



Farm size of farmers' market producers ranges from a backyard plot to nearly a thousand acres. John Paul Barbagelata (center) farms 350 acres near Linden, California. He sells about 10% of his produce at Certified Farmers' Markets.

Growers selling at Certified Farmers' Markets include both small and large commercial farms. Many sell at more than one market, traveling over 200 miles each way. Profit was the main reason.

The farmers of farmers' markets

Suzanne Vaupel

California's Certified Farmers' Markets have grown in number from 4 in 1977 to 110 in 1988. While consumers' increasing interest in buying fresh produce directly from the farmer is well known, little has been reported about the farmers who sell at these markets.

In 1986, the Rural Development Program of Cooperative Extension, in cooperation with the Direct Marketing Program of the California Department of Food and Agriculture, surveyed farmers selling at nine Certified Farmers' Markets around the state. (Certification exempts markets from standard size, packaging and container requirements.) We found that these farmers represented a proportional cross-section of all farmers in the state. Gross annual sales ranged from under \$2,500 to over \$500,000. The survey also studied the farmers' marketing strategies, the distances they traveled to the markets, and their reasons for selling at these outlets.

Farm size

A total of 277 growers were interviewed at farmers' markets in Los Angeles County, San Francisco, San Rafael, Sacramento, Stockton, Morro Bay, and San Luis Obispo. At the smaller of these markets, all the growers selling fresh produce were interviewed; at larger markets, over 60% were interviewed. Most of the farms selling at



Barbagelata, his wife, and a hired employee sell produce at 10 farmers' markets each week. Some growers sell produce at 19 markets each week.



Produce from Barbagelata's farm also goes to a broker, a cooperative, and a cannery, but he sells the entire output of this 30-acre field of vegetables and herbs only at Certified Farmers' Markets.

the markets were small, but farms of all sizes were represented nearly proportionately to their statewide distribution (table 1). This may be the only marketing channel where small farms are proportionally represented. The farms in the large category were almost evenly divided between those in the \$250,000 to \$500,000 range and those with sales over \$500,000. The proportion of small farms was greatest in the Los Angeles markets, and the proportion of large farms was greatest in the Morro Bay market.

It is sometimes thought that many of those selling at farmers' markets are part-time or noncommercial farmers. This is not true, according to our survey. Using the Census of Agriculture definition of noncommercial farms (less than \$2,500 in gross annual sales), we found 23% fewer noncommercial farms in farmers' markets than in the state as a whole. There were distinct regional differences. The Sacramento/Stockton markets had the highest percentage of noncommercial farms (table 2). The majority of them (62%) were operated by Southeast Asians who had recently started farming on small pieces of land in the San Joaquin Valley. San Francisco area markets had the lowest proportion of noncommercial farms.

Acreage of farmers' market growers ranged from a backyard plot to 960 acres. The average farm size was 70 acres, considerably less than the statewide average of 390 acres. One reason for this difference is that farmers who sell in these markets grow high-value fruit, vegetable, and nut crops rather than field crops requiring larger acreages. Statewide averages also include land in pasture, cover crops, and woodland.

Of farmers' market producers, 84% farmed 100 acres or less, compared with 72% in the state as a whole. In the Los Angeles markets, 90% of farms were 100

acres or less, compared with 69% in Morro Bay/San Luis Obispo. Sacramento/Stockton and San Francisco/San Rafael had 85% and 84%, respectively, farming 100 acres or less.

Farming was the principal source of family income of 58% of growers interviewed. In the 1982 Census of Agriculture, only 49% of all California farmers reported farming as their principal occupation.

Marketing strategies

Diversity is a key to the marketing strategies of farmers' market growers. Most used commercial marketing channels besides farmers' markets and other forms of direct marketing to sell their crops. During the year before this survey, 68% had used more than one marketing channel. Packer/shippers and wholesale markets were the commercial channels most often used by farmers' market growers. More growers used these than other forms of direct marketing, such as direct-to-retail, sales from the farm, and roadside stands (table 3).

The marketing channels used differed by farm size. While almost half the medium and large growers used packer/shippers, only 17% of small growers used them. Mid-size farms were more likely to use wholesale markets than were small or large farms. The large farms surveyed were more likely to sell direct-to-retail and through roadside stands and marketing cooperatives than were the small and mid-size farms.

Over 71% of the farmers who used packer/shippers sold more than half their produce through that channel. In comparison, only 51% of the total sample of farmers sold over half their produce through farmers' markets, and 28% sold less than a quarter of their produce through those outlets.

Several farmers reported specific niches for farmers' markets in their marketing strategies. Some sold there while waiting for wholesale prices to rise. One reported selling early fruit at the markets before he had sufficient volume to go to a packer. Others kept their farms operating with farmers' market cash sales while waiting to be paid by the packer/shipper. Or they maintained a cash flow during the winter by selling cold-storage apples at the markets. Several farmers said they started selling at farmers' markets after losing money selling through packers.

Many growers sold at a large number of farmers' markets, especially in the Los Angeles area, which has a system of 22 markets. The average number of markets attended was 3.43 for the entire sample and 4.91 for growers selling in Los Angeles. (Here a "market" means one location on a single day.) Statewide, 71% of the growers sold at more than one market and in Los Angeles, 80% sold at more than one. Of

growers selling in Los Angeles, 50% sold at four or more markets. Two growers and their families sold at 19 markets each week.

Many growers selling in Los Angeles markets farmed in the San Joaquin Valley. Often they filled a large truck with produce and sold at a different Los Angeles market each day until the produce was sold. One woman explained that she drove a truck to Los Angeles, sold out at a market, then met her husband half-way between Los Angeles and the farm, switched her empty truck for a full truck, and returned to another Los Angeles market the next day. In some families, two or three family members sold at a different market each day for 6 or 7 days a week.

A second aspect of the farmers' strategy is crop diversity. Only 8% grew a single crop in 1985, while 33% grew between 6 and 10 crops and 14% grew more than 20 crops.

TABLE 1. Gross-sales categories of California farmers and of those selling at Certified Farmers' Markets (CFMs)

Item	Category*			No response
	Small	Medium	Large	
	%	%	%	%
All farms	81	8	11	—
Sellers at all CFMs	81	8	5	5
CFMs:				
Los Angeles	85	9	2	4
Morro Bay/San Luis Obispo	74	3	17	7
Sacramento/Stockton	81	9	5	4
San Francisco/San Rafael	79	7	8	6

* Categories: Small = under \$100,000 gross annual sales; Medium = \$100,000-\$250,000; Large = \$250,000 and above. The Small Farm Center of UC Davis defines the gross sales limitation of a small farm as \$100,000.

TABLE 2. Proportion of noncommercial farms

Item	Noncommercial (< \$2,500 sales)
	%
All farms	31
All sellers at CFMs	24
CFMs:	
Los Angeles	24
Morro Bay/San Luis Obispo	27
Sacramento/Stockton	34
San Francisco/San Rafael	13

TABLE 3. Additional marketing channels used by growers at farmers' markets

Channel	Total sample	Growers by category			
		Small	Medium	Large	
	%	%	%	%	
Packer/shipper	22	17	48	50	
Wholesale	21	20	38	19	
Direct-to-retail	19	18	29	38	
Sales from farm	13	15	5	13	
Roadside stand	12	11	19	31	
Marketing cooperative	11	8	14	19	

TABLE 4. Distance traveled to farmers' markets

Market	Number	Avg.	Maxi-
		distance*	mum
		mi	mi
San Francisco	58	142	250
San Rafael (Marin County)	35	107	494
Los Angeles	53	96	362
Morro Bay/San Luis Obispo	36	48	143
Sacramento	33	46	219
Stockton	62	6	74

TABLE 5. Main reasons for selling at farmers' markets

Reason	Total sample	Growers by category		
		Small	Medium	Large
	%	%	%	%
More profits	32	31	48	38
Enjoy selling there	14	14	14	13
Cash sales	10	10	10	31
Another outlet	8	8	5	13

Vegetables and melons were grown by 75% of the farmers, fruits and nuts by 52%.

Distances traveled

Most of the sellers at rural markets were local farmers, but many growers traveled great distances to sell at large urban farmers' markets. Growers traveled an average of 142 miles each way to the San Francisco Alemany Market (measuring between county centers), 107 miles to the San Rafael

market, and 96 miles to Los Angeles markets (table 4).

Over 20% of the growers interviewed in Los Angeles markets traveled more than 200 miles each way, and many commuted these distances several days a week. In contrast, rural markets drew farmers from shorter distances, with an average distance traveled to the Stockton market of 6 miles.

Reasons for selling at markets

When asked their main reason for selling at farmers' markets, growers most often replied "profits." The second most frequent answer, however, had nothing to do with economics—it was that they enjoyed selling at farmers' markets. Other motivations included cash sales and finding an additional outlet for crops (table 5). Growers in all farm size groups ranked profits first, but large growers ranked cash sales as more important than enjoyment.

Other reasons mentioned for selling at these outlets were to find out what consumers want, to promote the farm or a particular product, and to educate consumers about different varieties of crops. Several mentioned the convenience of selling at markets close to their farms.

Conclusion

Growers who sell at these markets do not fit the common perception of backyard or part-time farmers whose only outlet is the

local farmers' market. The gross annual sales of farms represented at farmers' markets is consistent with the distribution of all California farms, ranging from under \$2,500 to over \$500,000. Farm size of farmers' market producers ranges from a backyard plot to 960 acres. There are smaller proportions of noncommercial and part-time farmers selling at farmers' markets than there are in the state as a whole.

Figures are not available on the number of farmers selling at Certified Farmers' Markets or the sales volume. It is clear from the rising number of markets, however, that they are becoming important marketing channels to more farms of all sizes. These markets are a full-time business for some farmers and a supplementary outlet for others. Several growers credited farmers' markets with saving their farms from bankruptcy.

Suzanne Vaupel is a Research Agricultural Economist, Department of Agricultural Economics, University of California, Davis. This study was funded by the Cooperative Extension Rural Development Program, Department of Applied Behavioral Sciences, UC Davis. Support and cooperation were also given by the Direct Marketing Program of the California Department of Food and Agriculture, California Direct Marketing Association, Southland Farmers' Market Association, and Bay Area Marketing Group. Photos by the author.

Sprinkler spacing affects almond frost protection

Joseph H. Connell □ Richard L. Snyder

The use of under-tree sprinklers for frost protection is an established practice but the specific mechanisms of the practice aren't well understood. This study of sprinkler spacing showed that best protection depends on placement of lines and air movement within the orchard.

Almond growers who irrigate with hand-move aluminum sprinkler pipe are usually limited in the area they can cover at any one time, by either the amount of water or the amount of pipe available. When frost is a

danger, placement of these limited resources may make a difference in the protection obtained. The choice has to be made between spreading sprinklers over an entire orchard, so that dry areas are left between sprinkler lines, and concentrating water application to provide more complete protection in one area. The purpose of this study was to learn how sprinkler operation at various spacings physically affects the orchard environment and which spacings provide the best management of limited frost-protection resources.

The experiment

An aluminum hand-move sprinkler system was simulated in a 12-year-old almond orchard near Chico, California, during the

winter of 1986-87. Normally, a permanent set irrigation system is used in this orchard, but part of the system was blocked so that we could study the simulated hand-move arrangement. There were four treatments in the experiment including the control (fig. 1).

Treatment 1 was the grower's permanent set sprinkler system, which has a 27- by 27-foot diamond spacing. The system has Toro nonimpact sprinkler heads that apply water at a rate of approximately 0.08 inch per hour (36 gpm per acre).

Treatment 2 simulated hand-move sprinklers with 54 feet between heads and between the lines. Treatment 3 also simulated hand-move sprinklers but they were spaced 108 feet between the lines. The latter spac-