying the product/process mix within the enterprise, he or she is ensuring against catastrophic loss. Yet an operator may increase risk in an attempt to increase profits. Potential changes in farm programs would require many farmers to rethink their risk management and operational programs. Enabling farmers to make the right choices would require a major educational effort by the Cooperative Extension System.

Impacts

Communities are also affected by agricultural diversification. Alternative products which could be generated from agriculture may have varying

degrees of value added to them throughout their route from field, forest, or feedlot to farmgate, processors, distributors, and consumers. Many rural communities could experience significant revitalization through processing or handling raw, intermediate, or finished products from alternative agricultural sources. Again, we see a major opportunity for Extension's educational programs in this area of rural revitalization.

Regionally and nationally, diversification of agriculture could add stability and security through managing of risk and increasing self-reliance.

Major Task

The Cooperative Extension System now, and especially in the future, has a major task, that of enabling farmers and ranchers to effectively diversify their operations. As the educational arm of USDA, Extension staff members at the national, state, and county level face a formidable challenge: through educational programs and facilitation to build the networks, catalyze the strategies, transfer the technologies, help identify and obtain the resources, and provide the multidirectional communication required for significant diversification to occur. **A**

Jewels From The Gem State

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Opposite. As an alternative enterprise, Lyca and Jim Elias, ranchers in Idaho's Hammett area, began to produce their Morning Star dried tomatoes for the gourmet food trade. Extension food scientist John Montoure of the University of Idaho is helping them assess equipment for the small commercial plant they envision. This page. Spence Ellsworth of Carey, Idaho, began to market Craters of the Moon mineral water when family members found that refrigerated water from the ranch's spring "tasted great." Both businesses exemplify how Idaho entrepreneurs—aided by Extension—are finding new ways to profit in agriculture.



Marlene Fritz
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From aquaculture to spearmint oil, from bottled water to specialty wools, from wildflowers to guest ranches, Idahoans are finding new ways to make money in agriculture.

In January 1988, about 300 persons gathered at an idea-sharing "Adapting in Idaho Agriculture" conference in Twin Falls. About 60 presentations and panels were included in the 3-day program.

University of Idaho Extension agents helped locate entrepreneur-speakers, and the Agricultural Communications Center there developed a successful information campaign. The conference provided a comprehensive look at how Idaho entrepreneurs are addressing the needs for agricultural diversification and how Extension can help them achieve success.

The meeting was sponsored by the offices of U.S. Representative Richard Stallings and Governor Cecil Andrus; the Agriculture Department of the College of Southern Idaho; the University of Idaho Cooperative Extension Service; the Idaho Departments of Agriculture and Commerce; and the Magic Valley Agricultural Institute.

Organic Grain A Natural

In Camas County, where most grain growers can't afford to apply herbicides or insecticides anyway, the decision to grow organic grain wasn't a tortuous one for Reuben Miller, a speaker at the conference.

"The conditions we had to meet were near enough to what we were already doing that we didn't have to make any drastic changes," says Miller, who manages the Camas Grain Company.

In 1980, Miller began negotiating with a San Francisco-based organic bakery. He evaluated what area growers were doing locally and what they could realistically expect to grow for the organic grain market. Starting with a few loads, Camas Grain's organic grain enterprise ballooned to about 100,000 bushels a year and now constitutes about 50 percent of the business—"the side of the business that we survive on," says Miller.

About 40 growers within a 100-mile radius supply the organic grain, agreeing not to apply herbicides, pesticides, or chemical seed treatments. They may use organic seed treatments and organic fertilizers. Although the yields they get aren't noticeably different from those produced by the methods these growers have traditionally used, the price difference is significant, varying from 20 to 80 cents more a bushel.

Miller says the most important tool in marketing an alternative agriculture commodity is "raising a quality product."

Bottling a "Liquid Asset"

The Ellsworth family of Carey, Idaho, had always relied on their ranch's hot springs for heating. In 1977, when their cold water well ran dry, they found that refrigerated water from the spring "tasted great." The result was a new family enterprise—bottling and marketing Craters of the Moon mineral water.

But Spence Ellsworth says that marketing a new product doesn't just mean having a good product and heading for the store. "Shelf space is hard to get," he says. "You have to create a demand by consumers to influence store managers."

What boosted their enterprise was word-of-mouth promotion by individual buyers and media attention from a half-dozen Idaho television stations and the wire services. "You can't buy that kind of advertising," comments Ellsworth. "The media will get behind an enterprise that appears to have an opportunity to create jobs."

Because competition is fierce, the economies of scale can be deadly for the small producer who buys everything in limited quantities. "For us, a label costs 6 cents, but the big companies get each one for a half cent," Ellsworth points out. "Our bottles cost us a lot more, and so does our freight."

He said the one cardinal sin of starting a new product enterprise is not being able to meet the demand. When cash flow is tight, inventories are necessarily small—and ordering supplies can take months. "If the demand takes off really fast, you may not be able to keep up," he says, "so proceed with caution."

Idaho: Famous Tomatoes?

Ranchers Jim and Lyca Elias produce dried tomatoes, packed in fresh herbs, fresh garlic, and olive oil—free of additives and preservatives. The Elias's "Morning Star" tomatoes sell for \$10 to \$16 a jar in the gourmet trade—not a low price, but substantially lower than their competition.



Children of first-rate ethnic cooks—Italian and Lebanese—the Eliases call themselves "food people." They noticed that gourmet magazines were featuring an increasing number of recipes calling for dried tomatoes—which add more flavor and less juice than fresh tomatoes. Friends who tasted their homemade product encouraged the Eliases to go commercial with it.

After locating growers of Roma tomatoes in New Mexico and California and a bulk dehydrating facility in California, the Eliases began seasoning and packaging their dried tomatoes in a house not far from theirs. University of Idaho Food Scientist Jorg Augustin conducted initial food safety tests before the Eliases sent the tomatoes to the Food and Drug Administration for approval.

To promote their product, the couple held weekend tastings in Sun Valley and Boise stores and sent samples to food critics and gourmet magazines. A mention in the February 1988 issue of *Food And Wine* magazine caused orders to explode. "I'm glad it didn't make the November issue," says Lyca Elias. "We couldn't have met the demand at Christmas-time."

Now the Eliases are investigating the possibility of building a small commercial plant and developing several new products. Food Scientist John Montoure of Extension at the University of Idaho is helping them to assess the types of equipment they may need and to identify possible sources, and is advising them on product safety measures.

So far, the Eliases have done most of their own labor. Their three daughters—ages 7 to 12—help where they can. Lyca Elias says entrepreneurs should be aware of how a new business can affect home life. "It has to be a team effort," she says, "and you have to be ready to work real hard at first. But it can be done!" ▲

Direct From Farm To Table



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Many Maryland farmers face a frightening dilemma: Should they learn to grow and market new crops using innovative techniques or should they build a new life off the farm?

Urban areas loom and encroach. New neighbors fear pesticides and don't like the smell of pigs. City dwellers face their own fears. They wonder how to feed their families well and keep them healthy with limited resources.

Could these two very different and sometimes conflicting groups be brought together for the benefit of all?

Pilot Project

In June 1988, David and Mary Rogers, a cooperating farm family from Caroline County on Maryland's Eastern Shore, began their weekly trucking of fresh grown vegetables and flowers to "town." Town in this instance was the Cherry Hill public housing development in Baltimore City. The "Tailgate Market" site was sponsored by the local public housing department management office and the neighborhood tenant council.

This farmers' market was the result of months of effort by Baltimore City Extension agents, who acted as liaison between the farmer, sponsor, and consumer and provided public relations.

The development of a framework for a special marketing project for the state initiative "Enhancing The Profitability of Maryland Agriculture" began in the fall of 1987. At the University of Maryland, a Cooperative Extension Service (CES) faculty committee sought to initiate a workable pilot program to help farmers tap unreached markets for Maryland produce. They wished to improve the nutritional status of low-income families by making fresh, high-quality produce readily available and increase the positive interaction between Maryland's urban and rural residents.

Baltimore City Extension brainstormed with a local citizen advisory committee. Extension specialists selected the Cherry Hill Housing Development for the pilot project because initial community resource contacts had been made there. Also, there was only one food market in the community and few other sources of fresh produce.

Site Chosen

Deborah Courtney and Yvonne Smith, social service counselors for the housing project, were the main contacts in Cherry Hill. They agreed to serve as sponsors for the project in the community and liaison to the housing project manager and the tenant council.

The site was chosen across the street from the management office, which also housed the local senior citizen center. This site provided ready access to the sponsors as well as a core group of customers from the center.

At this point, Robert Rouse, agriculture agent in Caroline County, suggested the Rogers family as cooperating farmers. The Rogers, from Wyndell's Venture Farm in Harmony, Maryland, sold fresh flowers and vegetables at farmers' markets in the Washington, D.C., area. They were also willing to try new ideas.



The Rogers had some apprehension about coming into Baltimore, an area unfamiliar to them. The local sponsors in Cherry Hill gave the Rogers an opportunity to get to know people in the community, who they could go to for help if problems arose.

City Extension agents met with Courtney and the tenant council president. The president agreed to support the tailgate market. The Rogers arranged to donate 4 percent of sales to the council, as they did at another market they used.

Cherry Hill is a low-income public housing development in which many people receive food stamps. It was important, therefore, that the farmer be able to accept them. The Maryland Department of Agriculture provided the Rogers with the necessary information about this matter and sent a representative on the opening day to review procedures with them.

Market Promoted Locally

To reach people within the development, Extension localized the market promotion. For opening day, Extension staff designed a flyer that was distributed to each household in the neighborhood. It was also distributed to local churches, schools, the community center, and the shopping center. After opening day, the flyer was blown up to poster size to be displayed in these areas throughout the summer.

Results

The Cherry Hill Tailgate Farmers' Market did business on Mondays from June 6 through August 8. Sales were slow at first, but they picked up as summer crops came in. It was an educational experience for everyone involved—the farmer, the sponsor, the consumer, and the Extension specialist.

"We liked getting good, fresh food to the people so they could enjoy it," said Mary Rogers.

"We needed fresh food," commented regular customer Gwendolyn Johnson. "This way we didn't have to travel to get it . . ."

"I learned how they farmed, how crops got out," said Social Service Counselor Yvonne Smith. "Customers who bought said they were pleased."

Potential

The pilot project illustrates the potential of neighborhood tailgate markets. With what we learned, we hope to expand the program to include more neighborhoods and farmers. The last 2 weeks of the market, the Rogers started at one site in the neighborhood, then moved to another to reach more people in the community and increase sales.

Some new markets may actually become neighborhood routes, each stop having a sponsor. But there are difficulties. "Breaking down the truck and setting up and moving from place to place isn't easy," says Mary Rogers. "We need young people to jump in and out of the truck, but people don't always want to buy from a young person." For this reason, youth and older persons are needed to work on the project.

Extension could use these markets for nutrition and horticulture education, offering demonstrations and recipes, while increasing the market's appeal. Tips on selling at farmers' markets could be offered to farmers. Flyers might include information on available produce and dates. More mass media promotion might also be helpful.

Agricultural profitability is now, more than ever, a two-way street involving both producers and consumers. Getting together can offer urban families good taste, good nutrition, and a hearty welcome for farmers. ▲

Opposite. David and Mary Rogers, farmers from Maryland's Eastern Shore, display their fresh produce at a public housing development in Baltimore City. This marketing project was initiated by Baltimore City Extension agents to help farmers tap unreached markets for Maryland produce and improve the nutritional status of low-income families. This page. A Baltimore backyard gardener, (left), checks out the Eastern Shore melons offered for sale by farmer David Rogers.

How Entrepreneurs REAP Profit

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Judy Green
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and
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*Associate Professor and
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Innovation, diversification, and adapting to change are not new ideas in agriculture; over time, most farms have undergone many transitions in production, marketing, and management strategy. But today there is renewed interest in farming alternatives—nontraditional crops and livestock, new marketing strategies, innovative production systems, and a variety of farm-based small business options.

Extension agents in many New York counties have been besieged with inquiries about farming alternatives. New York offers good opportunities for agricultural diversification and innovation, and farming entrepreneurs are recognizing and capitalizing on them.

They are raising nontraditional farm products such as fallow deer, salmon and trout, fresh-picked culinary herbs, seedless table grapes, turf, flowers, and ornamentals. They are developing innovative marketing strategies, including sophisticated on-farm retail operations and national mail-order businesses, and they are developing organic methods, hydroponics, and other production innovations. They are also adding value to raw products by producing juices; wines; yogurts; specialty cheeses from cow, sheep, and goat milk; maple syrup confections; pesto, sauces, and other gourmet processed foods; and handcrafted floral, herbal, woolen, fur, and hide items.

Entrepreneurs are providing services and recreation with farm tours, on-farm restaurants, bed and breakfast inns, petting zoos, cross-country skiing, and campgrounds. Some of these entrepreneurs represent the vanguard of emerging agricultural industries that will provide opportunities for many other farmers in the future. But they face many challenges. Like other small business startups, a new farm-based venture requires resources, careful management, and hard work, and may involve considerable financial risk. And when the enterprise is an unusual one, the lack of information, technical advice, and marketing support often places the innovator in the multiple roles of researcher, Extension specialist, and marketing agent for other producers.

Farming Alternatives Project

In 1986, Cornell started the Farming Alternatives Project under a grant from the New York State Department of Agriculture and Markets. Working through the Cooperative Extension network, the project helps families identify and evaluate new enterprise options and marketing strategies. Rather than simply dispensing information on specific alternatives, it emphasizes the decisionmaking process and helps people develop the management and marketing skills necessary for successful diversification.



As one of the first activities of the project, a series of four highly successful 1-day workshops was conducted for farm and rural families. The workshops featured examples of successful farming entrepreneurs and provided training in basic business planning, management, and marketing to more than 300 participants.

A videotape and a handbook for prospective farming innovators was developed for the project. *Farming Alternatives: A Guide To Evaluating The Feasibility Of New Farm-Based Enterprises* takes the reader through a step-by-step process, using a case-study and workbook format to evaluate personal and family considerations, available resources, alternative enterprise options, market potential, production feasibility, and cash flow.

Exciting Collaborations

The materials and programs have led to some exciting collaborative efforts between Extension and other educational and technical assistance agencies. Agents have found support from community colleges, small business development centers, resource conservation and development councils, State University of New York (SUNY) colleges, private industry councils, and the New York State Department of Education.

Farming alternatives programming also has provided a way for innovative farmers, farmers looking for new ideas, and would-be farmers to share experiences, learn from each other, and provide mutual support. In western New York, Extension Agent Joan Petzen helped organize a group called REAP—Rural Enterprise Association of Proprietors—after many of the participants in her farming alternatives program wanted an ongoing forum.

Opposite: Mel and Phyllis Nass of Venture Vineyards, in Lodi, New York, display their new farm products—concord table grapes and grape juice. This page: Peggy Knapp-Clarke (left), who runs a small dairy farm in Tioga County with the help of her brother Jason Knapp and his wife Ellen, maximizes profits from her small herd by marketing high butterfat milk to a yogurt manufacturer at a premium price. Jason, whose farm adjoins Peggy's dairy, is experimenting with such new enterprises as a pick-your-own blueberries operation.



Beth Feldman of Lively Run Goat Dairy, Interlaken, New York, feeds some of her milkers. She markets several varieties of goat's milk cheese locally and in New York City. Nontraditional farm products such as specialty cheeses are attracting increasing interest from farmers.

REAP members meet monthly to discuss production, management, marketing, and policy issues that affect their enterprises.

Research Dispels Myths

Two surveys conducted by the Farming Alternatives Project have helped to dispel a number of myths. The first is that only small, part-time farms are involved. Actually, among the 167 New York farms surveyed (each of which has developed some sort of alternative enterprise), median farm size is about 100 acres. And 30 percent are full-time or nearly full-time farms.

A second myth is that only new or inexperienced farmers are getting into alternatives. But more than a third of these farming entrepreneurs grew up on a commercial farm. Operators reported a median of 11 years of active farming experience.

One of the most significant myths dispelled by the research is that farmers going bankrupt with a more traditional enterprise can save the farm by getting into a new enterprise. Of the innovative farms surveyed, only about 10 percent were experiencing major financial difficulties when they started their new enterprise. In contrast, almost 75 percent had no significant financial stress.

A final myth is that alternative enterprises are not profitable. Actually, 60 percent of the enterprises surveyed were reported to be profitable in 1986, with 20 percent producing a "significant profit." However, economic viability is a real concern—almost 30 percent of the enterprises lost money.

An Adaptable Approach

Farming entrepreneurs in every state are working hard to create new opportunities for themselves and for other farmers. Meeting the information and technical assistance needs of such a diverse group presents many challenges for the Extension agent.

The business management approach and the materials developed by the Farming Alternatives Project in New York can be used in any region. They offer Extension agents the opportunity to take a leadership role, working with other community resource groups to help turn "farming alternatives" into viable new industries for the rural economy. ▲

Herbs And Spices— Arizona Alternatives

Fred Harper
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Growers of vegetable and agronomic crops in central Arizona are looking for alternative crops that have good income potential and are marketable.

Two circumstances have led to the need for change. First, a new state law limiting future groundwater use is spurring a shift to crops that require less water for production. Second, many small landowners find vegetables an unsatisfactory crop because it is so difficult to plug into the conventional wholesale domestic marketing system. Competition from local food chains makes direct marketing difficult.

Crop Potentials

Investigation has shown that a range of alternative crops broadly classed as herbs and spices offers good potential for these growers. Market demand for these crops is expected to increase. Many that grow well in Arizona's climate are imported.

Some crops in this group can be produced by small growers. It is the marketing of the crops that presents the greatest challenge—growers will need a marketing organization and a central processing facility. The county's Extension-sponsored Industry Development Corporation (made up of growers and economic development people) has plans to help fill these needs.

Because the herb and spice category encompasses a wide range of crops, it also has a diversity of market outlets. Many of these crops can be marketed locally at retail and as value-added types of products, giving them high-income potential.

Technological research is needed on some herb and spice crops to develop production techniques that will make them competitive with imports. The needs include sources of propagation material,

mechanical harvesting methods, and more efficient processing after harvest.

Workshop For Growers

A 2-day workshop helped stimulate awareness and interest in these potential crops and their market possibilities. Several months before the workshop, a demonstration planting of herbs and spices was established; a tour of the planting helped participants become familiar with many of the plants discussed.

The demonstration plot was also useful in developing cropping information, such as seasonality of production and culture, and it provided samples to be used for evaluating harvested-product quality.

One of the foremost national experts on marketing these types of crops came to Maricopa County to conduct the workshop. Each person who registered received a copy of the speaker's book, *Herbs As A Potential Cash Crop*, which they were to read before coming to the workshop.

Thanks to the interest generated by the workshop, a state growers' association was formed. Primarily educational in purpose, the association meets monthly. One of its activities is to develop marketing for growers.

Support From Industry Committees

The county's Vegetable Industry Development Corporation is providing Extension with support for obtaining research grants to help solve some of the problems associated with establishing herb and spice enterprises. The development corporation also plans to help put together a marketing organization and has helped develop a 5-year marketing plan.

A College of Agriculture interdisciplinary committee at the University of Arizona was established to obtain additional

support for the project. It involves both research and Extension personnel at the state and local levels. Members of the research component of this committee will be involved in research on making the crops marketable. The work will be supported by the grants obtained by the development corporation.

Developing Markets

Two members of the new herb association already have established local market outlets for several growers' products, including fresh herbs, processed foods such as jams and jellies, and items such as wreaths and potpourri.

The marketing specialist who led the workshop is conducting marketability tests on several locally grown products; other products are being shipped to marketing firms for recommendations about evaluation and preparation for shipment. ▲

New Ways In The Old West

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"If you want to raise alternative crops, you must really think like a business person," says Joe Higgins as he reviews his computer spreadsheets. Higgins raises German statice, an astringent herb intended for culinary and medicinal purposes, in western Montana's Bitterroot Mountains. He earned a 40-percent net profit on 1/4 million dollars' worth of dried flower sales in 1987, but, he concedes, "It took 10 years to get there."

Higgins believes that too many farmers do not review costs and returns well enough to know exactly what they earn from conventional crops. "If a farmer can't tell you precisely what his profit is on barley, how can he decide if some exotic crop is worth the effort?" he asks.

Like many other growers of agricultural alternatives, Joe and Judy Higgins pioneered their own markets, with visits to trade shows all over the Nation and personal contact with hundreds of buyers, jobbers, and store operators. They point out that the lack of information from conventional sources is a barrier.

Evolving Agriculture

Western Montana and neighboring Idaho once supported a wide variety of crops. In spite of high altitude and short seasons, food and feed crops appeared soon after the first miners sought gold, silver, and copper in the mountains. As the "booms" faded and agriculture underwent changes, fruit, vegetable, and seed crops gave way to hay and grain.

"It's easier to grow something that you can dump at the stockyards or the elevator," one county Extension agent says, "and agricultural programs and subsidies are a major part of decisionmaking about enterprises."

In recent years, small but determined groups of farmers have reintroduced some of the crops which once fed miners and loggers. They also

have introduced some new ones, such as Higgins' herb static, and open-pollinated garden seeds suitable for high-altitude plantings. Even more exotic is the harvesting of pollen, royal jelly, and propolis from bees for human use. Other entrepreneurs are raising llamas, elk, buffalo, and exotic fowl.

Entrepreneur Characteristics

Barbara Russmore of Alternative Energy Resources in Helena has analyzed nearly 200 survey instruments returned by farmers who are raising alternative crops, or who are in transition to less traditional enterprises. She notes that most of the people seriously working on agricultural alternatives are long-time farmers. "The majority of our sample has been in farming 20 years or more," Russmore says, "and about three-quarters of them depend entirely on the sales from their farms for income."

Developing Enterprises

Many people who have explored alternative enterprises report that they have incurred large telephone bills, including many calls to overseas locations, and that they have carried on voluminous correspondence with widely scattered scientists in order to educate themselves.

Few alternative enterprises receive any government support, and most have had to develop their own markets, since the products do not fit the usual market outlets. "I could not enter the traditional dairy market," states Alice Brosten, "so my family and I decided to market our milk as cheese." For the past 5 years, she has sold Brosten's Farm Cheese in unpasteurized forms to a select market that she had to start and expand on her own. It meant high long-distance telephone bills and driving thousands of miles to visit hundreds of store managers.

Hugh Spencer is typical of those who create their own markets. He reserves space at trade fairs and sportsmen's shows all over the United States to display and sell his artificial fishing flies made from specially developed bantam chickens.

Mail order is also an important part of agricultural diversification. Suzanna McDougal of Hamilton dries herbs in old pheasant incubators she salvaged from a state fish and game farm, packages them, and mails her products all over the Nation. Diana Downs, another herb grower, mails live plants to thousands of customers.

Alternative agricultural enterprises may involve a wide variety of different, but balancing, operations. At the N-Bar Ranch in central Montana, sheep, cattle, forage crops, and grain are raised according



to organic principles and sold to specialized markets. The ranch also produces vegetables, grass, and legume seed. In addition, the owner leases part of the ranch for hunting and provides personally guided hunts for trophy whitetail deer.

Necessary Precautions

These Montana operators agree on some precautions for others who may be considering an alternative agricultural enterprise:

- Find a market, however small, and begin developing it;
- Start out carefully to fill that market, and expand as errors are overcome;
- Know "the numbers" exactly, in order to have accurate data for future decisionmaking; and
- Be ready to try new ideas as the competition increases.

All of the successful Montana producers have been persistent in their quality control efforts, relentless in pursuing markets, and diligent in keeping and analyzing records. Their personal commitment has helped them stay afloat. ▲

Opposite: Karen Schneeberger fills catalog orders for her new alternative crop at her ranch near Victor, Montana—high-altitude garden seeds. This page: Karen surveys her stand of open pollinated popcorn.

245 Farming Hybrid Striped Bass

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Dave Bova, a fisheries technician at North Carolina State University, Raleigh, exhibits a pond-raised product of aquaculture—the hybrid striped bass. Extension specialists believe that this hybrid, a cross between a striped bass and a white bass, has potential as an alternative “crop” for many farmers in the state.

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When Lee Brothers harvests his newest crop, he doesn't climb into a combine or hook up a baler; instead, he pulls on waders and grabs a seine.

Brothers' “crop” is growing in ponds built on his Beaufort County farm on the North Carolina coast. Like a number of other farmers, Brothers is trying aquaculture—fish farming—as an alternative to conventional crops such as soybeans and corn.

Fish farming is not a novel idea. Catfish farming has become a thriving industry in Arkansas, Mississippi, and Louisiana; other types of aquaculture have long been practiced in other parts of the world. What sets Brothers' effort apart is the kind of fish he is raising—a hybrid produced by crossing striped bass with white bass. The result is what Brothers and others usually call a hybrid striped bass.

A New Approach

A significant amount of research has focused on the hybrid striped bass in recent years, but Brothers may be the only farmer in the Nation raising the fish commercially in ponds. A California farmer has been raising hybrids for several years, but he uses a system that involves tanks and raceways, Brothers says.

Among the scientists who see commercial potential in the hybrid striped bass is Ronald G. Hodson, an Extension aquaculture specialist at North Carolina State University. “The potential has caught the attention of most of us,” says Hodson. “I think hybrid striped bass can be to North Carolina what the channel catfish is to Mississippi.”

A Ready Market

The hybrid striped bass has particular commercial potential because a ready market seems to exist for the fish. The striped bass in the wild is considered a particularly tasty fish. But for reasons scientists do not fully understand, the number of fish in the wild has declined dramatically in recent years.

As a result, striped bass fishing has been either banned or severely restricted all along the East Coast, and the commercial catch of this desirable fish has dropped to near zero. The hybrid, which looks much like—and is said to taste much like—the wild fish, may have the potential to occupy the market niche once held by it.

The hybrid fish is easier to raise in captivity than the striped bass. But that doesn't mean that hybrids are easy to raise, nor is it clear that hybrids will realize their apparent commercial potential.

A Learning Experience

"It's been a real learning experience," says Brothers of his aquaculture operation. Like many farmers, Brothers farms the land—800 acres of soybeans, corn, and wheat—previously farmed by his father, who is now retired. And like many farmers, Brothers found conventional farming a tough way to make a living in the early 1980's.

"I started looking for new ways to make money," Brothers says. A friend who is an ichthyologist at Arkansas Tech University and had worked with hybrid striped bass suggested the enterprise to Brothers. Hodson, who was working with hybrids at North Carolina State University's Pamlico Aquaculture Center near the Brothers farm, also provided expertise.

For more than 2 years, Brothers sought aquaculture advice. He visited catfish farmers in Arkansas to see how their operations worked. He thought about raising crawfish, but finally decided on hybrid striped bass. He built levees for three 6-1/2-acre ponds and three 3-1/2-acre ponds.

The First Sale

Brothers put the first fish in his ponds in July 1987. He recently made the first sale from that crop. A New York City fish market paid \$3 per pound for 1,500 pounds. He has talked with potential buyers in Toronto, Chicago, and Florida.

It takes about 18 months to grow the fish to the 1-1/2 to 2 pounds considered most marketable. Brothers thinks he will be able to produce roughly 100,000 pounds of fish a year.

There are still hurdles to overcome. Brothers would like to spawn his own fish; it's less costly than buying fingerlings. But because of fishing restrictions, it's difficult to obtain striped bass females to use as brood stock.

And there are other potential problems. Brothers recalls that a salt water gill parasite killed half the fish in one of his ponds before he was able to get it under control. Water quality is critical, according to Brothers.

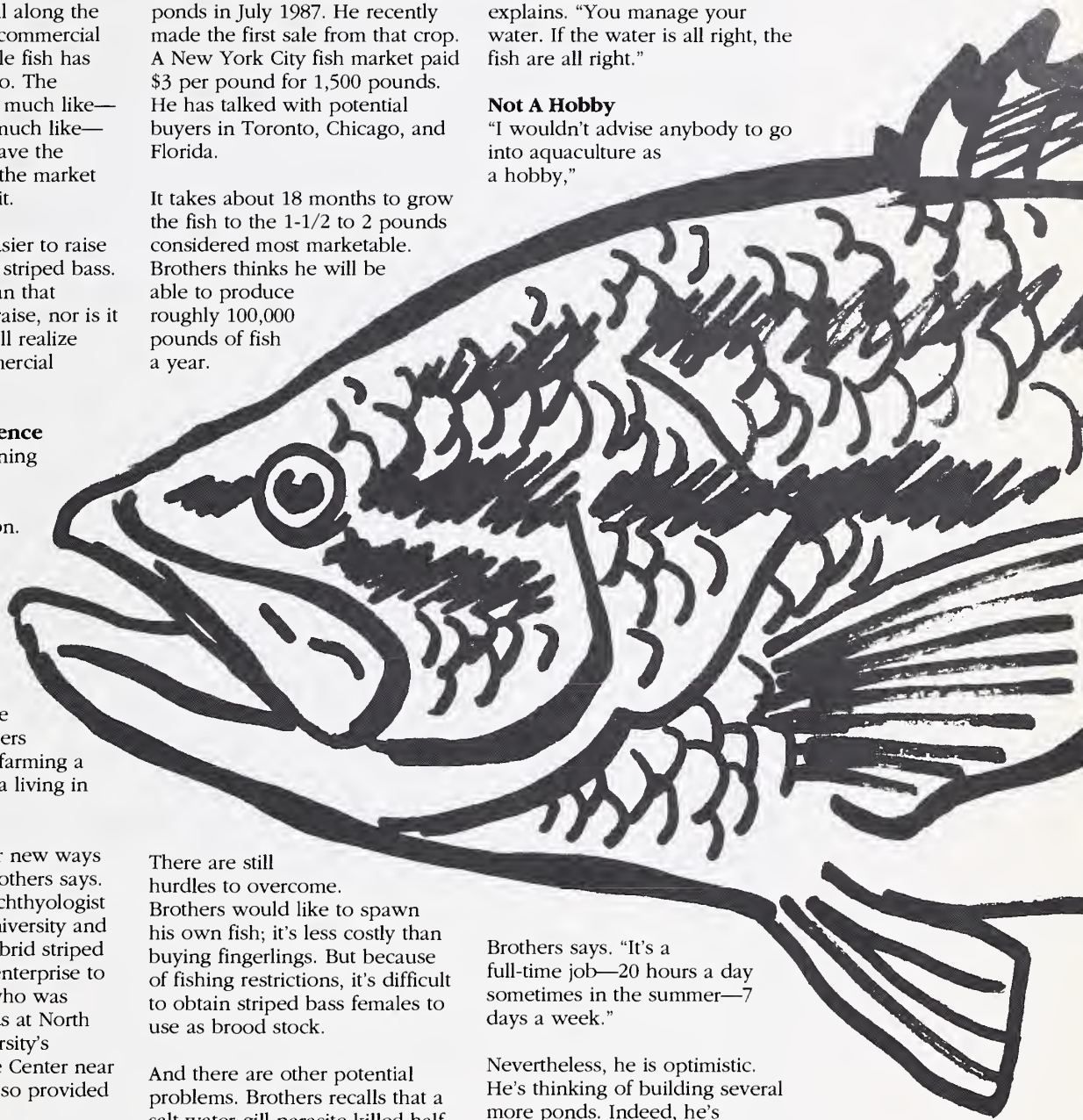
"You put your fish in the pond and forget about them," he explains. "You manage your water. If the water is all right, the fish are all right."

Not A Hobby

"I wouldn't advise anybody to go into aquaculture as a hobby,"

Brothers says. "It's a full-time job—20 hours a day sometimes in the summer—7 days a week."

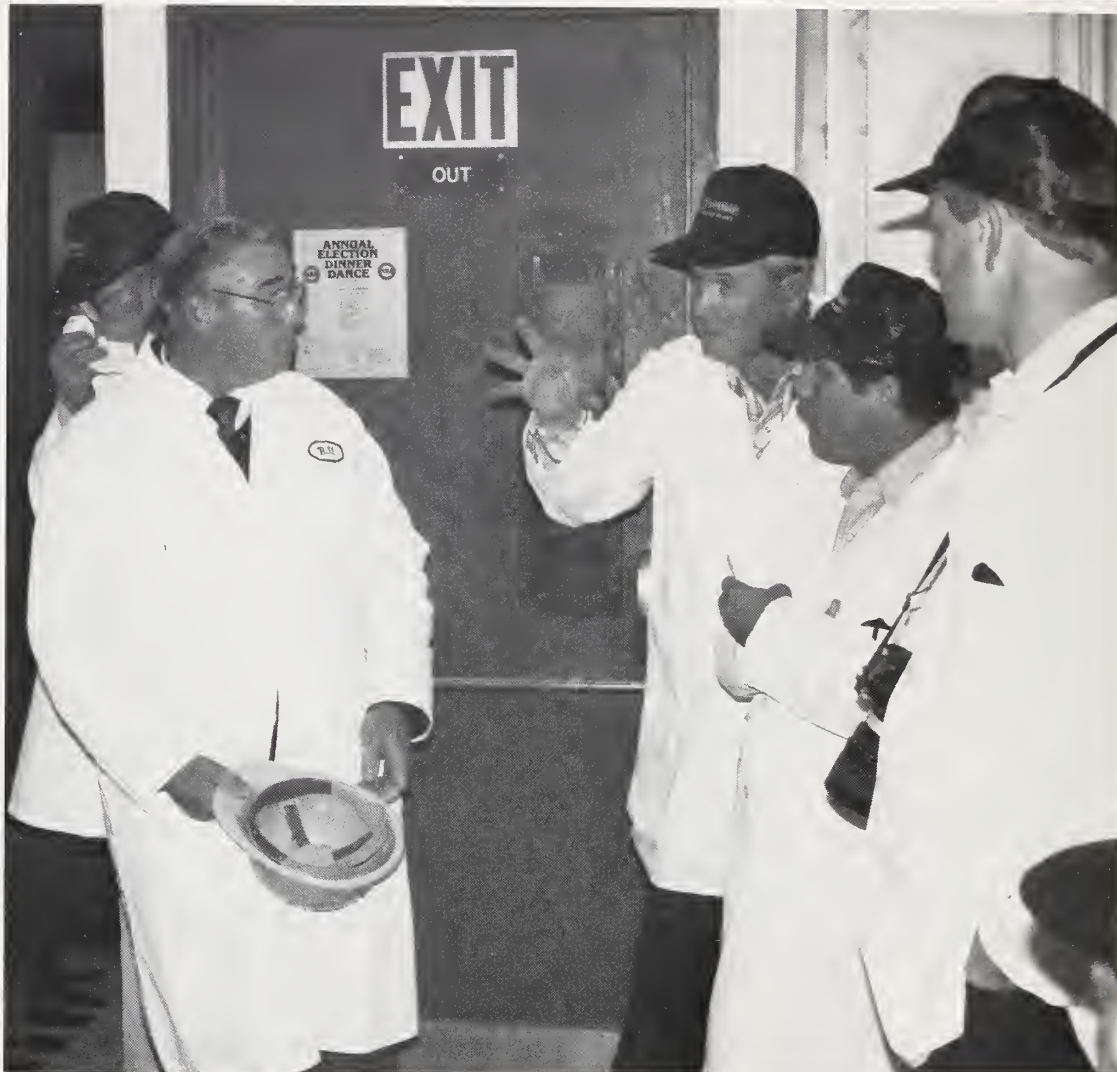
Nevertheless, he is optimistic. He's thinking of building several more ponds. Indeed, he's thinking of giving up conventional crops and concentrating solely on raising hybrid striped bass. ▲



Beef Tour Hits The Road

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The 1988 Beef Marketing Tour, with rancher participants from Nevada, Arizona, California, and Utah, had increased rancher awareness of alternative marketing opportunities as one of its objectives. Here, tour participants visit a Safeway prefab boxed beef plant in Vernon, California.



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The 1988 Beef Marketing Tour hit the road in late March with an ambitious itinerary. The schedule included one of the world's most advanced turkey growing operations, a gigantic feedlot with a yen for the Japanese market, a historic ranch with a decidedly modern approach to ranching, and a beef packing plant that processes more beef in a day than most people eat in a lifetime.

The scheduled stops were supplemented by discussion groups, sponsored dinners, and on-bus educational videos, which all added up to 4 days of

intensive learning. Tour participants, who were from ranches in Nevada, Arizona, California, and Utah, came with great expectations.

Dale Garcia, an Arizona rancher, was hoping to learn more about how to improve his herd. A chance to gain new ideas on marketing was Californian Jerry Blair's reason for going along for the ride. Nevadan Courtney Dahl needed to learn new marketing options—particularly for cull cows. He was also looking forward to meeting other local beef producers who might be interested in entering into cooperative arrangements.

Tour Objectives

The beef marketing tour had three fundamental objectives: To increase rancher awareness of alternative marketing opportunities; to showcase successful marketing programs being used by producers of beef and other meat; and to make ranchers more aware of the changing world of beef marketing.

"The ranchers needed an opportunity to see firsthand how some facilities have grown from family-run operations to full-fledged corporations," says Jim Sullins, a California Extension livestock advisor who helped organize the tour. "They also needed to see new management and marketing techniques in application."

On The Road

The visit to the Louis Farms turkey ranch in Tipton, California, was an eye-opening experience. The beef producers were surprised to realize how controlled and restricted the turkey business has become. "The beef industry could end up the same way if we do not pull together and promote and market our product," one cattleman comments. "We've got to pull our heads out of the sand."

The second day began with a visit to the Harris Ranch feedlot. Located in California's San Joaquin Valley, this 600-acre facility has a 100,000-cattle capacity. The feedlot is so sophisticated that nearly everything but the cow is computerized. Here, the key to success is diversification.

Recognizing that a good beef business involves more than feeding cows, the Harris operation uses some creative ways to make a profit. One of them involves raising cattle in a uniquely fattening way for a unique market—the Japanese. They, unlike cholesterol-conscious Americans, prefer heavily marbled, fat beef. Harris ships these special cows live to Japan via aircraft. "The Japanese are paying premium prices for the type of product they desire," explains the feedlot manager.

Further Insights

The Western Stockman Market in Famosa, California, was the next stop. The auction manager, who shared his thoughts about the future of auctions, was particularly enthusiastic about video auctions: "They will provide a means to expose cattle to buyers without the problems of shipping cattle to auction yards."

On the third day, the group visited the Tejon Ranch. This legendary ranch is one of the West's most diversified operations—from grapes, firewood, longhorn cattle, and mining to a roadside restaurant. The manager explained how the ranch has capitalized on its resources to maximize profits through diversified marketing programs. Many tour participants felt that this stop provided the greatest insight into alternative marketing ideas for beef producers.

The Safeway prefab boxed beef plant in Vernon, California, was the last stop. At this operation, which processes about 700 carcasses a day, the cattlemen gained an understanding of the relationship between consumers and the production side of the beef industry.

Evaluating The Impact

At the conclusion of the tour, a discussion about beef promotion, packing plant consolidation, and high-tech processing brought together a wide variety of thoughts about alternative marketing strategies.

Arly Berman, a California cattleman, was particularly interested in vertical integration. "From raising the cows and calves to selling the packaged beef ... that was fascinating and enlightening," he says.

"One of the things I learned is how much the beef industry's advertising campaign has to do with selling beef. We need to keep it up," Nevada Rancher Ken Lee emphasizes.

Participants' informal critiques of the tour indicated satisfaction with the experience. Utah Rancher Daryl Blake, for example, came away with strong impressions of the Harris and Tejon operations. "We learned that there's a lot more to market on our ranches than just the cattle," he says. "I think they gave us good ideas—there are resources there that we aren't tapping."

Key Concepts

In summary, ranchers learned four key concepts from the tour:

- The importance of expanding market horizons to be involved from conception to consumer in the total marketing picture of beef;
- The importance of advertising and product promotion;
- Opportunities in marketing of nontraditional products such as firewood, recreational use of rangeland, and wildlife resources; and
- Awareness of alternative marketing options such as video, foreign export, and the use of futures to capitalize on beef markets.

The general consensus of the participants was that the marketing knowledge gained will help them improve the competitiveness and profitability of their beef ranches. All the ranchers received an individualized computer analysis of their existing operations as a followup to the tour.

Financial assistance for the tour was provided by the participating universities, ranchers, and industry support companies. Members of the Mojave Desert Range Project (an interstate committee to address education needs in the Mojave Desert area) coordinated the event between states.

A VHS video on the 1988 Beef Marketing Tour includes tour highlights and comments from the participants.

For more information, contact:
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For Texas... It's The Berries

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Kent and Juanita Wiggins, Smith County Texas, say they backed into their Christmas tree and berry production. They are representative of a large number of people in agriculture who are seeking ways to remain in farming by selecting alternative enterprises.

In Texas, citizen committees identified diversification as one of the critical agricultural issues to be emphasized in future Extension programming. They believe that the selection of alternative enterprises is essential to the well-being of this dynamic industry, particularly for the smaller farmers.

Long-Time Diversifiers

The Wiggins have been expanding and diversifying their farming since the late seventies. Kent is a full-time fireman for the Tyler Fire Department.

When son Mickey needed a project for his vocational ag class, the family planted their first Christmas tree seedlings. From this successful choose-and-cut operation, they expanded into blueberry production in 1984 and added blackberries and raspberries in 1985. Today, they have nearly 7 acres in berries and are phasing out the Christmas tree production.

Plant propagation is becoming a larger part of the total operation. For this reason, the Wiggins have added a small greenhouse. One son has purchased adjoining land and is adding peach production. They are considering pecans and strawberries for future plantings.

A Viable Alternative

Christmas tree production continues to be a viable alternative for some producers. "From a beginning of about 170 acres of Christmas trees in 1976, this industry has grown to 3,575 acres," reports James Chandler, forester for the Texas Agricultural Extension Service. "Under the guidance of the Extension Service, the Texas Christmas Tree Growers Association was organized and now has 454 members statewide."

About 600,000 Christmas trees worth over \$9.5 million were marketed by 193 farms in 73 Texas counties during the 1988 Christmas season.

"Increased acreage nationwide has created a very competitive market," Chandler states. "However, those growers with good-quality trees and marketing knowledge can be successful. Our Extension educational programs are aimed at increasing both production expertise and marketing know-how."

Berries And More Berries

Another area of diversification has been in berries, primarily blueberries, blackberries, and raspberries.

Research by Texas Agricultural Experiment Station horticulturists at Overton showed that blueberries could be grown in the acid sandy east Texas soils. Currently, more than 150 producers in the area have over 1,000 acres of blueberries. Operations range from less than 1 acre to 65 acres.

"The major problem facing producers is harvesting," says Marty Baker, Extension horticulturist at Overton. "The fields are too small to justify machine harvesting, yet hand labor is expensive and difficult to obtain."

According to Don Cawthon, first president of the newly formed Texas Blueberry Marketing Association, in 1988 approximately 175,000 pounds of blueberries were marketed to 11 produce brokers and supermarket chains through the 45-member association. In 1989, Cawthon says he expects 20 new members and a potential sale of 500,000 pounds of blueberries through the Association.

Specialty Crops Compete

Specialty crops such as Asian vegetables are receiving much attention in the state.

Research and demonstration plantings have been made at Overton, Prairie View A&M University, Stephenville, and College Station. Other plantings are scheduled for El Paso and Lubbock.

Beyond Berries

Other areas of diversification being studied, but not yet fully developed, include wildlife management and marketing, leasing of private lakes for fishing rights, crawfish production, and exotic animals. Salt water shrimp and redfish are being produced inland. In the goat and sheep producing area of the state, hand-spinners are converting wool and mohair into yarn and garments. The first harvest of commercially grown English walnuts has just been completed in southwestern Texas, and apple production is increasing.

Planning And Commitment

Greg Clary, Extension economist, says that before producers begin to diversify, they need to consider several factors. Many alternative enterprises are labor intensive and require a completely different financial situation. "The key to successful diversification is planning," Clary states. "This includes budgeting, cash-flow projections, estimates of labor requirements, and market research. Following planning, producers must make a commitment to follow through to reach realistic goals."

"Selecting alternative enterprises is a slow, methodical procedure," Clary points out. "If producers really expect to succeed, they must determine how the anticipated enterprise fits into the total picture of the current farm business." ▲

Big Oysters From Little Chambers Grow

June Gibson

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A new system that uses lowly shrimp-pond water effluent for producing highly prized, highly priced oysters promises to be a powerful stimulant not only for Hawaii's aquaculture industries, but also for its overall economy.

Hawaii's economic standbys, the sugar and pineapple industries, have been subject to foreign competition and a host of problems that potentially threaten the Island's agricultural economy. The need for diversification has become increasingly evident, and aquaculture seems to be a natural.

The first year of the 4-year oyster-production research project is being carried out at the Manoa Campus of the University of Hawaii's College of Tropical Agriculture and Human Resources (CTAHR). Hawaii's largest shrimp producer is cooperating with CTAHR's agricultural engineers in the experiment.

Overcoming Obstacles

Agricultural Engineer Jaw Kai Wang had to overcome three major difficulties to make the project work: lowering costs for oyster food, lowering labor costs, and keeping the potential delicacies clean.

"Oysters gobble up food to the tune of half their production costs, so that was one problem we had to look at carefully," he comments. Wang also knew that oysters are fond of algae and that they will clean themselves if conditions are right. That gave him an idea.

He made clean water available to sanitize the oysters, making them suitable for raw consumption. The water was then used to raise the shrimp; algae formed and in turn was used to feed the oysters. The process not only conserves water, but cuts production and labor costs, neatly zeroing in on the three obstacles to profitable oyster production.

Assisting Nature

The mechanics of the system Wang and his colleagues designed include a growth chamber to assist nature by further ensuring oyster cleanliness. Light in the brackish water of the chamber is controlled, and the area is flushed out periodically. The water is treated in a sedimentation tank before it is recirculated to the shrimp pond.

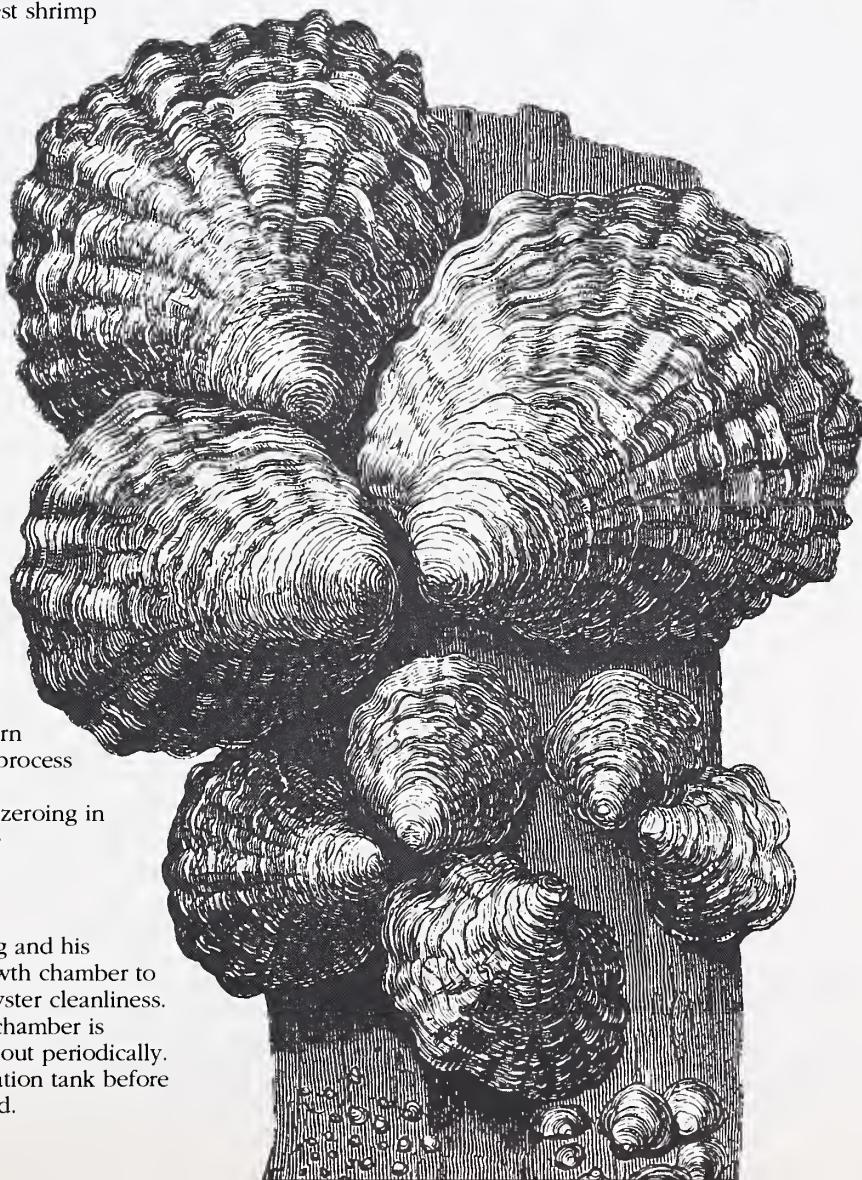
Perhaps the most exciting news to come from the CTAHR agricultural engineers is that Wang and his fellow scientists believe they will be able to bring a crop of Hawaiian oysters to market every 6 months.

"That's a full 2 years less than the time they need in the Chesapeake Bay and South Carolina, two major natural production areas, and it would give us a great competitive edge," Wang says.

Becoming Competitive

It is estimated that both the technology and a blueprint for the development of an oyster industry for Hawaii will be in place within 36 months. A critical task remaining is to develop oysters into a price-competitive industry, one that has the potential to equal or even surpass the present chief contributors to Hawaii's economy.

"We'd have an economic tiger by the tail," comments Wang. "The demand of U.S. markets alone for oysters exceeds \$.5 billion annually. And we haven't talked about the shrimp possibilities." ▲



The Family Farm: Potential For Profit

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Looking beyond traditional crop and livestock enterprises, many Tennessee farm families are using their imaginations to generate profits from their lands and supplement their incomes with their skills.

The alternative enterprises they are undertaking include the production of nontraditional or exotic agricultural products, but they also involve manufactured products, products collected from native sources, and services provided by the farm families.

Agents and specialists with the University of Tennessee Agricultural Extension Service are

helping farm families explore a wide variety of such ventures. The possibilities include, for example, producing fresh fruits and vegetables, and white or low-cholesterol meats. They include outdoor landscaping, nursery operations, and outdoor recreation (fee hunting and similar operations).

Without careful analysis, alternative enterprises can easily fail. Area farm management specialists working with the Extension's MANAGE program at the university help farm families to determine the feasibility of potential enterprises and to develop budgets.

Evaluating New Enterprises

Fee hunting is an example of an alternative farm enterprise that is being explored in Tennessee to satisfy a demand and to generate money from land that has not created much income.

"Three years ago we started talking with forest landowners about profitability from their woodlots," says George Hopper, forestry management specialist. "We wanted to organize farm units into cooperatives for forestry management and to encourage landowners to integrate wildlife into forest management for profitability."

In Wayne County, which has one of the largest deer populations in the state, forest landowners were complaining about hunters using their property without permission. With the help of County Extension Leader Ken Burress and Extension Assistant Neal Wilkins, the landowners formed a nonprofit corporation.

The 20-member Wayne County Forest Landowners Association, which started in January 1988, covers 15,000 acres. The

members advertised their association in several newspapers and developed a brochure. They posted custom-printed signs that prohibit hunting on association properties without written permission. Hunters pay fees to individual landowners for permits to hunt on their land. Wilkins and Hopper are measuring the association's success after its first hunting season and will use it as an example for other counties.

Switching Farm Enterprises

Unlike families who simply want to supplement their present farming operations, some are leaving one farming operation for another. Keith Kilpatrick moved from the family beef operation into the nursery business. He supplies nurseries with seedlings of Carolina and Eastern hemlocks, sourwoods, spike bush, azaleas, rhododendron, mountain laurel, and white pine—all native plants already known to grow well on his farm next to the Appalachian Mountains in southeast Tennessee.

With help from Polk County Extension Leader Don Ledford, Extension specialists, and the University of Tennessee-Tennessee Valley Authority Rapid Adjustment Program, Kilpatrick developed a farm plan and analyzed his entire operation. He increased the plants that were profitable and eliminated those that were not. Agricultural economists, entomologists, plant pathologists, plant and soil scientists, horticulturists, and agricultural engineers worked with Kilpatrick to develop his total nursery operation.

"The Extension Service at the university provided one source of help to Kilpatrick," says Ken Tilt, nursery production specialist. "He used other information resources and had the motivation, management skills, hard work, and dedication needed to develop a successful nursery business."



In return for Extension's help, Kilpatrick uses his knowledge to help other growers. At the university's nursery education programs, he shares the information he has gained. Specialists hold demonstrations on irrigation and insect, weed, and disease control on Kilpatrick's farm.

Supplementing Farm Income

Some farm families are looking for alternative enterprises merely to supplement their farm incomes. Extension helps them through rural small-business development and rural entrepreneurship programs.

A team of University of Tennessee and Tennessee State University Extension specialists is developing workshops and a workbook for evaluating business ideas—both agricultural and nonagricultural. Resource Development Specialists George Smith, University of Tennessee, and Joe Morris, Tennessee State University, are project leaders.

Smith is working with county Extension home economists to find outlets for products generated by alternative enterprises.

With Smith's help, Margaret Pile, Fentress County Extension home economist, organized the Mountaineer Craft Center in Jamestown. Started in June 1987, it was modeled after a cooperative started by Jeanne Webb, Extension home economist in Coffee County.

In its first year, the Mountaineer Craft Center sold more than \$10,000 worth of crafts and returned more than \$8,000 to the handcrafters, most of whom are farm families. TVA's Agricultural Institute provided \$3,500 to the association for brochures, supplies, a gas furnace, and water lines.

A Continuing Effort

As consumer preferences continue to change, farm families will continue to explore alternative enterprises to satisfy the demand. Armed with programs such as these, the Agricultural Extension Service at the University of Tennessee is prepared to help them investigate the profit potential and assist them with management and marketing concepts. ▲

Opposite: Don Ledford (right), Extension Director, Polk County Extension Office, Tennessee, examines Keith Kilpatrick's new crop of mountain laurel. Ledford worked with Kilpatrick to develop a farm plan and analyze the plant operation. This page: J. E. Riley of Clifton, Tennessee, posts sign on his land to show that he's a member of the Wayne County Forest Landowners Association, a nonprofit corporation formed with Extension help. Fee hunting is an example of an alternative farm enterprise that encourages forest landowners to profit from their woodlots.

New York Maple Syrup— How Sweet It Is!

24 Extension Review



Opposite: Christopher Moquin, field assistant at Cornell University's Uiblein Extension Sugar Maple Research Station in Lake Placid, New York, monitors a maple syrup filter press. This page: Gabe Tucker, a graduate student at Cornell University in the Department of Natural Resources, checks the vacuum tubing of the sap collection system's main line for possible animal damage.

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New York's natural resources are an important asset with great potential to assist in developing a more robust rural economy. Maple syrup production is one of several natural resource related enterprises that are attractive to many farm and agribusiness managers.

New York has well over 1,200 maple syrup producers, ranging from hobbyists to large producers and reprocessors. Syrup production provides an opportunity to diversify onfarm income with reasonable demands on time, labor, and capital. As a result, it has become an integral part of many family farms.

Industry Characteristics

The maple industry has relatively low economic barriers to entry and is considered a seasonal operation. Many maple syrup production activities occur when the farm has an excess of labor. Others can be scheduled as part of normal farm operations or when time is available during the summer and fall.

Production at some operations is done with traditional sap buckets, horse-and-sleigh gathering equipment, and wood-fired evaporators; at others, it involves sap collecting with plastic tubing, preheaters, reverse osmosis, oil-fired open-pan evaporators, and vapor compression evaporators.

Marketing techniques vary as much as the production systems: wholesale marketing to large re-processors, selling from roadside stands, marketing through local retail outlets, and nationwide mail-order marketing.

Current Extension Programming

Cornell Extension has worked closely with the New York Maple Producers Association and maple equipment suppliers to develop and implement a successful maple education program. Past educational programs were production oriented. With so many new producers entering the maple industry, emphasis is shifting to market development, recordkeeping, and management alternatives.

Regional "maple schools" each January provide novices, hobbyists, and experienced producers with information on such topics as efficient production methods, new or improved processing technology, current research, and sugar bush management. Attendance has averaged nearly 1,100 over the past few years and is expected to increase because of the growing interest in alternative income sources and rural revitalization.

Producers On Tour

In 1988, about 400 people attended the 2-day "New York Maple Tour." Held in a different region of the state each year, the tour takes maple producers to several maple operations of various sizes. The audience has the opportunity to discuss specific aspects of the operations with the host-producers.

Through discussion with their peers, all producer classes are exposed to many views on production and marketing issues. At each tour site, speakers give research, educational, and industrial updates.

A New Component

Collecting and concentrating maple sap is energy and labor intensive. In New York, regardless of the fuel used, energy accounts for about 40 percent of all production costs for medium-sized maple operations, including annual discounted capital expenses. Therefore, it is important for producers to use management techniques that minimize energy costs.

In 1988, Cornell Cooperative Extension and the New York State Energy Office introduced the Small Business Energy Efficiency Program (SBEEP) to maple producers. The SBEEP offers free energy surveys and energy efficiency improvement recommendations to small businesses.

The surveys were conducted by certified technicians knowledgeable of the maple production process. They measured current energy consumption of maple operations and recommended improvements on the basis of the data they collected, the producer's management techniques, and other records the producer provided.

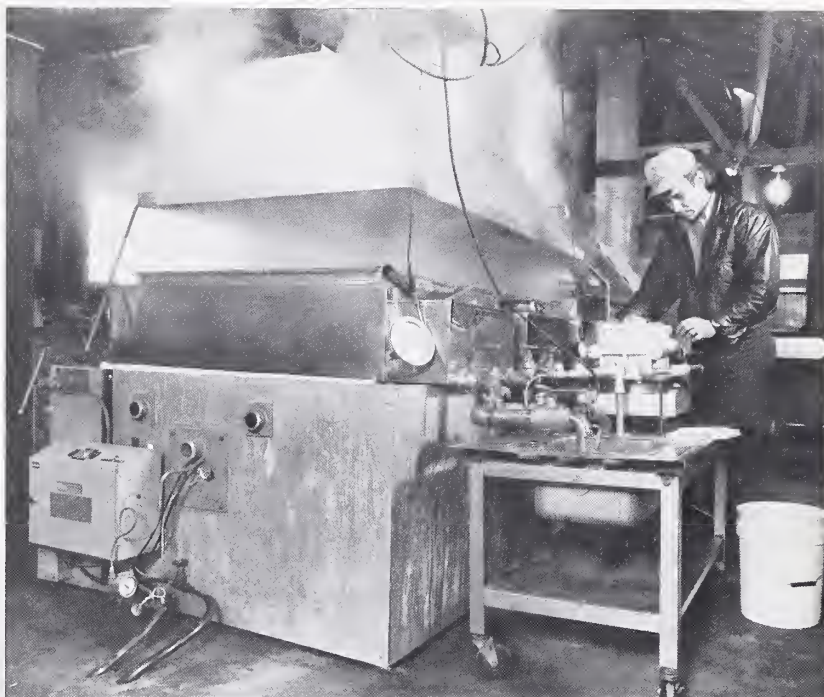
As a result of the 17 surveys completed in 1988, 11 maple producers saved money by implementing recommended energy efficiency measures. The other six operators also received recommendations for becoming more energy efficient, but because of longer payback periods or for other reasons, the suggestions were not acceptable to them.

If all the recommendations made in the energy survey had been implemented, the average producer could have reduced energy costs by more than 31 percent—for a savings of \$640 per year.

Although about 80 percent of the typical maple producers in New York use wood to fire their evaporators, nearly all the producers selected to participate in the SBEEP used No. 2 fuel oil. This was because of the difficulty of establishing energy efficiency standards for wood-burning operations. In contrast, efficiency standards for evaporators fired with #2 fuel oil were much easier to establish. As a result, a certified technician's report for an oil-burning operation could be more informative and complete than a similar report developed for a wood-fired unit.

Future Programming Plans

The maple industry has several high-priority needs: Development of an efficient recordkeeping system; evaluation of the economic and managerial consequences of tap-hole renting and leasing agreements; determination of fertilization and nutrient requirements for the sugar bush; analysis of local, national, and international marketing opportunities;



and suggestions for minimizing the effects of pollution, diseases, and insects.

Research is especially needed on: Progeny testing of sugar maple from various genetic backgrounds for sugar content and environmental resistance; study of the effects of manmade influences on the health and vigor of the maple tree; definition of markets and their characteristics; and development of information to help expand domestic and international markets.

With this information, the Extension maple program can be more responsive to the needs of the state's rapidly expanding maple industry and the needs of a revitalized rural economy based in part on that industry. Continued coordination between Extension and the New York Maple Producers Association will help rural New York "taste the sweet flavor of success." ▲

Hames Don Tilmon
Extension Farm Management Specialist,
and
Richard Fowler
Director,
Cooperative Extension Service,
University of Delaware, Newark

Delaware is a small state, with only about one-half million acres of cropland spread over three counties. The main crops are corn and soybeans, which are grown primarily for the broiler industry. Additional enterprises include 50,000 acres of vegetables, plus dairy cattle and hogs.

Delaware Cooperative Extension is also small, but the needs of the state's producers are much the same as those of any other agricultural state. When something new comes along, Delaware growers want to know about it, just as growers anywhere else do. When a new approach to the delivery of Extension programming comes along, state specialists must train county staffs, just as they do in the big states.

So how does Delaware accomplish all this with a small staff, particularly when also being challenged to support nine new Extension initiatives? The answer is, we cooperate.

Support From The Top

Richard Fowler, Delaware Extension Director, is also the ECOP liaison to the Alternative Agriculture Issue Task Force. When he learned about efforts to organize an area workshop for growers on the topic of alterna-

tive agriculture in nearby southeastern Pennsylvania, he immediately threw Delaware's support behind the effort and suggested that New Jersey and Maryland also be invited to join in to make it a multistate project.

As planning for the conference progressed, it became evident that the attendance could be significant and that extremely high-quality programming was demanded. Experts were brought in from Georgia, New York, and the U.S. Department of Agriculture. In addition, many local experts, such as buyers from the Philadelphia produce market and growers of alternative crops, were invited to speak.

To help hold down the cost to the growers, the departments of agriculture in each of the four states were invited to join in the sponsorship of the conference; two agreed to do so. The workshop was taking on a truly cooperative flavor.

Training Agents

During the planning, an important question surfaced: What would happen if the workshop primed many of growers with interest and they began coming to county offices with questions the agents were not prepared to answer? Obviously, agent training was needed.

The goal was to prepare agents to use an analytical approach to handle growers' inquiries on raising and marketing alternative crops. The best way to accomplish this seemed to be to incorporate inservice training into the conference.

Delaware personnel submitted a proposal to the Northeast Center for Rural Development for funds to be used for the agent training.

The inservice training portion of the workshop, which followed the grower portion, was designed to include indepth discussions with many of the experts who had appeared on the earlier program. The quality of the training was well beyond what smaller states could afford.

Cooperation Pays Off

The first Alternative Agriculture Marketing Conference took place in Reading, Pennsylvania, in November 1987. More than 350 people from 9 states attended. Local buyers of fresh produce participated, and one buyer came from Michigan to establish contacts with potential growers of edible flowers for the restaurant trade.

Forty-five agents and specialists attended the followup inservice portion of the workshop. This included 23 from Pennsylvania, 8 each from Maryland and New Jersey, and 6 from Delaware.

As a result of the success of this initial venture, all four state departments of agriculture cooperated with the four Extension Services to sponsor a second conference. ▲

You Can't Fight Mother Nature!

George W. Dickerson
*Extension Horticulture Specialist,
New Mexico State University,
Agriculture and Resource
Development Program Unit,
Albuquerque*

Northern New Mexico farmers find farming a tough row to hoe. Their area is characterized by small farms, short growing seasons, cool weather, and limited markets. Turning such factors into assets, however, has been Extension's strategy for small farm profitability in the state.

One tool Extension is using is the appropriate selection of specialty crops to grow in environmental problem areas. This may range from growing broccoli or cauliflower in short, cool growing areas to production of asparagus on saline soils. In short, the motto has been to "flow with" and not "fight" with Mother Nature!

Risks Of Raspberries

The red raspberry has become one of New Mexico's most profitable specialty crops, but this crop is not without risks. Late frosts and desiccating winds in spring can devastate biennial canes of standard raspberries like the Latham. This problem has been overcome with the introduction of everbearing raspberries like Heritage.

One of the biggest problems with Heritage has been stand establishment in alkaline soils. County Agents William Neish and Gerald Chacon have worked with the author and local growers in trying to solve this problem through onfarm demonstration and research trials. Stand establishment has been improved through use of root stimulators, liquid gel treatments that attract moisture, and establishment of windbreaks.

Improving An Historic Staple

Occasionally, profitability involves improvement of old crops, or in some cases, even ancient crops. Few North American crops rival the history of the blue corn plant, a staple for many native Americans in the Southwest for hundreds of years. Classified as a flour corn, and used in traditional dishes like atole (cornmeal mush), it was later adopted by Hispanic settlers who used it in tortillas. It is now also used in pancake and muffin mixes.

Although blue corn is priced four to five times the price of yellow or white corn, it too has its problems.

For six years Extension in New Mexico has been conducting a blue corn improvement program. Extension's plant breeding program has been oriented toward increased yields, earliness, improved color, and lodging resistance. Researchers involved in the fertility project have evaluated the effects of nitrogen and potassium on yields and lodging. Both programs have been highly successful.

Working with Lawrence Montoya of Santa Ana Indian Pueblo and County Agent Rudy Benavidez, the author has also been evaluating the response of blue corn to various rates of nitrogen and potassium. Unlike hybrid corn, blue corn seems to require only moderate levels of nitrogen per acre.

High Tolerance

Blue corn appears to have a high tolerance for pest problems. Last year, blue corn trials in Alcalde were heavily infested with Bank's grassmites early in the season. It was decided not to apply any pesticides. By season's end, most plants were over 12 feet tall with no signs of major mite problems.

Specialty Crop Seminars

To inform growers of innovative ways of marketing produce, Extension specialists conduct specialty crop seminars and conferences. Growers who participate in marketing panels



share successful methods they've used to market produce.

Market Identification Survey

Last summer, a unique marketing project was initiated at New Mexico State University. Kathleen de Sutter, an NMSU undergraduate business student, conducted a market identification survey of all known produce buyers and restauranters in New Mexico.

Five hundred people responded to the survey, and 304 of them indicated they would be willing to buy produce directly from a grower. This data will be inputted into a database computer program and will result in a publication for county agents to supply their growers with outlets for their specialty crops. ▲

In the Sangre de Cristo Mountains of New Mexico, Mora County Extension Agent Skip Finley (left) examines a 'Heritage' raspberry crop with grower David Salman. Despite such risks as late frosts, the red raspberry has become one of the state's most profitable specialty crops. Extension has helped solve such problems as stand establishment through on-farm demonstration and research trials.

Diversification— The Name Of The Game

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Daniel Putnam, agronomist at the University of Minnesota and a coordinator at the Center For Alternative Plant And Animal Products, examines buckwheat, one of many alternative crops he is researching.

Laura McCann
Program Coordinator,
Center For Alternative Plant and Animal
Products,
University of Minnesota, St. Paul

Diversification of the cropping base and development of new products from existing crops are recognized as important sources of economic growth for the farm economy. The Center For Alternative Plant And Animal Products, a multidisciplinary unit within the University of Minnesota which generates and evaluates new crop ideas for agriculture, also emphasizes disseminating information to the public through in depth symposia on alternative crops and products.

In addition to a research project on the assessment and adaptation of lupines as an alternative crop, the Center has initiated research on the feasibility of producing and processing grain amaranth in Minnesota. Amaranth is a high protein pseudo-cereal which was historically grown by the Aztec and Mayan civilizations.

Several wild species of plants that are challenging to grow, such as milkweed and groundnut, have been identified as potential candidates for crop development. Certain minor crops, such as millet, buckwheat, or broccoli, show economic promise. Researchers are evaluating some alternative crops new to a region such as amaranth, adzuki beans, or comfrey.

Symposia With Published Proceedings

The Center acts as an information resource for the Extension Service and provides current research information to the public. Symposia on agricultural alternatives are offered periodically and the published proceedings are made available to the public. Discussion of research needs in the area is part of every symposium and stimulates further research.

Dairy sheep—A symposium on North American dairy sheep will be held at the Earle Brown Continuing Education Center at the St. Paul campus July 25-28, 1989. In addition to the technical presentations, the program will include a post-symposium tour, and a workshop on sheep milk products.

Shiitake mushrooms—On May 3-5, 1989, the Center conducted a symposium-trade show in St. Paul, Minnesota, assessing the current status of the shiitake mushroom industry with information on production and management systems. This was the first in a series of symposia planned for the area of forest products. The meeting included a trade show and tour.

Some of the symposia held during the past year include the following—

Soybean utilization alternatives—At this symposium in February 1988, which was supported by the American Soybean Association and several state soybean associations, speakers addressed such topics as the chemical characteristics of soybean components, methods of modifying soybean composition, and recent advances in industrial, human food, and animal feed uses for soybeans.

Cut and dried flowers—This symposium on the commercial field production of cut and dried flowers was held in December 1988. It was cosponsored by the American Society of Horticultural Science. Speakers discussed commercial production and handling information, and identified research needs in the industry.

Publications developed by the Center include proceedings from the symposia and a series of crop specific publications. In addition, the Center plans to distribute to county Extension offices a compilation of factsheets and bulletins dealing with alternative crops.

To receive information about the proceedings of these symposia, which are available for purchase, contact:

Extension Special Programs
405 Coffey Hall,
University of Minnesota,
St. Paul, Minnesota 55108

For further information on publications and activities of the Center, contact:

Luther Waters
Director,
Center For Alternative Plant And Animal Products,
305 Alderman Hall,
1970 Folwell Avenue,
University of Minnesota,
St. Paul, Minnesota 55108 ▲



**Jack Sperbeck
and
Sam Brungardt**
*Extension Communications
Specialists,
Communication Resources,
University of Minnesota, St. Paul*

Developing alternative crops like lupines—legumes cultivated for their seeds—could increase dairy farm profits and help rural communities. But there are those who believe that such cultivation is a risky business.

“But if you never take a risk, things are never going to be any different,” says C. Eugene Allen, acting director of the University of Minnesota’s Agricultural Experiment Station.

Grants from the Central Minnesota Initiative Fund (CMIF) and the Bremer Foundation are helping researchers and Extension workers finish the first year of a 3-year lupine project. The project is assessing the risks involved in growing white lupines as a protein source on central Minnesota dairy farms where soybeans aren’t reliable.

About 27 percent of Minnesota’s dairy cows are in the 14-county CMIF area. Central Minnesota dairy farmers spend about \$14 million a year for “imported” protein supplements for their

herds. Purchased protein can account for 20 to 50 percent of a farmer’s cash expenditures.

High Protein Source

Dan Putnam, coordinator of the lupine research project at the Center For Alternative Plant And Animal Products and for other lupine research at the Minnesota Agricultural Experiment Station, is optimistic. “Lupines have a high protein content of 32 to 39 percent,” he comments, “and can be fed directly to farm animals. Lupines are frost resistant, fix their own nitrogen, and do well on the acidic, sandy soils of central and east-central Minnesota.”

Putnam points out that the main obstacle to expansion of lupines is yield consistency, not market development. “Food companies already are buying lupines to make high-protein pasta and flour,” he points out, “and they’re using the hulls as a fiber additive.”

“However, yields have varied tremendously from grower to grower and from year to year,” Putnam says. “We need to find production methods that will result in consistently high yields. The potential is there. At Staples,

Minnesota, yields have ranged from 20 to 70 bushels an acre. Therefore, lupines might be competitive with soybeans, which have averaged 27 bushels an acre over the 14-county area.”

The project involves researchers from several university departments, the Staples Irrigation Center, plus Extension agents and dairy farmers in seven counties.

Demo Plots And Trials

Onfarm demonstrations are part of the project. Cooperating farmers grow 5 acres of lupines to feed to their cows. Experiment station and Extension personnel provide production and feeding recommendations and analyze the economics of growing and feeding lupines.

The farm research trials compare lupines, soybeans, and field peas as homegrown protein sources and assess various weed-control strategies for lupines.

In controlled trials at Staples and other sites, researchers will try to determine optimum plant density, row spacing, and seeding dates. They are investigating the best varieties to grow in different areas, the value of inoculation, developing pest control guidelines, and studying lupine response to irrigation.

Studies involving lactating dairy cows will compare lupines, field peas, soybeans, and soybean meal as protein sources and determine how lupines can be substituted for soybean meal.

Information on the potential of lupines as a grain legume crop will be communicated by the Center For Alternative Plant And Animal Products to farmers, Extension agents, industry members, and entrepreneurs.

“It is quite unlikely we will find a crop that will replace thousands of corn or soybean acres,” says Acting Director Allen. “But when you add up many small niches where the crop can fit into farm operations, it can amount to something significant.” **A**

The Center For Alternative Plant And Animal Products, at the University of Minnesota, evaluates new crop ideas for agriculture. Researchers and Extension workers are assessing the risks of growing white lupine—a legume cultivated for its seed—as a protein source for dairy herds.

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Why Not Kenaf?



Kenaf, the bamboo-like, fiber plant native to Africa, is currently being researched for use as poultry litter. The long stalk in the center shows kenaf in its fresh-cut form. To the far left of the stalk is a circle of freshly stripped outer fiber. Next to the circle is the stuffed form of the fiber used for carpet backing. Shown to the right of the stalk is the chopped inner core being researched for use as poultry litter.

Hames Don Tilmon
Extension Farm Management Specialist,
and
Richard Taylor
Extension Agronomy Specialist,
and
George Malone
Poultry Scientist,
University of Delaware

"Kenaf" may not be a household word across the country, but most people in the land-grant system who are interested in alternative crops have heard of it. A relative of okra and cotton, kenaf is a warm-weather annual that can reach 10 feet in height in less than 3 months. Soon, kenaf may become a well-known term in the poultry industry.

While most recent research on kenaf has been concentrated in the area of newsprint, printing, writing, and tissue paper, a major product from the plant is fiber or cordage, which is used for carpet pads, twine, rope, and fiber bags. The fiber represents 35 percent of the plant by weight. When separated for use as cordage, it leaves the core material as a byproduct.

Enter The Broiler Industry

Poultry is a thriving industry on the Delmarva Peninsula—the most concentrated area of broiler production in the Nation. The high concentration

of poultry housing creates a tremendous demand for broiler litter materials, both for newly built houses and for the periodic cleaning out of existing housing. Wood chips or sawdust, the main materials now being used, are expensive and in short supply.

The search for an alternative source of broiler litter material has centered on kenaf core. Preliminary experiments with raising chickens on chips of this plant byproduct are yielding encouraging results.

During the winter of 1987-88, Extension Farm Management Specialist Don Tilmon approached Daniel Kugler, kenaf program manager at USDA, about getting samples of kenaf core for testing as an alternative litter material. A small sample of core was obtained, and in March 1988 the first chicks were placed on the experimental litter.

George Malone, poultry scientist at the University of Delaware, compared the kenaf core against sawdust (the industry standard on the Delmarva) and was "extremely pleased with the potential."

Replicated variety trials were begun in May 1988 by Extension Agronomist Richard Taylor. Six varieties were replicated on both dry land and irrigated plots. Kenaf International, a California company with whom USDA has signed a cooperative agreement for a kenaf crop demonstration project, advised on cultural practices.

Additional quantities of core materials were obtained from Kenaf International for replicated litter trials in early July. Six pens of 60 broilers each were grown on 2 types of litter. The preliminary results suggest that kenaf core is a suitable broiler litter material.

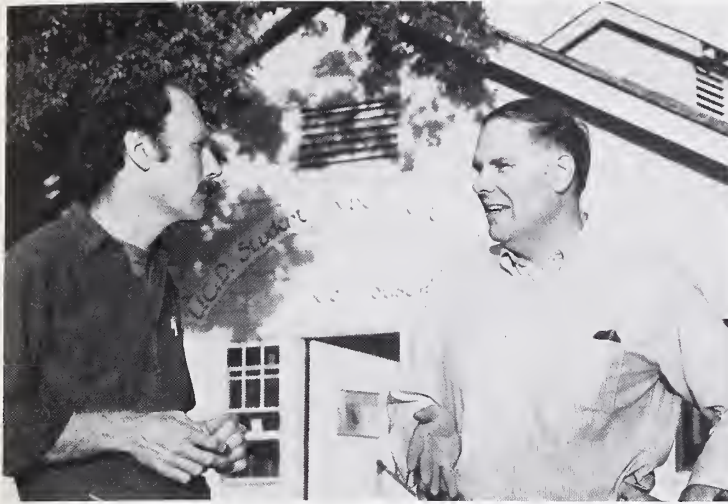
Additional studies will be conducted for verification and evaluation under various management situations.

Additional Uses

Evaluation of kenaf core material has not been confined to broiler litter trials. It is also being explored as a medium for urban sludge composting. In Philadelphia, for example, the composting of municipal sludge is currently being carried out through the use of wood chips. The supply of wood chips is not infinite, however, and to renew the resource requires 20 years or more.

Large-scale composting trials were recently carried out during the spring of 1989. The environmental implications of these trials are enormous. Every major metropolitan area creates sludge; kenaf offers an annually renewable answer to dealing with the problem. ▲

Management Is The Key



Lyra Halprin
Writer,
Sustainable Agriculture Research
and Education Program,
University of California, Davis

A comprehensive study at the University of California (UC) may help allay farmers' concerns about how to remain competitive while reducing the use of petrochemicals and using other "low input" farming practices.

Funded by the UC Sustainable Agriculture Research and Education Program, the study involves nine UC-Davis faculty and Extension researchers from the departments of entomology, agronomy and range science, nematology, plant pathology and botany, and two Extension farm advisers from Yolo County.

Researchers are growing tomatoes, field corn, beans, safflower, and lupines in three separate areas using three farming systems: conventional, "low input," and organic.

The conventionally farmed fields use external pesticides and fertilizers. The organically farmed fields use internal, environmentally sound products including manures, living mulches for weed control and nitrogen fixation, natural pest control, and reduced tillage. The "low input" fields also emphasize the use of

internal, environmentally sound products, but may make minimal use of petrochemical fertilizers, herbicides, or insecticides.

The farming systems comparison project is a replicated experiment conducted under standard experimental procedures, but it is done in a systems context. "The management of the system is primary," comments Extension Specialist William Liebhardt, director of the Sustainable Agriculture Research and Education Program.

Two local farmers are advising the researchers on current best practices for conventional and organic farming.

Answering Other Questions

The sustainable agriculture program includes several other projects:

Postharvest handling—Waxing, the use of fumigants and other chemicals, or harvesting crops immaturity and then using hydrocarbon gases to artificially ripen them are the most common methods for getting produce to market without deterioration.

Organic grower analysis—Roberta Cook, Extension economist, and Gretchen Will of the Organic Market News and Information Service have completed an analysis of the organic growers in California, including marketing and production practices and needs.

Dairy waste management analysis—Leslie Butler, Extension economist, has completed a survey of California dairy farmers on current dairy waste management practices, equipment used, and disposal techniques and problems. Results and recommendations will be published as Extension bulletins, and the possibilities of establishing a market for dairy waste will be published in farming publications.

Natural nematode control—Mike McKenry, Extension nematologist, is looking at barley, vetch, sweetclover, marigolds, and other cover crops as possible natural nematode control agents that could replace the use of highly toxic soil fumigants.

Evaluating living mulches—Tom Lanini, Extension botanist, is working with a group of colleagues to evaluate the weed and insect management properties of legumes used as living mulches.

Strawberry "Conversion"—Stephen Gliessman of the Agroecology Program at UC-Santa Cruz is working with other researchers and a farmer to evaluate the effectiveness of converting to farming systems that greatly reduce or eliminate the use of synthetic fertilizers and pesticides in strawberries.

The researchers are looking for replacements for the fumigants traditionally used in commercial strawberry production.

These and other projects in the sustainable agriculture program are aimed at answering producers' questions about improving their profitability while protecting the environment. **A**

William Liebhardt (right), Extension specialist and director of the Sustainable Agriculture Research And Education Program, University of California, Davis, discusses methodology with Mark Van Horn of the Student Experimental Farm. Liebhardt is involved in a farming systems comparison project which is investigating three different farming systems: conventional, "low-input," and organic.

Oklahoma Opens Up Opportunities



Opposite: Crops such as cabbage are giving Oklahoma farmers more options for diversifying their operations. This page: Fresh vegetable sales have become common at many roadsides in Oklahoma communities.

Robert Keating
Extension Editor,
Agricultural Information
Department,
Oklahoma State University,
Stillwater

In the 1980s, reliable information has been the key to opening up alternative opportunities for many Oklahoma agricultural producers.

Full-time and part-time farmers interested in diversifying their operations have been drawn to field days, videoconferences, seminars, and industry shows to gather information about commercial alternatives such as

tomatoes, asparagus, Christmas trees, and aquaculture. They have found Cooperative Extension specialists from Oklahoma State University (OSU) ready to provide answers needed for decisionmaking about feasible alternative opportunities.

The Center For Alternatives In Agriculture at the university is coordinating information and offering assistance to Oklahoma farmers considering alternatives or actually implementing the changes.

Providing useful information and coordinating Extension information delivery are primary

purposes of the Center, explains Ray Campbell, its coordinator. "Some producers have benefited from diversifying from traditional commodities such as wheat and cattle," he says. "Others have taken advantage of situations such as a strong potential demand for a particular product in their area or extra land that was conducive for a specific use. Still others simply have enjoyed producing something new from a small investment of time and money."

A Systematic Effort

Oklahoma agriculture has developed under striking diversity in climate and soil type within the state's borders. Oklahoma's climate and its favorable geographic location relative to markets and transportation sources offer opportunities for its agricultural producers to expand their economic base.

"Diversification can't be effective for the agricultural system as a whole if it's done haphazardly," Campbell points out. "A systematic effort is needed to coordinate and disseminate information about promising alternatives to potential users."

The Center For Alternatives In Agriculture provides OSU's Division of Agriculture with a coordinated means for evaluating new crops, livestock enterprises, and product ideas; for facilitating research and development efforts; and for disseminating practical information to the public.

OSU is maintaining fruit and vegetable research work at five of its experiment stations. Efficient production of many fruit and vegetable crops in counties surrounding the sites reflects the work being accomplished by OSU personnel at the stations. Detailed information about growing and marketing the crops is provided via field days, videoconferences; and numerous publications, as well as news releases and television segments.



Conferences And Horticulture Shows

In 1988, OSU sponsored a statewide Governor's Conference on Alternative Opportunities to follow up on its series of seminars and videoconferences.

Dozens of OSU personnel are involved every year in the statewide Horticulture Industries Show, which focuses on the production and marketing of vegetables, fruits, pecans, herbs, Christmas trees, and turfgrass. County and state Extension workers have provided expertise to the formation of popular farmers' markets in many Oklahoma towns. A network of Extension personnel with expertise in many different subject areas is providing local and state growers' associations with assistance.

When producers deal with a perishable product or an uncertain market, they need to be cautioned as well as encouraged. "Extension specialists at the university stress the importance of thorough planning that includes marketing strategy," comments Jim Motes, Extension vegetable crops specialist.

Viable Alternative For Few

Motes has preached for years that vegetables are viable alternative crops for only a small percentage of farmers considering them. Those producers, he declares, are

the top managers. He has warned that "turning to vegetable crops is not a way out of a debt crisis situation for a farmer, and producing vegetables is much more labor and capital intensive than traditional agricultural enterprises in the state."

If a producer comes up with negative answers when evaluating such factors as financial resources, management strategies, potential marketing opportunities, and commitment to properly managing the enterprise, then moving into an alternative enterprise, Motes explains, probably should be discouraged or the plan revised.

Invaluable Info

Randy McGee, a southern Oklahoma producer who is growing vegetables commercially, believes OSU Extension specialists have been invaluable in providing information about vegetable production, irrigation, variety selection, and disease and pest control. "Many times when I was facing a problem," McGee says, "OSU's vegetable experts were the only sources I could turn to who could give me dependable information. I've received timely information from them many times."

Plan For Marketing First

Before financial commitments are made to produce an alternative

commodity, marketing is an essential item in the planning process, emphasizes Extension Economist Jim Nelson. "If there is a single rule of thumb to guide farmers in marketing nontraditional commodities," Nelson says, "it is to plan for marketing before you plan production."

Nelson advises Oklahoma producers considering starting a vegetable enterprise to "think fresh." By this, he means that fresh market vegetables offer better profit potential for small, beginning producers. "Whether marketing is direct via a roadside stand, or a pick-your-own operation, selling fresh market vegetables through an appropriate outlet allows a producer to start small and learn as he goes," Nelson says.

OSU is implementing new ways every year to assist Oklahoma farmers in making decisions about alternative opportunities, Campbell points out. Among the newer thrusts are integrated pest management programs in vegetables and a research team approach to vegetable production problems in southern Oklahoma.

OSU has been at the forefront of the modern-day movement toward more diversification of Oklahoma agriculture, Campbell believes. OSU personnel, he points out, have worked closely within the state with such groups as producer cooperatives, the Oklahoma Department of Agriculture, and the Agricultural Research Service, USDA, in establishing viable production systems that offer Oklahoma farmers alternatives to their traditional commodities.

"I believe alternative agricultural opportunities in the 1980s are an example of an area where Extension has had a very significant impact on a large-scale agricultural trend," Campbell declares. "I believe some directions have been established that will benefit our Oklahoma farm families for generations." ▲

Raising Awareness In Berkshire County

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John Pontius
*Extension Small Farm Specialist,
Farm Economics and Business,
University of Massachusetts, Amherst
and*

Cathy Roth
*Extension Home Economist,
Berkshire County Extension Office,
Massachusetts*

Providing farmers with the skills and knowledge to assess and try new alternatives in crops and marketing is important. Berkshire County, Massachusetts, has found it equally important to raise the awareness of the local community about the new ventures their farmers are trying.

The fabric of the county's communities is changing. An outmigration of permanent residents has been accompanied by an increase in second-home owners who are in the county in the summers and for ski weekends. Gentrified towns are replacing those that were historically farming communities which depended on the agricultural economy.

New residents have little sensitivity to the remaining agriculture other than the picturesque relief it provides to mountains and forests. Many communities want to preserve farms as open space, but have little understanding of the need for farmers to remain economically viable.

Determining The Situation

Needs assessments, community forums, and other means of data collection revealed three basic facts related to the county's agriculture:

1. Farmers needed ways to increase their income, either from alternative sources or from alternative agricultural strategies.
2. Communities generally wanted to maintain agriculture, but had little understanding of how to do so.
3. Many people, both farmers and nonfarmers, were willing to work to enhance the viability of local agriculture.

Program Development

As Extension began developing a program, all planning was aimed toward one overall goal—enhancing agriculture in Berkshire County. The Extension staff identified farmers and nonfarmers who were willing to participate in project development and implementation and included them in the activities.

The first focus of the Extension effort was to provide farmers with information and skills on new or alternative agricultural practices and marketing strategies. An ad hoc committee of Extension staff, farmers, and people interested in improving local agriculture began to develop educational programs.

In 3 years, three major conferences/field days for farmers focused on the following topics:

- Alternative agricultural practices and crops, such as organic production methods, dairy goat production, growing perennial flowers for sale, and herb production.
- Development of enterprises that make use of farm-based resources, such as forest-based enterprises, bed-and-breakfast businesses, and value-added businesses like catering.

Reaching Nonfarmers

The educational program provided farmers a background for trying new approaches. But the county also saw the need to promote local agriculture to nonfarmers. This second effort had a dual focus: to encourage local consumption of local farm products and to increase interest in local farms in a way that would enhance the county's agriculture.

Extension identified and brought together leading farmers and other citizens to identify problems and solutions relating to local agriculture and to develop a process for implementing them.

The process involved farmers, town officials, politicians, land activists, conservationists, educators, the media, and people with special concern for rural economic development. All had an interest in rural and farm issues and had reasons to work on behalf of the solutions they proposed.

Extension staff facilitated the meetings but allowed the process to take its own course. They knew that the local people needed to articulate the problems in their own way in order to be able to work to solve them.

A Council Is Formed

A major outcome of the series of meetings was the decision to establish a formal body and give it a name. As a result, the Berkshire Food and Land Council was born. In its early deliberations the council made several decisions that have been important to its actions.

First, they articulated a set of goals, which included: conserving natural resources and farmland; achieving sustainable local food production; establishing an activist model for other communities to follow; and increasing community and political support for local agriculture.

Second, they decided to generate “doable,” affordable, and successful projects.

Third, they decided to recruit nonmembers when needed for specific projects.

Finally, they decided to involve the local press as much as possible and to help generate articles on local agriculture.

The council has undertaken several projects:

- Sponsorship of a World Food Day event that brings politicians and activists together to talk about food production locally and worldwide.
- Development of a map of more than 60 local farms that sell directly to consumers.
- Matching of available land with people who are trying to start or expand farming operations.
- Creation of study groups to educate council members about important agricultural issues.
- Planning of another conference/field day to discuss appropriate solutions to such local problems as making a living on a family farm, rural planning for sustainable farms and communities, and enhancing the resources of rural communities.

By creating the Food and Land Council, Berkshire County leaders believe they have found an excellent way to support alternative agriculture. ▲

Robyn Van En and Hugh Raichiff, farmers from Berkshire County, Massachusetts, and members of the newly formed Berkshire Food And Land Council, proudly stand behind their produce. Extension's educational program played an important role in helping farmers like these identify problems and solutions relating to local agriculture.



Opposite: In Florida, workers use a mechanical sprigger to establish St. Augustinegrass, a popular turfgrass species. This page: Trio carefully places sod on a golf course putting green. Many traditional Florida farmers are investigating sod production as an alternative market commodity.

L.B. McCarty
Extension Turf Specialist,
University of Florida, Gainesville

Sodding is a way to achieve instant green grass by covering the soil with strips of grass that have been grown in a solid stand and then harvested intact with a thin layer of soil and roots attached. The demand for quality sod has increased dramatically, and the sod-growing industry is expanding rapidly.

The short and intermediate outlook for sod production is good. Areas with new building construction are particularly "hot spots" for the sod industry. The growing population of the Southern United States makes it a high-demand area. However, competition is keen.

Farmers considering sod production as an alternative agricultural enterprise should make a careful evaluation of the local market and their own situation.

Production

Producers must consider these factors: establishment, water quantity and quality, inexpensive water sources, primary cultural practices, pest management, harvesting and marketing, and costs and returns.

Establishment—

Establishment involves land preparation, soil improvement, irrigation installation, and turf planting. Startup costs depend largely on existing equipment, degree of land preparation needed, and initial sod establishment.

Much of the necessary equipment is adaptable from traditional farming operations, but several specialized pieces are required. These include mowers, harvesters, forklifts, rollers, and possibly irrigation equipment. Additional

costs would be incurred for tools and supplies to maintain and operate a mechanical shop, office computers, telephone, and secretarial services.

*Water—*Ample water quantity, as well as quality, should be a primary consideration. Water sources include deep artesian wells, ponds, streams, canals, and lakes. However, tighter governmental restrictions on well drilling and water allotment from public sources might limit available quantities during dry periods.

*Inexpensive water sources—*Effluent water from municipal and industrial sites has become an alternative irrigation source. This effluent or "gray" water can be an excellent and inexpensive source of irrigation. Guaranteed chemical analysis and written contracts detailing the water's quantity and quality should be negotiated before use.

Primary Cultural Practices—

Cultural practices in sod production include fertilization, mowing, rolling, and water management. Fertilizer management depends on the soil type, grass species, and local environmental conditions. Quick, efficient crop production requires fertilizer programs that promote quick coverage and strong rooting without producing excessive top growth.

Turfgrass must be mowed frequently and at the proper height to prevent scalping, which delays regrowth and makes the grass weaker and more susceptible to pest invasion. A water-filled roller must be used several times during production to smooth the area.

Turfgrass needs irrigation during periods of drought, but drainage must be available during excessively wet weather. Turf grown in constantly wet soils develops a poor root system, becomes more susceptible to pest invasion, and prevents machinery



access. Lateral drainage ditches, natural sloping terrain, or installation of drainage tile are necessary for wet soils.

Pest Management—Pest suppression is a key to successful sod production. Any pest or management practice that affects the sod's appearance or root system causes a lower quality product.

Fields converted from traditional row-crop agriculture to sod production typically have some carryover pest problems. Sod growers must continually be alert for diseases, insects, nematodes, and vertebrate pests. By far the most persistent pests, however, are weeds. Once established, weeds are hard to control without affecting the quality of the sod.

Harvesting And Marketing—Sod is harvestable when enough root strength has developed to hold the cut strips together with minimum soil adhering. Most smaller operations (less than 100 acres) use a walk-behind sod cutter. Larger farms need a unit mounted on or pulled behind a tractor.

Wholesale buyers include landscape maintenance or installation contractors, garden centers, building contractors, homeowners, and golf course/athletic field superintendents. Growers with small acreage or limited shipping capabilities generally sell to homeowners and lawn care professionals. In addition to growing and shipping, many sod businesses offer contract installation services.

Shipping costs generally limit the competitive selling range for most producers. Most small to medium-sized growers restrict deliveries to a radius of less than 100 miles. Promotion opportunities include trade magazines, newspaper ads, trade show booths, word of mouth, yellow pages, and direct contacts with potential customers.

The keys to success are (1) establishing a market before planting and (2) ensuring repeat business by providing a quality product.

Costs And Returns
Costs and returns vary considerably with location, equipment, labor availability, and management practices. Generally, production costs increase as the farm size decreases. Time required to produce harvestable sod from initial establishment depends on the turfgrass species, soil type, and environmental conditions.

In Florida, for example, centipede grass usually takes 18 months from the initial planting to harvest. Bermudagrass requires 6 to 12 months. Normal yields generally range between 30,000 and 35,000 square feet of usable sod per acre.

Capital investments for sod farms include land, buildings, and equipment. Variable costs include labor, fuel, fertilizer, pesticides, repairs, and parts. Fixed costs include insurance, taxes, depreciation, land charge, and management charges. Labor for a 250-acre sod farm is estimated at five full-time and two part-time (seasonal) employees.

In Florida, capital costs for Floratan St. Augustinegrass sod production are approximately \$1,250 per acre, exclusive of land investment. Production costs per crop are about \$550 per acre. Net profit per acre (return to risk), including interest and principal payments on capital expenditures, is about \$275 per acre, assuming 100-percent financing of capital outlay. These figures should be adjusted for other grass species and geographic regions.

Proceed With Caution

Commercial sod production is both labor intensive and capital intensive. Keen competition, saturated markets, and a fluctuating economy make a thorough investigation of potential markets and costs of production necessary. Farmers considering investing in sod production should first consult with their county Extension agent, state or regional sod production/growers group, and a reputable local grower. ▲

Software For Success

The farmers that are best suited for alternative agricultural opportunities often have unique values and farm characteristics.

Farm advising on alternative crops must consider the concerns of the farmers who grow them. So when we decided to incorporate computers into the complex advising process, our first step was to involve the farmers. This started us on a yearlong venture which resulted in an expert computer system for small-farm planning.

Farmer Interviews

St. Mary's County, in southern Maryland, offers a wide cross section of small-scale farmers, many of them making decisions about crops to plant in place of tobacco. We interviewed 14 such farmers on how they made decisions. The group included part-time, full-time, Amish, and Mennonite farmers of varying educational levels.

While a few farmers talked of profits as a decision criterion, there was little agreement on the definition of profits. For some, it was returns over cash production costs; for others, it was the equivalent of gross income.

We had several goals as we designed our new computer system:

Preserving interaction between agents and farmers—An agent's role is to help farmers decide what they want to grow, not to tell them what they should grow. To ensure that the computer system would maintain the interaction that occurs in this process, it was designed to be used by agent and farmer together.

Increasing user confidence and acceptance of results—Many of the farmers were reluctant to adopt new practices; none were eager to accept the advice of an unaided machine. Presenting the expert system as part of a consultation with an agent was expected to help overcome this problem.

Making the system adaptable—Prices, costs, available crops, and markets for crops can be quite different from season to season and from one geographic area to another. To make the system adaptable, we designed it as a "shell" which agents could use to build expert systems to suit current conditions.

Designing the system to run on personal computers—Typical county Extension offices are limited to PC-class hardware and may be located in remote areas where regular networking with central computers is difficult. Therefore, the system was designed to run on a PC.

Enterprise Requirements

Agents must initially work with specialists to set up the system for local conditions.

Basic budget data—Each enterprise must have a yield, price, production cost, and labor requirement for each month. The agent estimates these numbers initially, but they can be changed during a consultation.

Basic requirements—These are listings of things which a farmer must have to successfully produce a specific crop. For example: "If you do not have irrigation, do not grow tomatoes."

The enterprise groups and the basic requirements set the system apart from most other crop planning software.

Advising With The System

The typical farmer-client arrives at a scheduled appointment armed with information on land and labor available and a proposed plan for the farm. The agent enters this information into the computer, and the process of finding a satisfactory farm plan begins.

The system checks the basic requirements for each enterprise in the farmer's initial plan to ensure that the enterprises are suited to the farmer's situation. A plan that passes this step is next assessed in terms of its labor and land requirements and income potential.

If the farmer and agent think the plan needs improvement, the system can help with modifications. The basic logic of the procedure to modify a plan is simple. First, the program determines the highest income-producing enterprise in the group. Then it calculates how much of that enterprise can be grown with available resources.

If the new plan is acceptable to the farmer, the procedure ends. If not, the available resource levels are updated to reflect what has been used by other enterprises in the plan, and the program moves on by trying to add the next highest income crop in the group to the plan.

Farmers who reject the plans involving crops in the current group are asked to select another group. All enterprises in the new group are added and the process of suggesting maximum amounts of most profitable enterprises starts again.

Conclusions

Small-scale, part-time farmers seem to be particularly good candidates for advising with this system. So are new farmers and retired persons thinking about agricultural pursuits. ▲

Coauthored by Daniel J. Donnelly and Edward Swecker, Agricultural Agents, Maryland Cooperative Extension Service, St. Mary's County; Richard A. Levins, Extension Farm Management Specialist, University of Minnesota, St. Paul; and Dewitt C. Caillavet, Research Associate, Department of Agricultural and Applied Economics, University of Maryland.

A Model Market For The Oregon Coast



William R. Rogers
*Extension Agricultural/Forestry Agent,
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Oregon*

Unemployment was high along the central Oregon coast during the early 1980's as fishing and forestry, the once-dominant natural resource-based industries, experienced difficult times. As people began to look seriously for alternative ways to make a living, various agricultural options were a common choice.

Recognizing A Need

During the early 1980's it became relatively common for former fishermen, loggers, mill workers, or newcomers to the area to contact the Lincoln County Extension Service about how they could make a living from their land.

The time seemed right for a regional conference on alternative agricultural opportunities. Such a conference would allow people with similar interests and questions to get to know each other and share information.

Conference On Alternatives

Enthusiastic support for a coastal conference on agricultural alternatives came from the

Oregon Coast Zone Management Association (OCZMA), an organization of county governments, port districts, and soil and water conservation districts.

Local agricultural organizations and the Oregon State University College of Agriculture administration also fully endorsed the effort. Grants and donations totaling \$4,000 were obtained to cover preconference expenses.

At the first planning meeting, 27 people from six coastal counties discussed opportunities and limitations for coastal agricultural development.

The conference was held in January 1986. The first speakers provided an overview of economic changes that might affect agriculture and key ideas for becoming successful in any business. They were followed by panels of successful producers representing many types of agricultural enterprises, from sheep to Christmas trees, mushrooms, and mussels.

Second Conference

The general feeling of optimism that prevailed at the 1986 conference was reflected in the evaluations returned from 135 participants. Nearly all found ideas they felt they could use.

Frequent requests for more information on marketing led to a second conference, in March 1987, which focused on marketing alternatives and techniques.

Gerilyn Brusseau, restaurateur and author from Edmonds, Washington, provided an exciting keynote address on the opportunities for selling products to local businesses. Successful marketers gave advice about such products as fruits, herbs, mushrooms, beef, vegetables, specialty ornamentals, and forest products.

Attendance increased to 165 and included participants from all over the Pacific Northwest as well as the Oregon coast.

Model Market Plan

A model market plan was developed and presented at the 1987 conference. After the conference, more than 30 participants obtained assistance for their own personal marketing plans based on the model.

The model market plan has been incorporated as a central component of the statewide Extension Service initiative entitled: "Identifying Agricultural Alternatives for Oregonians."

Gross farm sales from farms in Lincoln County increased from \$5.9 million in 1986 to more than \$10 million in 1988. Some of this increase was due to a recovery of the forest products industry, but the production of vegetables, fruits, and miscellaneous specialty crops also increased over the same period—from \$1.9 million to \$2.8 million.

Many local grocery stores and restaurants now regularly purchase locally grown produce, and the farmers' market is booming.

There is a continuing demand for good information on alternative crops, and more workshops or conferences will be needed. But it is clear that Extension's efforts have already provided a beneficial start. ▲

From Trees To Trout

40 Extension Review

Eighty-five percent of Kentucky's farms are small farms and 96 percent are family-operated. Extension at Kentucky State University is encouraging low-cost alternatives for limited-resource farmers.



Marion Simon
Extension State Specialist for Small Farms and Part-Time Farmers, Kentucky State University, Frankfort

Extension paraprofessionals are a key factor in a Kentucky effort to introduce low-cost alternatives for limited-resource farmers and reduced-labor alternatives for part-time farmers.

The Kentucky State University (KSU) Cooperative Extension Program has taken a lead role in developing such alternative farm enterprises as aquaculture, rabbits, horticultural crops, and Christmas trees.

Of Kentucky's 99,000 farms, 85 percent are small farms; 96 percent are family operated. Sixty-five percent of the state's farmers have off-farm jobs. Through the Small-Farm Program at KSU, Extension paraprofessionals (small-farm assistants) in 11 counties are working one-on-one with these small, limited-resource farmers.

Trees For Marginal Land

Christmas trees have a minimum labor requirement and are well suited to marginal, hilly land. At maturity, they can yield a return of \$6,000 to \$14,000 per acre. A joint KSU/University of Kentucky project is introducing commercial Christmas tree production to Kentucky farmers. One result of this cooperative effort has been the formation of the Kentucky Christmas Tree Growers' Association.

The Small-Farm Program has used Extension demonstrations to introduce Christmas tree production into three counties. Jack Bransford, small-farm assistant in Allen County, reports that 2 acres of seedling Scotch, white, and Virginia pine trees were established on a cooperator's farm in 1988 for \$700.

Aquaculture Efforts

Aquaculture, specifically channel catfish and rainbow trout production, is expanding rapidly in Kentucky. Through the efforts of Extension at KSU, the Kentucky Aquaculture Association (KAA) has been formed to coordinate efforts of the producers.

The total cost for producing a cage of fish is less than \$500. After experimenting with this method, farmers can decide if open-pond, commercial production fits into their farm plans. Many of the demonstrations have been sponsored by KAA, KSU's aquaculture program, and TVA.

Berries Fit In The Farm Plan

Horticultural crops are being introduced throughout Kentucky. The Small-Farm Program has introduced blackberries, raspberries, strawberries, and blueberries through TVA-sponsored demonstrations.

For a \$250 investment, Extension demonstrations at the university show that a 1/2-acre strawberry patch can yield \$750 in produce annually. For a \$250 to \$400 investment, one-half acre of thornless blackberries or raspberries can be expected to yield \$800 in annual sales for several years.

The major vegetable crops in Kentucky are tomatoes and peppers; cabbage, cucumber, and other vegetables play a lesser role.

In Wayne County, for example, the Extension paraprofessional has worked with small vegetable producers to achieve major impacts in the use of improved varieties, trickle irrigation, pest management, and soil fertility.

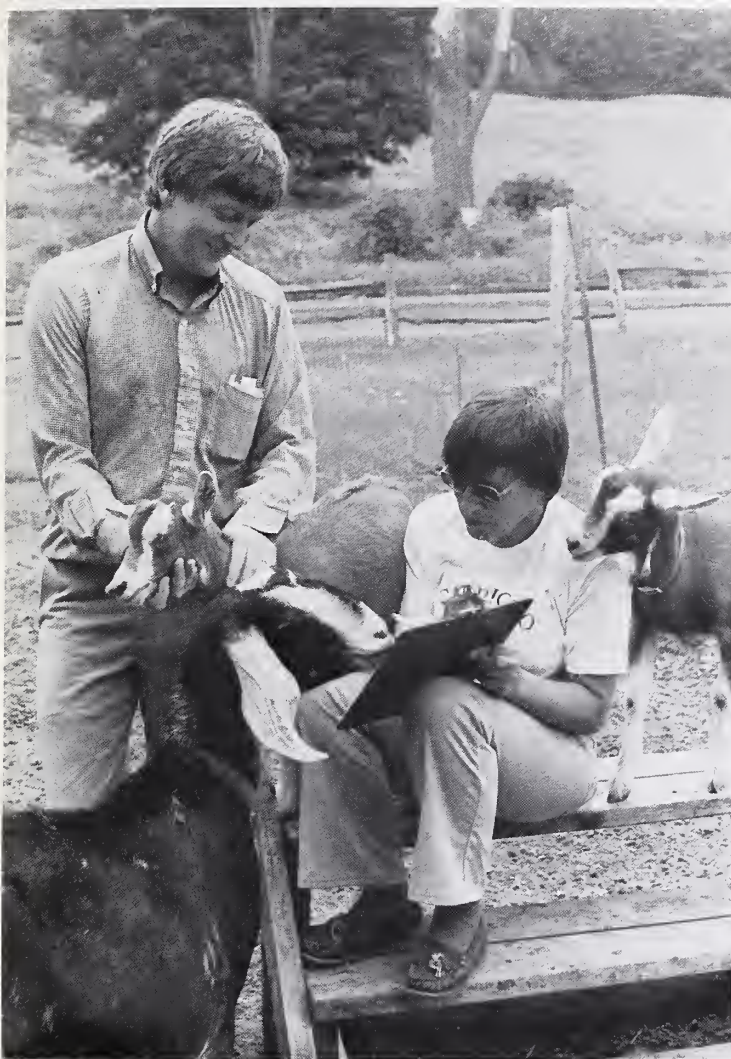
Rabbit Production

In 1985, the Small-Farm Program introduced rabbits as an alternative enterprise. For a \$250 investment in cages and breeding stock, a farmer can begin rabbit production. Profits per doe average \$29 to \$31 annually. For the small producer, 100 does can yield approximately \$3,000 for a few hours of labor per week.

Dana Lear of Lincoln County recently converted a swine farrowing house to a rabbitry.

Joe Lee and Fay Fooshe of Trigg County supplement their income by producing both rabbits and sorghum molasses. The rabbit herd they have developed within the last year is very productive. The Fooshes raise their own sorghum and produce sorghum molasses (syrup) on the farm. The syrup is sold locally via direct marketing. They also make and sell sorghum suckers. ▲

So The Novice Farmer Gets Going



Sharon Gaudin
Journalism Intern, Editorial Assistant, Cooperative Extension Service, University of Vermont, Burlington

How do two sisters with no previous farming experience—one a medical technologist and one a phone company employee—begin raising and farming goats commercially?

The sisters—Mary LaVoie and Marguerite Dorsey—claim it all began when they purchased a goat for its milk. “About 6 years ago, we bought a goat for its

milk,” explains Marguerite Dorsey. “She was lonely all by herself so we got another one to keep her company. Then suddenly we were raising anywhere from 2 to 20 goats at a time.”

The sisters, who live on a farm in Grand Isle, Vermont, had only toyed with the idea of commercial farming. Then opportunity presented itself. “We only dabbled in the goat farming business until about a year and a half ago,” says Mary LaVoie. “Then we heard of a goat farmer who wanted to sell his entire operation.”

But a problem remained. The sisters had the farm but knew little about raising and farming goats commercially. Recognizing

they were going to need quite a bit of help, they called the University of Vermont Extension Service.

Ed McGarry, Director and Extension agent for Grand Isle County, answered their call for help. “The sisters had done their homework,” McGarry says, “but they needed some extra help.”

Professional Advice

McGarry was able to get the novice goat farmers going, helping with aspects that ranged from herd management to hay choices.

McGarry is helping them design a new milking parlor. “The milking parlor we have now is really set up for cows,” says LaVoie. “The new one will be set up specifically for goats. We knew what we wanted, but alone we never would’ve known how to put it together.”

She remembers the time Ed McGarry helped with a goat’s difficult birth. “McGarry happened to arrive when I was having trouble with a complicated delivery. He was a great help.”

McGarry believes that giving the new goat farmers encouragement has been one of the most important ways he has helped. “When you are unsure of yourself,” he says, “it can really help to have someone there to reassure you that you’re doing all right ...someone who will point out better ways of doing things when that is what is required.”

Plans For Expansion

Both sisters would like to devote themselves to full-time goat farming. They are now planning to expand their herd from 38 to 150 milkers and are adding on to the barn to accommodate the growth. ▲

Grand Isle County Extension Agent Ed McGarry, University of Vermont, advises Mary LaVoie, Grand Isle, about her commercial goat farming enterprise. The business has grown steadily over the years aided by Extension advice and encouragement.

A Systems Approach To Agriculture

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The University of California Sustainable Agriculture Research and Education Program is funding a project that compares rotational and conventional grazing systems. In this "systems approach" experiment, foraging animals are rotated regularly through pastures rather than being allowed to continuously graze a large pasture.

Lyra Halprin
Writer,
Sustainable Agriculture Research and
Education Program,
University of California, Davis

"Systems approach"—it sounds like computer jargon, or the way jetliners land at fog-covered airports. It's actually a philosophic and scientific way to deal with large, complex issues, using researchers from many fields. And it's the method emphasized by the University of California (UC) Sustainable Agriculture Research and Education Program as it strives to help California farmers maintain profitability while remaining environmentally sensitive.

"Many of the projects we've funded have principal investigators in four or more disciplines, and most of them involve Cooperative Extension people," says Bill Liebhardt, Extension specialist and director of the Davis-based statewide program. He notes that one farming comparison project includes 11 Extension and research personnel.

"Using a systems approach is not easy," Liebhardt says. "It involves more management decisions, because you're dealing with many researchers. A project that looks at an agricultural problem from many angles and disciplines is likely to produce, long-term results, "because it takes the entire agricultural vista into consideration."

Addressing Continuing Concerns

The UC Sustainable Agriculture Research and Education Program was created in 1986, at the request of the California Legislature, to address

concerns about the economic viability of farming and the effects of current farm practices on the environment and on human health. The program is charged with funding competitive grants, disseminating new and existing scientific information, and coordinating long-term farmland research. A “systems approach” is the guiding principle of the 29 research and education grants the program has funded in the last 2 years for a total of \$461,000.

Liebhardt emphasized that many of the continuing problems in agriculture cannot be solved by a single discipline. He cited floor management of orchards and vineyards as an example. “Changing one aspect changes the management of the entire system,” he points out.

“If you evaluate the effectiveness of a legume cover crop only in terms of how much nitrogen it added to the soil, for example, you may believe it had a positive effect,” Liebhardt explains. “But that approach doesn’t tell you about the positive or negative effects that the cover crop may have had on pest dynamics. And, although cover crops may increase water infiltration, they also tend to cool an orchard or vineyard floor and may add to the risk of frost damage in cold weather. Simplistic solutions often lead to the creation of other problems.”

Grazing Comparison Project

Eight UC-Davis researchers from the department of agronomy and range science and the department of animal science are engaged in an extensive grazing systems analysis designed to measure the systems responses at the soil, plant, animal, and consumer level. They are observing the changes that occur when foraging animals are rotated regularly through pastures. Conventional grazing management allows the livestock, or “harvester,” to forage at will over every field.

“With intensive grazing management, we finally have control over our ‘harvester,’” states UC Extension Range and Pasture Specialist Mel George, one of the collaborators in the project. Their goal is to determine whether intensive grazing management can help ranchers produce leaner, healthier lamb and reduce synthetic nitrogen fertilizer use on 20 million acres of annual grassland.

Liebhardt points out that the conventional “bovine gymnasium” grazing method produces another whole syndrome: the need for silos to store extra feed when the grasslands give out, the thousands of gallons of gasoline needed to haul the feed to the cattle and to haul the manure away from feedlots, and the possible increased use of antibiotics when many animals are confined to feedlots.

Maintaining Forage Growth

UC-Davis Research Physiological Ecologist Jeff Welker believes that grazing management could be the key to maintaining clover growth in the grasslands. Rotational grazing, also called the Voisin grazing method, has been observed to be more useful in this respect than conventional grazing systems. However, no scientific data exist to show why it works better.

A systems-level approach will help farmers and researchers determine whether grazing management will maintain clover growth in the grasslands and how the lambs, energy use, and rancher profitability will be affected. Welker is examining the metabolic processes of nitrogen fixation, decomposition, and uptake by grass and clover in the experimental grazing pastures over a 3-year period. He is tracking how the plants fix atmospheric nitrogen over time and how much of that nitrogen is returned to the soil and absorbed by clover and grass in grazed pastures.

Other Investigations

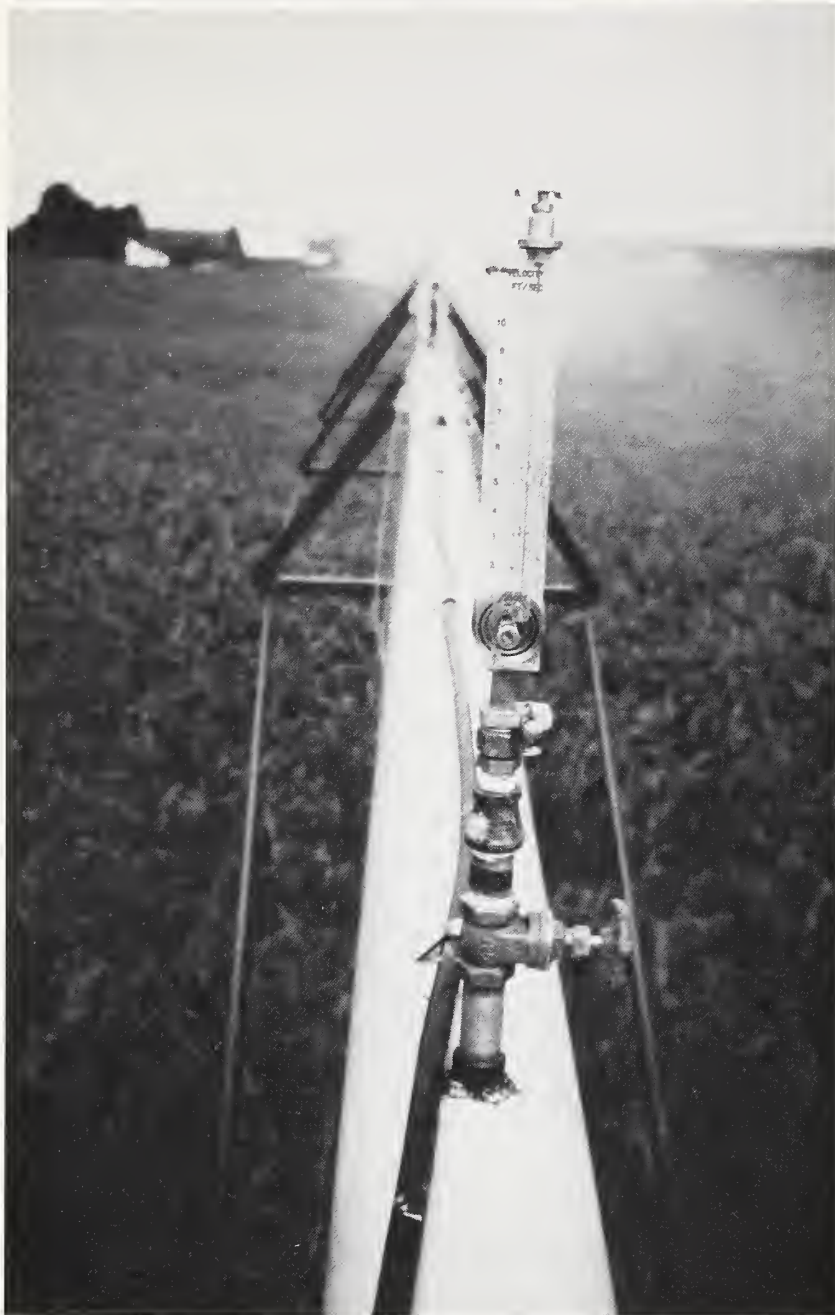
Other researchers of the eight-member team are investigating: clover populations, including which genetic strains of clover plants survive a season of grazing; lambs’ grazing habits and the forage capacity of the experimental fields; the fat content and other characteristics of lamb carcasses at the end of the season; sustaining high levels of pasture clover under different grazing regimens; and the best way to rotate animals to maintain the pasture clover and grass.

Economic Comparison

One part of the project most ranchers will be interested in is an economic comparison of the management systems. “Farmers ask if they can subdivide their pastures for controlled grazing and still get a return on their investment,” George comments. “We will evaluate in a more controlled environment the impact of controlled grazing on productivity. We should be able to show them that subdividing pastures is economically feasible.” ▲

Alternatives For Profitability

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Flow meter checks the amount of water delivered by the irrigation system. Technicians working in the Michigan Energy Conservation Program For Agriculture And Forestry calibrated 50 irrigations systems for an energy savings of more than \$,300 per system.

William McLeod
Information Specialist,
Michigan Energy Conservation Program,
Michigan State University, East Lansing

Michigan farmers and forest product producers will save more than \$100 million in energy costs through practical conservation methods fostered by a new statewide energy conservation program.

The state legislature established the Michigan Energy Conservation Program for Agriculture and Forestry (MECP) in 1988 and financed it with \$16.5 million in energy overcharge funds. The program will continue through the 1990 growing season.

MECP is a cooperative effort of the Michigan Department of Agriculture, USDA's Soil Conservation Service, Michigan State University's Cooperative Extension Service and Agricultural Experiment Station, and Michigan Soil and Water Conservation Districts.

To help farmers and forest product producers implement energy-saving programs, MECP offers a one-time grant of up to \$1,000 for each participant.

Energy Technicians

MECP is funding at least one energy technician in each of Michigan's 83 Soil and Water Conservation Districts. Trained by university specialists, Extension field staff, and Michigan Department of Agriculture project coordinators, technicians work directly with farmers and forest product producers to implement energy-saving measures in six areas: soil fertility and manure management; conservation tillage; integrated pest management (IPM); livestock facilities and waste management; irrigation management; and forest product production, which includes improved wood-burning technology.

"In the first year, MECP technicians have worked with more than 9,000 farmers and forest product-producing firms," says Ted Loudon, MSU's MECP program leader.

Fertility Management

To attract farmers to the program, Eaton County Extension Agent Roger Betz and Energy Technician Craig Binkowski offered 10 free soil tests. Farmers submitted soil samples representing more than 9,600 acres.

A computer program that compares previous fertilizer usage with soil test recommendations showed many farmers that phosphorus levels in their soils were adequate to maintain crop production without adding fertilizer. About 90 percent of the farmers followed MECP recommendations completely, for average savings of about \$13 per acre.

Other fertility management programs designed to reduce energy consumption focus on improved nitrogen use. "Research shows that farmers get improved nitrogen efficiency when they soil-test for residual nitrate nitrogen and side-dress for the optimum rate," says Maurice Vitosh, the MECP fertility team leader.

Manure Management

Lee Jacobs, an MECP manure management specialist, explains that the manure management program is designed to reduce chemical fertilizer purchases, cut energy costs, and inform producers about potential groundwater contamination due to excessive manure applications.

MECP has distributed about 800 informational packets to livestock and poultry producers to explain how to calibrate spreaders and how to use a manure analysis.

Facility Ventilation

"About 10,000 Michigan livestock and poultry producers use power ventilation systems to cool their facilities," says Bill Bickert, MECP livestock team member. "If 10 percent of these producers would adopt modern ventilation technology principles, more than a million kilowatt-hours of electricity could be saved annually."

Installing easily removed polypropylene woven fabric sidewalls to provide full-wall natural ventilation reduces temperatures in dairy barns by 3 to 8 degrees during hot weather. This not only eliminates the need for electrical ventilation, but also reduces production losses caused by hot, humid housing. Three demonstration sites have been set up with MECP assistance.

Irrigation

After the 1988 drought, about 175 Michigan irrigators sought help from MECP technicians to improve the energy efficiency of their irrigation programs. Technicians evaluated and calibrated 50 irrigation systems for an average annual energy savings of more than \$300 per system.

Growers also received assistance from "Scheduler," a computer program that projects when crops need additional moisture. "Scheduler adds up water additions from rainfall or irrigation and subtracts losses from evapotranspiration to give the technician a final soil water balance," says Edward Martin, MECP irrigation specialist.

By knowing how much soil moisture is available and the crop growth stage, the irrigator can pinpoint when the crop will need additional water and how much to apply. Eliminating one irrigation application can save growers with a large overhead sprinkler system up to \$500.

Subirrigation, where water is pumped to the crops through drainage tile, is also promoted by MECP because it uses less energy than overhead sprinkler systems.

Conservation Tillage

Because of MECP's efforts, the impact of conservation tillage on Michigan's more than 58,000 farmers is expected to grow. "Our main thrust is to refine and promote conservation tillage systems for major crops grown by Michigan producers," says Francis Pierce, conservation tillage team leader.

"We want to demonstrate to producers that conservation tillage can be applied not only to traditional cropping systems, but also to specialty crops such as dry beans, sugar beets, onions, potatoes, and other vegetable crops."

The program also promotes zone tillage, which shatters compacted soil layers.

Pest Control Practices

Reducing energy expenditures related to pesticide practices is a goal of MECP's integrated pest management (IPM) program. "We eliminate unnecessary pesticide applications by actively monitoring pest populations and spraying only when pests reach an economic threshold," says John Hayden, IPM coordinator. "By following IPM principles, fruit growers have cut back from 8 to 3 insecticide sprays per season and reduced fungicide sprays from 12 to 7. This has had a major impact on profit margins for these growers and reduced the amounts of pesticides going into the environment."

Continuous corn growers who have adapted IPM principles of scouting rootworm populations to project future problems from the insect have been able to save up to \$10 per acre by applying insecticides only when needed. This year 17,000 acres were monitored for pest problems regularly, and an additional 20,000 acres were scouted at least once by MECP energy technicians.

Energy technicians also calibrated 85 sprayer systems for growers. Technicians found that operators were applying an average of 20 percent more pesticides than they thought the sprayer was delivering. Improper calibration was costing the average farmer \$5 to \$10 more per acre.

Forestry Programs

The forestry component of the MECP has focused on helping sawmills improve their efficiency and increasing the use of wood for fuel, says Donald Johnson, MECP forestry specialist.

At a sawmill that produces 3 million to 5 million board feet of lumber per year, technicians saved the operator \$60,000 annually by reducing the thickness of the cut.

To promote the increased use of wood as an energy source, MECP is offering grants of up to \$75,000 to defer the cost of installing wood-fired systems for heat or industrial processing.

On The Way

"After 1 year, the Michigan Energy Conservation Program is well on the way toward helping producers save energy, increase profits, and implement conservation management practices that will reduce non-point-source pollution," Loudon says. "The interagency working relationships fostered by the project are expected to have continuing benefits as we jointly work toward improving profitability and protecting the environment." ▲

FarmNet For Nonfarm Income

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NY FarmNet,
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The traditional picture of the self-sufficient farm family all working together has changed. In New York State and across the United States, family members' roles are diversifying and off-farm work is a major trend.

According to a recent survey of 738 New York farm family units completed by Jane W. McGonigal and Robert L. Bruce, Cornell University, over 37 percent indicated that one or more members (predominantly female) were employed off the farm. Nationally, 46 percent of all farm women are employed off the farm.

Ninety percent of the New York farm families used income from off-farm employment for family living and farm expenses. About half spent the income on some combination of family living expenses, farm bills, and special expenses such as college tuition or vacations.

Why Work Off Farm?

How and why do family members select off-farm employment? John Dennison, coordinator of the privately funded "Farmers In Transition" program at the State University of New York (SUNY) in Morrisville, which offers career counseling and funds for career retraining, says, "Thirty percent of the requests for training for off-farm work come from farmers who are planning on staying in farming."

One New York farmwoman said that she "got a job when the farm was doing well because that was when my husband didn't need me as much." Many career-oriented women with or without advanced education who marry into a farm family continue to pursue careers during marriage. Some of these women value a paying job as recognition for their efforts, something that may

not happen on the farm. Another incentive for getting an off-farm job is to provide benefits including health insurance, social security, and disability credit.

NY FarmNet Role

NY FarmNet is an information, referral, and counseling system for assisting farm families. Since this Cornell Cooperative Extension administered program began in March 1986, only 10 percent of the callers to NY FarmNet's statewide, toll-free number have asked about help for finding employment opportunities. Men place 60 percent of these requests; women callers often ask about jobs for their husbands. Most of these calls come from families being forced out of farming.

Displaced farmers are unlikely to ask about career choices or job options to match their skills.

"They call the 800 number with the attitude of, 'I need a job now!'" says Karen A. Juenger, coordinator of the NY FarmNet office. NY FarmNet sends these callers a basic employment and job training packet and refers the callers to local community colleges, the New York Job Service, and the Job Training (JTPA) offices for counseling. A useful publication included is *Finding A New Career*, one of the "Farmers In Transition" program's factsheets written by Kate Graham, a Cornell research associate, and John R. Brake, agricultural economics professor and director of NY FarmNet. The factsheets are based on interviews with many farm families who had left farming due to financial problems.

County Job-Seeking Programs

Local Cornell Cooperative Extension agents have been assisting farm men and women in finding the right job through agency networking.

The largest program in New York State developed to assist farm families in assessing their goals and in retraining and developing new careers is the Farm Family Opportunity Program of Delaware, Otsego, and Chenango Counties. This program grew from a task force started by local Cornell Cooperative Extension staff.

With encouragement from NY FarmNet, Carl Crispell, the farm business management agent in Delaware County at the time, drew together a local agency task force to look at local farming problems. Representatives from the clergy, mental health, and employment agencies, the Private Industry Council (PIC), and others met and brainstormed.

Cornell Cooperative Extension agents from the three-county area recruited farmers for a Farmer Advisory Committee to work with Delhi's college committee. They came up with the idea of the Farm Family Opportunity Program (FFOP). The area PIC provided the startup money for the first year. Now in its third year of operation, the program has state funding.

Identify Resources

The program's chief goal is to help farm families identify what resources are available to help them stay in farming or to make a successful transition to a new career. Twenty-five percent of the clients, it has been estimated, want off-farm work and plan to continue farming.

NY FarmNet, Cornell Cooperative Extension, and the Farm Family Opportunity Program have formed a supportive network for financially stressed farm families in the three-county area.

Networking of communication and services is critical to meet the changing needs of today's farm families. ▲

Focus Of USDA's 1988 Yearbook: Agricultural Marketing



What do people want to buy? How many? Where? When? In what form? These are the crucial questions of marketing. Answers to these questions will help determine the kind of alternative product or service that could be produced and how it should be merchandised.

Marketing U.S. Agriculture, *The 1988 Yearbook of Agriculture*, with many of its articles by Cooperative Extension System staff, is a treasure chest of marketing ideas. Many articles provide case examples of individuals, firms, and commodity organizations discovering what consumers want and the organizations' strategies for satisfying those wants. For example, in 1978 Ben & Jerry's Ice Cream began in a converted gas station in Burlington, Vermont. By 1987, 50 stores rang up sales of \$30 million for this old-fashioned ice cream.

The 1988 Yearbook of Agriculture also provides marketing ideas for more traditional farm enterprises as well as perspectives on the role of marketing in the global economy.

Limited free copies of this 336-page hardcover anthology are available from Members of Congress. Or order your copy for \$9.50 from the Superintendent of Documents, Washington, D.C. 20402-9325.

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