

CHAPTER 4

Marketing California's Agricultural Production

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Marketing California's agricultural production presents unique opportunities and challenges. Because of its climatic advantages, California is able to produce a great variety of products that are not grown extensively elsewhere in the United States. The California Department of Food and Agriculture estimates that the state is the leading U.S. producer for about 65 crop and livestock commodities. Fifty-five percent of the value of California agriculture's \$26.1 billion in 2002 farm gate sales is contributed by the fruit (\$6.0 billion), vegetable (\$6.6 billion), and nut (\$1.8 billion) industries. Indeed, California dominates the U.S. horticultural sector, accounting for approximately 37, 55 and 85 percent, respectively, of the 2002 farm gate value of the principal vegetables, fruit, and tree nuts produced in the United States (USDA/ERS).

California's leading position in the \$30.8 billion U.S. horticultural industry is explained by climatic, technological, and infrastructure advantages, as well as the market- and consumer-driven orientation of its agribusiness managers. Given the importance of horticultural crops to California agriculture, and to the nation, our discussion draws heavily on examples from this sector.

Many of California's fruits and vegetables are highly perishable, and production is seasonal. A major challenge in marketing is to ensure both the high quality of these products and their availability to consumers year-round. Another key challenge facing marketers is the maturity of the U.S. market. Both the U.S. population growth rate and the income elasticity of demand for food are low, meaning that the market for domestic food consumption expands only slowly over time, and firms are essentially competing for share of stomach. This competition has intensified given the high rate of new product introductions and expanded year-round availability of formerly seasonal items, often through imports. Both of these factors have led to a greater array of substitute products, frequently dampening demand for large-volume staples like oranges and apples.

California's bounty also presents opportunities. Through the diversity of its agricultural production, firms marketing California produce have the opportunity to provide food retailers with complete lines of fruits, vegetables, and nuts. Because California produces a large share of the U.S. supply of key commodities such as almonds, lemons, olives, lettuce, prunes, strawberries, table grapes, processing tomatoes, and walnuts, California producers and marketers traditionally had unique opportunities to exercise control over the markets for those commodities. However, expanding world supply of many commodities has reduced California's share, increasing competition and presenting new marketing challenges.

This chapter documents the importance of marketing in both U.S. and California agriculture and highlights the institutions that have emerged and the strategies that have been pursued by California's food marketing sector to compete effectively in this market environment.

THE IMPORTANCE OF MARKETING IN AGRICULTURE

The U.S. food industry is the largest in the world. The final value of food sold through all retail channels was \$485.2 billion in 2002 with an additional \$415 billion sold through foodservice channels (hotels, restaurants and institutions) (The Food Institute, 2003). Marketing functions account for the largest share of the U.S. food dollar, and the percentage of food costs due to marketing is rising over time. Food marketing thus has an important effect on the welfare of both consumers and farmers. The U.S. Department of Agriculture (USDA) maintains two general measures of relative food costs. The *market basket* consists of the average quantities of food that mainly originate on U.S. farms and are purchased for consumption at home. The farm share of the value of the market basket remained stable at about 40 percent from 1960-80 but has declined rapidly since then, to 30 percent in 1990 and 21 percent in 2001. Table 1 depicts the trend in farm share for selected commodities of importance to California. Although farm value has traditionally accounted for more than 50 percent of retail value for animal products such as meat, dairy, poultry, and eggs, those shares have now fallen well below half. The farm share for fruits and vegetables tends to be much lower and does not differ much between fresh and processed fruits and vegetables.

Table 1. Farm Share of Retail Value for Major Agricultural Commodities, 2001

Product	1980	1990	2001
	-----Farm Value percent-----		
Meat products	51	46	31
Dairy products	52	39	34
Poultry	54	44	41
Eggs	64	56	35
Cereal and Bakery Products	14	8	5
Fresh Fruit	26	23	16
Lemons			14
Oranges			19
Fresh Vegetables	27	28	19
Lettuce	21	22	23
Processed Fruit & Vegetables	23	26	16
Pears			13
Tomatoes			7

Sources: <http://www.ers.usda.gov/Briefing/FoodPriceSpreads/spreads/table1a.htm>;
<http://www.ers.usda.gov/Briefing/FoodPriceSpreads/basket/table2.htm>; Food Cost Review, 1995, Agricultural Economic Report No. 729, U.S. Department of Agriculture, Economic Research Service, April 1996; Fruit and Tree Nuts Situation and Outlook Yearbook, FTS-2002, U.S. Department of Agriculture, Economic Research Service, October 2002; Vegetables and Melons Situation and Outlook Yearbook, VGS-2002, U.S. Department of Agriculture, Economic Research Service, July 2002

The second major measure of food marketing costs in the U.S. is the *marketing bill*, which is calculated as the difference between what consumers spend for domestically produced farm foods and what farmers receive. In 2001 the farm share of the food marketing bill was 19 percent. This measure of the farm share has also been declining steadily over time, falling from 41 percent in 1950 to 31 percent in 1980 and then to 24 percent in 1990. The marketing bill takes account of food expenditures both at home and in restaurants. The proportion of the U.S. food dollar spent outside the home has been rising rapidly. In 2002, such expenditures accounted for 46 percent of the food budget compared to 37 percent in 1990 and 32 percent in 1980.

KEY TRENDS IN MARKETING STRATEGIES AND U.S. FOOD CONSUMPTION: SPOTLIGHT ON THE FRUIT AND VEGETABLE SECTOR

While the overall U.S. food market is characterized by slow growth, eating habits are becoming more diverse. Demographic and psychographic trends, such as ethnic diversity and new attitudes about food consumption as it relates to self-identity and well-being, have contributed to a much more segmented market. Food marketers must increasingly target specific consumer segments rather than employing mass marketing strategies. More retailers are looking to their suppliers to assist them in understanding and better serving different types of consumer segments. In response, many suppliers are becoming involved in new types of marketing services, including consumer research and category management. The latter is designed to help retailers improve net profitability for a category of products through efficient assortment, pricing, promotion and shelf-space management. For suppliers the aim is to focus on identifying and

servicing the evolving needs of specific accounts as a preferred supplier, rather than marketing more homogeneous products with fewer support services on a spot market basis. We discuss three important food-marketing trends:

- buyer consolidation, changing procurement patterns and implications for suppliers
- demand, focusing on trends in fresh produce consumption
- international trade and competitiveness.

Buyer Consolidation, Changing Procurement Patterns and Implications for Suppliers

The U.S. retail industry is dominated by chain stores. In 2002, retail chains (defined as a food retailer operating 11 or more stores) accounted for 83 percent of supermarket industry sales vs. 58 percent in 1954 (The Food Institute, 2003). The remainder of sales is by independent stores, although the vast majority of these stores are affiliated to buying groups, either voluntary chains such as Supervalu or to a lesser extent retailer cooperatives such as Associated Wholesale Grocers. In 2002 there were 32,981 supermarkets including all format types.

Firms in the U.S. food-marketing sector often view a large market share, including, if possible, the position of market leader, as a key requisite to success. Pursuit of market share has led to a dramatic consolidation in the U.S. food chain at all levels, ranging from the farm through food retailing. Due to the difficulty of capturing sizable market share from rival firms, many U.S. food marketers have pursued share growth through mergers and acquisition of rivals. Mergers and acquisitions in the food sector occurred at a rapid pace in the 1980s, temporarily peaked in 1988 at 573 mergers, declined and then reached an all-time high of 813 in 1998, since declining to 415 in 2003 (The Food Institute, 2004a). Although the growth in merger activity has temporarily abated, cumulative activity in recent decades has likely had important implications for the structure of competition in the U.S. food sector.

Consolidation occurring at the food manufacturing level has progressed rapidly for some time. About 16,000 food and tobacco processing companies operate in the U.S., but in 1997 about 75 percent of sales were by the 100 largest of these firms. The largest sales growth, fueled mostly by mergers and acquisitions, has been recorded by the top 20 of these 100 firms, which in 1997 were estimated to account for about 50 percent of value added in food manufacturing (Rogers, 2000). Most of the 53 food and tobacco industries surveyed in the U.S. Census of Manufacturing have experienced increasing concentration over time. The average market share held by the four largest firms in these industries has risen from 43.9 percent in 1967 to 53.3 percent in 1992, the most recent year for which data are available.

In contrast to the food manufacturing sector, over the decade 1987-97 retail concentration ratios were quite stable with the share of U.S. food sales accounted for by the top 4, 8 and 20 retailers at about 20, 30, and 40 percent, respectively. During this decade new players were emerging in the U.S. food system, including value-oriented retailers such as Wal-Mart with its fast expanding supercenter and club store formats, specialty food retailers like Trader Joe's, European entrants into U.S. food

retailing, and other mass and drug store merchandisers entering the food business. This phenomenon is called channel blurring and continues with the recent emergence of "Dollar Stores," on-line food shopping and the on-going competition from the foodservice sector for the consumer food dollar. This challenging marketplace motivated many conventional retailers to become larger in hopes of improving their competitiveness. From 1997-1999, in particular, mergers occurred between several already large retail chains, beginning to induce important and still unfolding changes in relationships between buyers and suppliers. By 2002 the estimated share of U.S. food sales accounted for by the top 4, 8 and 20 retailers had reached 31, 45, and 57 percent, respectively. This means that in 2002 suppliers faced a market where only 20 retail firms sold at least \$276 billion in food.

Despite the mergers, the United States has no truly national supermarket chains. In 2002 only eight chains had over 1,000 stores, and only one of these has over 2,000 outlets. Given the large geographic size of the United States, chains tend to be regional in focus. However, the recent high merger activity has contributed to much larger chains than ever before, with five surpassing \$25 billion in sales in 2002, and four with stores in over half of the country. Still, many local and regional chains remain quite competitive by staying in close contact with their customers and implementing highly targeted marketing strategies. The regional, ethnic and demographic diversity of U.S. consumers leads some to predict that small to mid-size chains may have an important role to play for some time to come.

Within the retail channel the supercenter concept has emerged as a major industry force, which further concentrates buying power in the hands of a few very large new players. Supercenters are a type of mass merchandising format combining a full-line supermarket with a full-line discount department store and range up to 24,400 square meters in size (more typically 11,100), compared to 4,900 square meters for the average supermarket. Total 2002 grocery-equivalent sales of supercenters (excluding the non-grocery department sales) were estimated at \$45.5 to \$50.3 billion with total supercenter sales reaching \$116.7 billion (The Food Institute, 2003).

The largest entrant to this format is Wal-Mart, with an estimated \$29.3 billion in U.S. grocery-equivalent 2002 food sales, a 75 percent share of national supercenter sales and 1,333 supercenters as of mid-2003. Already the largest retailer in the world, operating in ten countries, Wal-Mart is opening over 200 new supercenters per year in the U.S. alone, and is fast becoming the dominant global player in grocery retailing with \$244.5 billion in 2002 global sales among all its store formats, including large discount stores (with limited grocery assortments) and warehouse club stores (Sam's Clubs). Wal-Mart has also entered the conventional grocery-retailing sector in the U.S. with 52 neighborhood markets in 2002, and growing.

Wal-Mart's immense buying power combined with its approach of driving non-value-adding costs out of the food system appears to have raised the competitive benchmark for conventional retailers. It emphasizes supply chain management via co-vendor managed automatic inventory replenishment procurement systems. Vendors have shared responsibility for growing the category and have real-time access to data on sales of their products via Wal-Mart stores. In exchange, they provide special services, packs and support, such as category management, tailored to the needs of the Wal-Mart account. Even for volatile fresh produce items Wal-Mart tends to operate

on a seasonal or annual contract basis with a small number of preferred suppliers per product or category. Other retailers are also developing closer linkages with preferred suppliers, gradually causing a shift away from the spot market, the traditional *modus operandi* in fresh produce procurement.

Another factor contributing to greater food retailer market power is the intensifying battle for their limited shelf-space by food marketing firms. During 2003, food-marketing firms introduced 11,574 new food products (The Food Institute, 2004b). Since the average supermarket carries about 30,000 product codes, competition among firms introducing new products has led to the common practice of retailers charging fees known as "slotting allowances" for allocating shelf space to new products. Supermarket space allocations and the competition for display areas are critically important to California marketing firms. Until recently, fresh produce was exempt from slotting allowances, but these fees entered the produce department in the latter half of the 1990s with the introduction of branded fresh-cut produce. These items, like other consumer packaged goods commonly subject to slotting allowances, require dedicated shelf-space year-round. While bulk produce items are still not usually subject to slotting allowances, payment of other types of fees has increased marketing costs for growers and shippers (Calvin et al., 2001).

Increased retail buying power is influencing supplier strategies and inducing marketing alliances and joint ventures at the shipper level. Shippers have increasingly sought to come closer to matching the scale of the fewer, larger buyers. Marketing alliances between shippers appear to be the mechanism of choice as they allow each party to maintain its own growing, packing and cooling operations. This seems important for fresh produce shippers, most of which are family-owned and not publicly traded even if their businesses are structured as corporations. The larger scale obtained from marketing alliances helps firms to make greater investments in marketing systems and services, since they can be spread over a higher sales volume. Each year more suppliers are offering category management services, broadening their product lines, and becoming year-round, either via domestic or international diversification of supply sources. This greater vertical coordination can enable both suppliers and retailers to plan more effectively and reduce transaction costs, thereby improving the horizontal competitiveness of each party.

Demand, Focusing on Trends in Fresh Produce Consumption

U.S. food demand trends reflect the preferences of an older, wealthier, more ethnically diverse and more educated population today than 20 years ago. The entrance of more women into the workforce, in conjunction with higher incomes, has led to an increased demand for convenience in food preparation and consumption. In general, lifestyle and demographic trends have stimulated demand for eating out as well as for more value-added, higher-quality, specialty and convenient food products sold in retail establishments. In response to decades of market share erosion to foodservice, food retailers increasingly seek to compete by providing ready-to-eat home meal replacement offerings. This implies greater retail recognition that their offerings have traditionally been "ingredients to prepare" while consumers have increasingly sought

“meals to eat.” Food suppliers are actively assisting retailers in launching these more convenient new products.

More and more, differentiated, specialty food products may also be organically grown, as both growers and marketers seek points of difference to compete in a saturated food marketing system. Organic foods are estimated to account for around 2 percent of U.S. retail food sales, about \$9-9.5 billion in 2001 (Greene and Kremen, 2003). As the nation’s largest producer of organically grown commodities California producers are major participants in the growth of this sector (see Chapter 10).

Fruits and vegetables have benefited from many demographic and lifestyle trends occurring over the last 25 years, a plus for California’s horticultural-reliant agriculture. For example, higher-income households on average consume more fresh produce than do lower-income households; in 2000 households earning more than \$70,000 per year on average spent \$496 dollars on fresh produce annually, compared to \$302 for households in the \$15,000 to \$29,999 range (The Food Institute, 2002). Hispanic households, the most rapidly growing segment of the population, consume more fresh produce than do non-Hispanic Whites or African Americans (\$456/household compared to \$336 and \$260, respectively). Hispanics currently represent around 13 percent of the population and are projected to reach 18 percent by 2020.

However, despite the forces favoring healthful diets, U.S. consumers have become more overweight, with two-thirds of adults estimated by USDA to be overweight in 2000, including one-third obese. According to ERS’s loss-adjusted annual per capita food supply series, average daily calorie consumption was 12 percent, or roughly 300 calories, above the 1985 level (Putnam et al., 2002).

As heightened attention has been brought to bear on obesity as a serious national health concern, in conjunction with mounting scientific evidence regarding the health benefits of fresh produce, more governmental effort is now focused on relaying positive messages to consumers about the potential health rewards of fruit and vegetable consumption. For example, there are new federal school lunch program initiatives featuring fruits and vegetables and a revamped USDA Food Guide Pyramid. The benefits of fruits and vegetables are being promoted by the Produce for Better Health Foundation (5 A Day program) in conjunction with numerous organizations such as the National Cancer Institute. Increasingly, consumer awareness of the benefits of eating fruits, vegetables and nuts is rising.

Per capita consumption of fruits and vegetables, in both fresh and processed form, increased 15 percent from 1976 to 2002, reaching 324 kg, as shown in Table 2. However, examining only the total fruit and vegetable category masks important changes occurring within, such as changes in product form and relative preferences for vegetables versus fruits. Health claims benefited fresh fruits and vegetables proportionally more than processed ones, with 59 percent of total fruit and vegetable consumption in fresh form in 2002, compared to 49 percent in 1976. Fresh fruit and vegetable consumption totaled 145 kg in 2002, up 8 percent over 1989 and 29 percent relative to 1976. These gains are impressive in a developed country with a mature (slow growth) food market in the aggregate.

Vegetable consumption, in both fresh and processed form, grew much more rapidly from 1976-02 than did fruit consumption. Vegetable per capita consumption increased 20 percent to 195 kg, while per capita total fruit consumption grew by only 7

Table 2. U.S. Per Capita Fruit and Vegetable Consumption/Utilization (kilograms), 1976-02

Item	1976	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Growth 89-02	Avg. Growth per year 89-02	Growth 76-02	Avg. Growth per year 76-02
Fruit																						
Citrus																						
Fresh	12.95	10.99	10.86	11.53	10.70	9.69	8.63	11.00	11.70	11.22	10.81	11.15	12.03	12.06	9.20	10.62	11.00	10.83	1.2%	0.1%	-16.4%	-0.7%
Processed	46.46	43.22	38.58	34.06	36.57	34.85	36.04	31.49	38.13	36.50	37.01	42.81	42.21	44.17	41.99	42.72	40.91	39.63	8.4%	0.6%	-14.7%	-0.6%
Subtotal	59.41	54.21	49.44	45.59	47.27	44.54	44.67	42.49	49.83	47.72	47.83	53.96	54.25	56.23	51.19	53.34	51.92	50.46	6.7%	0.5%	-15.1%	-0.6%
Non-Citrus																						
Fresh	24.75	31.56	33.01	32.63	32.90	32.10	31.98	33.70	32.98	34.07	33.19	33.10	34.10	34.06	36.57	35.09	33.44	34.56	5.1%	0.4%	39.7%	1.3%
Processed	35.41	42.54	42.31	43.93	42.82	42.70	41.19	43.96	43.30	41.87	41.02	41.31	44.54	41.10	42.17	43.34	41.21	43.34	1.2%	0.1%	22.4%	0.8%
Subtotal	60.16	74.10	75.32	76.56	75.71	74.80	73.17	77.65	76.28	75.94	74.20	74.41	78.64	75.16	78.74	78.43	74.65	77.91	2.9%	0.2%	29.5%	1.0%
All Fruits																						
Fresh	37.70	42.55	43.88	44.16	43.60	41.79	40.61	44.69	44.68	45.29	44.00	44.25	46.13	46.11	45.78	45.71	44.45	45.39	4.1%	0.3%	20.4%	0.7%
Processed	81.87	85.76	80.88	77.99	79.39	77.55	77.23	75.45	81.44	78.37	78.03	84.12	86.76	85.27	84.16	86.06	82.12	82.97	4.5%	0.3%	1.3%	0.1%
Fruit Total	119.57	128.31	124.76	122.14	122.99	119.34	117.84	120.14	126.11	123.66	122.03	128.38	132.89	131.38	129.93	131.76	126.57	128.37	4.4%	0.3%	7.4%	0.3%
Vegetables																						
Vegetables * Excluding Potatoes																						
Fresh	52.03	60.18	63.30	64.66	68.12	66.20	64.17	67.49	69.46	72.70	70.53	73.77	76.02	74.64	77.41	80.75	80.07	79.01	16.0%	1.1%	51.9%	1.6%
Processed	54.11	54.17	54.13	52.95	56.22	60.24	61.41	60.09	60.68	60.15	59.95	59.08	58.42	58.56	57.93	57.53	54.06	55.24	-1.7%	-0.1%	2.1%	0.1%
Subtotal	106.14	114.35	117.44	117.61	124.34	126.45	125.58	127.58	130.14	132.85	130.48	132.85	134.45	133.21	135.34	138.28	134.13	134.24	8.0%	0.6%	26.5%	0.9%
Potatoes																						
Fresh	22.41	22.14	21.73	22.50	22.68	21.18	22.77	21.91	22.73	22.50	22.32	22.63	22.00	21.32	21.77	21.46	20.96	20.41	-10.0%	-0.8%	-8.9%	-0.4%
Processed	34.38	34.97	35.43	32.98	34.93	35.02	38.06	37.01	39.28	39.51	39.78	43.14	42.14	41.32	40.14	41.46	41.55	40.78	16.8%	1.2%	18.6%	0.7%
Subtotal	56.79	57.11	57.15	55.48	57.61	56.20	60.83	58.92	62.01	62.01	62.10	65.77	64.14	62.64	61.92	62.91	62.51	61.19	6.2%	0.5%	7.7%	0.3%
All Vegetables																						
Fresh	74.44	82.32	85.03	87.16	90.80	87.38	86.94	89.39	92.18	95.20	92.85	96.41	98.02	95.96	99.18	102.20	101.03	99.42	9.5%	0.7%	33.6%	1.1%
Processed	88.50	89.14	89.56	85.93	91.14	95.26	99.47	97.11	99.97	99.66	99.73	102.22	100.56	99.89	98.08	98.99	95.61	96.02	5.3%	0.4%	8.5%	0.3%
Vegetable Total	162.93	171.46	174.59	173.09	181.94	182.65	186.41	186.50	192.15	194.86	192.58	198.63	198.59	195.85	197.26	201.19	196.64	195.43	7.4%	0.6%	19.9%	0.7%
Fruits and Vegetables																						
Fresh	112.13	124.87	128.91	131.32	134.40	129.17	127.56	134.09	136.86	140.49	136.85	140.66	144.15	142.08	144.96	147.91	145.47	144.81	7.7%	0.6%	29.1%	1.0%
Processed	170.37	174.91	170.44	163.91	170.53	172.81	176.70	172.56	181.40	178.02	177.76	186.34	187.32	185.16	182.23	185.04	177.74	178.99	5.0%	0.4%	5.1%	0.2%
Grand Total	282.50	299.78	299.35	295.23	304.93	301.98	304.25	306.65	318.26	318.52	314.61	327.00	331.47	327.24	327.19	332.95	323.21	323.80	6.2%	0.5%	14.6%	0.5%

*USDA reports only aggregate sweet potato and mushroom consumption. Fresh and processed sweet potato and mushroom utilization estimated based on normal market allocations. Only 75% of sweet potato per capita utilization is included since the remainder is for non-human uses. Dry beans and lentils are also excluded.

Sources: Compiled by Dr. Roberta Cook, UC Davis from data from the Economic Research Service, USDA, Fruit and Tree Nuts Situation and Outlook Yearbook, October 2003 and Vegetables and Specialties Situation and Outlook Yearbook, July 2003.

percent to 128 kg. Key forces driving the increase in vegetable consumption include the emergence of fresh-cut salads and vegetables (such as bagged/packaged salads, baby washed carrots or broccoli and cauliflower florets), growth in the fast food industry with its usage of processed tomatoes, primarily for pizza, and processed potatoes, primarily for French fries.

The growth in fresh-cut produce is rapidly reshaping the produce sector. In 2002 fresh-cut produce sales were estimated to have reached \$12.6 billion (approximately 16 percent of total fresh produce sales), with about 60 percent sold via foodservice channels and the remainder through retail. However, to date primarily vegetables have benefited from this trend. In 2002 the value of fresh-cut fruit sold through supermarket channels was still quite small, \$238 million according to IRI, with total sales including through foodservice channels estimated by industry sources at over \$600 million. Recently fresh-cut fruit new-product introductions have risen and fresh-cut fruit postharvest technology is improving. Growing consumer demand for convenient, healthy snack foods and desserts lead some to predict that fresh-cut fruit may be poised for the same type of rapid growth experienced by fresh-cut vegetables over the last decade. California fruit shippers should benefit from this growth, both as producers and as sourcing agents.

The diversity of fresh produce offerings in U.S. supermarkets has expanded at an astounding rate. The number of items carried by the average supermarket produce department increased from 133 items in 1981 to 350 items in 2001. This reflects the emergence of more diverse eating habits, and the growing demand for specialty and ethnic fresh fruits and vegetables, as well as the introduction of a myriad of fresh-cut, value-added products, designed to respond to the growing consumer demand for convenience. The abundant supply of increasingly diverse and convenient fruit and vegetable offerings should support continued growth in per capita consumption.

International Trade and Competitiveness

Exports have come to represent an increasingly important growth market for U.S. food marketers, in light of a mature domestic market. The importance of the export market varies widely by commodity and state, with a weighted average export share of 18 percent for the top 50 products produced in California in 2002 (Bervejillo and Sumner, 2003). Among horticultural crops export shares are higher for nuts than for fruit and vegetables, due to the lower perishability of nuts (facilitating trade) and California's important role in world production. Over 60 percent of California's almond crop is exported annually compared with 10 percent of lettuce and around 12 percent of strawberries. With certain important exceptions (including avocados, asparagus, table grapes and kiwifruit) California is a net exporter of most of the crops it produces, even those facing import competition. Most fresh produce imports tend to enter during the off- or early-season when domestic production, including in California, is low.

Trade liberalization negotiated under the Uruguay Round of the GATT and implemented under the World Trade Organization (WTO), as well as through regional trade agreements such as NAFTA, has expanded market access and strengthened mechanisms for combating non-tariff trade barriers such as scientifically

unfounded phytosanitary restrictions. Advances in postharvest technology, including the development of container-level modified atmosphere technologies, have also facilitated exporting perishables to distant markets. Total U.S. horticultural exports, including fresh and processed fruits, vegetables, and nuts, were \$11.3 billion in 2002, up from \$2.7 billion in 1985. California firms captured a sizable share of this export growth, exporting \$4.9 billion worth of horticultural products in 2002 according to USDA. However, trade liberalization has also led to greater import demand, with U.S. horticultural imports reaching \$18.7 billion in 2002. In recent years imports have grown more rapidly than exports but imports are still a small share of total U.S. horticultural consumption, 18 percent in 2001.

As markets become more open, they become globalized and many California commodity sectors are increasingly impacted by changes occurring in international markets. Expanding export demand, in particular in Asia, led by Japan, in the first half of the 1990s caused producers to increase plantings of perennial fruit crops, for example. By the time this area was coming into production as of around 1995 and beyond, export markets had peaked and declined due to Japan's economic recession and the resulting Asian flu. A growing export market in Mexico also temporarily peaked in 1995 due to an economic crisis there. Simultaneously, greater world production of many commodities also grown in California has increased competition for California firms in third country markets.

The rapid emergence of China as a major producer and growing exporter of fruits and vegetables is already having a competitive impact on demand for California products in Asian markets and will continue to do so as China improves its infrastructure and export quality. China is the world's largest producer of vegetables, apples and pears. Although most of the production remains in China to serve internal demand generated by its 1.3 billion inhabitants, even a small export share can be significant relative to the international volumes normally traded in any given commodity. On the other hand, income growth should expand import demand as Chinese consumers demand a greater array of higher quality food products, including fruits and vegetables. Import demand is being further stimulated by the explosion in supermarkets which require year-round availability of produce.

Indeed, a recent trend throughout the developing world away from wet markets and toward supermarkets bodes well for international fresh produce trade, and hence, for California producers. It is estimated that the 30 largest retail grocery chains now account for at least 10 percent of world food sales. Many of these chains have stores located on several continents and their global procurement practices and cold chain management investments and exigencies mean that these modern produce departments must be kept full year-round. Since no country produces all of the fruits and vegetables it needs year-round, international trade will undoubtedly expand.

As some California commodity sectors adjust to new market realities, structural adjustments may occur. However, in general, California agriculture remains very competitive with imports still a small share of supply. California growers and shippers substitute capital and technology for labor, enabling them to remain competitive even in the most labor-intensive horticultural crops. The primary crops for which sizable production has moved off-shore, in this case to neighboring Mexico, are those requiring bunching at harvest, such as green onions, asparagus and radishes. Still, over

the next decade it is likely that many California commodity sectors will face greater import competition and more competition in export markets. While competition in third country markets will be strong, total international trade should expand as trade liberalization continues under the WTO.

THE VERTICAL STRUCTURE OF CALIFORNIA AGRICULTURAL MARKETS

California's agricultural markets are remarkably diverse in their structure and organization. There is no single structure that can be considered a prototype. This section examines the various ways in which California's agricultural markets are organized, emphasizing the marketing systems for fresh produce and processed fruits and vegetables.

Marketing Fresh Produce

The principal marketing channels in the U.S. fresh fruit and vegetable marketing system are shown in Figure 1. Final value in 2002 is estimated to be at least \$81 billion with roughly equal amounts distributed through foodservice and retail channels and around 2 percent comprised of direct farm to consumer sales. In California, there are about 400 Certified Public Markets and many fresh produce growers participate in these markets for at least a part of their sales.

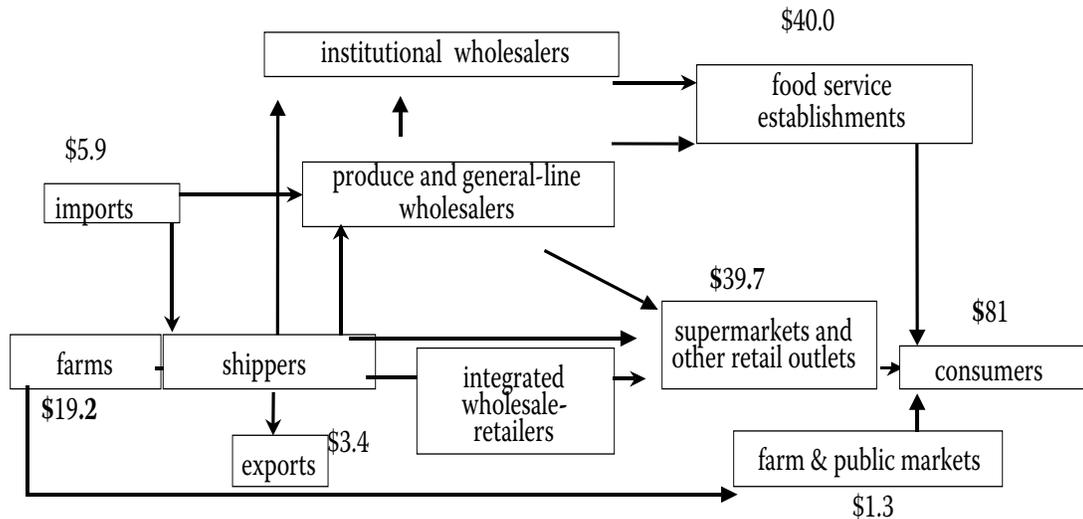
Produce sold in retail or foodservice outlets may be procured directly from shippers or from wholesalers operating in terminal markets or in independent warehouses in local communities. Terminal markets have steadily declined in importance since the 1950s. Today there are major terminal markets serving only 15 cities, and these markets primarily handle the residual fresh market domestic production that cannot be marketed directly to retail or foodservice buyers. The largest terminal markets tend to be located near port areas since many imports are still handled by importers/intermediaries physically receiving the product upon arrival to the U.S. Terminal markets are no longer a factor in the distribution of processed food.

The decline in terminal market share is largely a result of the increased buying power of integrated wholesale-retail buying entities, which operate large-volume centralized buying operations, and enhance efficiency by purchasing directly from the source, bypassing the wholesaler and thereby avoiding intermediary margins and handling costs. Also, the retailer- or foodservice-buyers are able to communicate directly with suppliers concerning important issues such as desired product quality, safety/traceability, packaging characteristics and shipment timing, improving their management of the supply chain. For fresh products, direct production-source-to-buyer shipments have the additional advantage of not breaking the cold chain, better preserving product quality.

Brokers may be used by either buyers or sellers at any level of the distribution system. Most brokers do not take title to or physically handle the goods, and, rather, assist in making the sale and possibly arrange transportation and other logistics. Their role had grown in importance since World War II. However, retail consolidation has been reducing the role of brokers as buyers seek closer relationships with preferred

suppliers with strong category management skills. Today successful brokers tend to be those with global sourcing capabilities and account-specific service-orientations, including category management, designed to meet specialized buyer needs.

Figure 1. U.S. Fresh Fruit & Vegetable Value Chain, 2002 Estimated Billions of Dollars



Source: Estimated by Dr. Roberta Cook, UC Davis.

Turning now to the opposite end of the marketing system, farm production of most commodities in California remains atomized in the sense that producer volumes, although often large in absolute terms, are small relative to the size of the market. It is estimated that there are about 16,500 fruit, vegetable and nut growers in California producing about half of the total volume of these crops grown in the U.S. However, most fresh produce growers don't market their own produce, marketing instead via shippers acting as agents. Most shippers are large growers that have integrated their operations downstream into the marketing of their own production and the production of other growers—hence their designation as forward-integrated “grower-shippers.” These grower-shippers generally control harvesting, packing, and cooling, and arrange for domestic and export sales, transportation, and promotion of production. They are the dominant type of marketer of California fresh produce.

According to the Red Book Credit Services there are around 5,000 fresh produce shippers in the U.S. as a whole, with about 900 located in California. These shippers are selling to an estimated total of 1,079 principal buyers, including 267 retail chains, 188 produce wholesalers, with the difference accounted for by independent retailers and other types of buyers. The bulk of retail chain purchases are being made by 161 retail chains each selling at least \$64 million in 2001 (Progressive Grocer, 2002).

Consolidation at the buying end of the food marketing system has driven consolidation at the production level. Today's large, integrated wholesale-retailer and

foodservice buyers demand more services from their suppliers, tailored to their specific needs, including: (1) category management, (2) ripening and other special handling and packaging, including private labels, and (3) year-round availability of a wide line of consistent-quality fruits and vegetables. Grower-shippers have responded with improved communication and information management programs and by becoming multiregional and multicommodity in focus. The ability to provide account-specific products and services represents a major change from the days of uniform product offerings. While these services can be costly, many shippers are finding that they enable them to become preferred suppliers to large buyers, potentially stabilizing demand and somewhat lowering market risk.

Many California grower-shippers obtain products from other countries during the off-season, sometimes via joint ventures. This enables shippers to extend shipping seasons and sell products produced in several locations via one marketing organization, maintaining a year-round presence in the marketplace.¹ For example, shippers based in Salinas, California, also commonly ship out of the San Joaquin Valley, Imperial Valley, southwestern Arizona, and Mexico. The rapid growth in multi-location firms has contributed to the integration of the Mexico-California-Arizona vegetable industries, in particular. Because most vegetable crops are not perennials, the location of production can shift readily, based on relative production and marketing costs and growing season.

Increasingly, buyers are contracting with grower-shippers for high-volume perishable items to stabilize prices, qualities, and volumes. While contracts were relatively common in the foodservice sector, they are new to retail. The entrance of supercenters to food retailing has led this change as these mass-merchandisers focus on driving costs out of the distribution system. The introduction of contracting is likely to have structural implications at the grower-shipper level, since shippers need to offer large, consistent, year-round volumes to meet buyers' contracting requisites.

RETAILER-BUYER POWER IN THE PROCUREMENT OF FRESH PRODUCE

The evolution of the California produce industry has enhanced its efficiency by cutting marketing costs and improved communication of consumer demand back to growers. However, the consolidation of purchasing within the hands of a few large buyers raises concerns about oligopsony exploitation of producers. Perishable crops, which must be harvested, sold, and marketed within a very short time frame, tend to give growers relatively little bargaining power in dealings with buyers. Sexton, Zhang, and Chalfant (2003) and Richards and Patterson (2003) analyzed this issue recently for several fresh fruits and vegetables. Although the results differed among the commodities studied, in general the authors concluded that retailers were often able to reduce prices to growers below competitive levels as a consequence of their market power.

In addition to apparently exerting buyer market power for at least some commodities, the manner in which retailers set prices to consumers for those

¹ Year-around sourcing by California marketers is controversial because some growers believe it benefits competing producers. Work by Alston et al. (1996) indicates that year-around sourcing has actually increased demand for California table grapes, most likely because the year-around availability reinforces consumer buying habits.

commodities can also have an important effect on producer welfare. To the extent retailers exercise oligopoly power to consumers by marking up the price of a commodity above full marginal costs, they reduce sales of the commodity, an outcome detrimental to producers. Further, evidence from scanner data shows that retailers set prices for produce commodities with little regard for the underlying trends in the farm-commodity market. For example, among 20 retail chains studied by Sexton, Zhang, and Chalfant, nine maintained the same weekly price for iceberg lettuce over the two-year period from 1999-2000, despite wide fluctuations in the FOB price received by producers.

Table 3. Farm and Retail Price Correlations for Iceberg Lettuce Los Angeles Retail Chains 1999-2000

	FOB	LA 1 Private Label	LA 1 Head	LA 2 Fresh Express	LA 2 Dole	LA 2 Ready Pac	LA 2 Head	LA 3 Dole	LA 3 Ready Pac	LA 3 Head	LA 4 Fresh Express	LA 4 Ready Pac	LA 4 Head
FOB	1.000												
LA 1 Private Label	0.110	1.000											
LA 1 Iceberg	0.688	0.073	1.000										
LA 2 Fresh Express	-0.133	0.124	-0.035	1.000									
LA 2 Dole	-0.169	0.015	-0.279	0.389	1.000								
LA 2 Ready Pac	0.103	0.021	0.139	-0.083	-0.063	1.000							
LA 2 Head	0.446	0.174	0.613	0.005	-0.238	0.125	1.000						
LA 3 Dole	-0.237	0.015	-0.405	0.179	0.385	-0.330	-0.146	1.000					
LA 3 Ready Pac	0.011	0.133	-0.007	0.018	0.216	-0.349	0.072	0.137	1.000				
LA 3 Head	0.534	0.029	0.775	-0.047	-0.465	0.122	0.717	-0.332	-0.078	1.000			
LA 4 Fresh Express	0.033	0.009	0.027	-0.078	-0.002	0.065	-0.008	-0.155	-0.027	0.014	1.000		
LA 4 Ready Pac	-0.201	-0.032	-0.280	0.221	0.214	-0.014	-0.178	0.058	0.032	-0.272	0.028	1.000	
LA 4 Head	0.456	0.063	0.660	0.063	-0.268	-0.032	0.659	-0.192	0.046	0.733	0.019	-0.232	1.000

Table 3 illustrates the wide variability among four Los Angeles retail chains in setting prices for iceberg head lettuce and iceberg-based bagged salads. The table contains the correlations in the weekly retail prices charged by the various chains for iceberg head lettuce and the various brands of iceberg-based bagged salads (Dole, Fresh Express, Ready Pac, and private label). Correlation with the FOB (farm gate) price for iceberg lettuce is also provided. Correlation coefficients fall in the range of -1.0 (perfect negative correlation) to 1.0 (perfect positive correlation), with values near zero indicating very little correlation between the movements over time for the particular price pair. Each chain's head lettuce price is positively correlated with the FOB price (column 1), but the correlations are much lower than if the retailers were merely adding a cost-based mark up to the FOB price. Correlation between retail and farm pricing essentially disappears for the bagged salads, however. In all cases, the correlations are nearly zero, and in some cases are negative, meaning the retail price moved on average in the opposite direction of the farm price.

To understand retailer pricing for fresh produce commodities, one needs to appreciate that the modern retailer sets prices for 30,000 or more product codes.

Pricing decisions are not made with an eye towards profitability of any single product, but, rather, are oriented toward the profitability of the entire store. The produce section is traditionally a source of high profits for retailers, and, because of the importance consumers attach to produce, retailers can use their produce aisle as a way to differentiate themselves and attract consumers to the store. Accordingly, stores' pricing policies for produce vary widely. Some stores prefer to offer consumers stable prices week in and week out (referred to as every-day-low pricing). Other stores regularly feature produce as a sale item, so prices vary dramatically from week to week (often referred to as hi-lo pricing). Neither pricing strategy is likely to be beneficial to producers. Sexton, Zhang, and Chalfant demonstrated that retailers who maintain stable prices over time despite fluctuations in sales and price at the farm level cause lower producer income on average because price must fluctuate even more in those sectors, such as foodservice, which do not artificially stabilize price, in order for the market to clear.

MARKETING PROCESSED FOODS

Marketing arrangements are different for processed foods, including fruits and vegetables, nuts, grains, meats, and dairy. Growers in these industries sell to processing firms rather than to food retailers. Like the food-retailing sector, the food-processing sector has also become increasingly concentrated, and effects of high processor concentration can be especially severe in terms of their impacts on grower-processor relations. Most raw farm products are generally bulky and perishable, making shipment costly and limiting growers' access to only those processors located within a limited radius of the farm. For example, broilers are generally shipped 20 or fewer miles, and processing tomatoes are hauled 150 or fewer miles. Thus, even if many processors operate in an industry nationally, typically only one or a few firms buy from a given geographic region.

California food processors are themselves a diverse lot. A key distinction is whether or not the processor has successfully developed its own brand identification. Processors with successful brands are able to capture a price premium in the market. Examples of California processors with leading brands include Blue Diamond (almonds), Sunsweet (prunes), Heinz (processed tomato products), Del Monte (canned fruits and vegetables), Sun Maid (raisins), Diamond (walnuts), Lindsay (olives), and Sunkist (citrus). Processors who lack dominant brands sell primarily to foodservice buyers and to the private label market. Private labels refer to retailers' house brands. These brands generally sell at a discount compared to major brands, resulting in a lower return for the processor.

Great variety also exists in the form of business arrangements among growers and processors. Grower-processor relationships can be thought of as comprising a continuum with pure "arm's length" exchange or spot markets at one extreme, and grower-processor vertical integration (a single firm owning both production and processing facilities) at the other extreme. In between the extremes are various forms of contractual relationships between growers and processors.

Pure arm's length exchange or spot markets are increasingly rare. Two key factors have contributed to the decline. First, as the number of firms buying in a given

geographic area has declined, the efficiency of price discovery in spot markets diminishes, and concerns over buyer market power escalate. Second, arm's length transacting is a poor way to coordinate activity and transmit market information between buyers and sellers, and this type of coordination has become increasingly important in meeting consumers' demands in the marketplace.

The processing tomato industry illustrates some advantages of vertical coordination and problems of conducting transactions through spot markets. Unlike tomato sectors in many other countries, tomato production in California consists of two completely separate, dedicated industries rather than a single, dual-usage industry; tomatoes are grown either for processing or for fresh usage. Tomatoes are perishable and costly to transport. Thus, processors have an incentive to procure production near their processing facilities. Timing of production is also critical. Tomatoes must be harvested immediately upon ripening and then processed quickly to avoid spoilage. The efficient operation of processing facilities and the effective processing of the harvest require that a processor's deliveries be spread uniformly over an extended harvest period of 20 or more weeks. Similarly, processors specialize in producing different types of tomato products. Some plants produce only bulk tomato paste, which is then remanufactured at other locations into various processed tomato products, while others produce whole tomato products. The preferred type of tomato to grow depends upon the intended finished product.

Delivery dates and product characteristics cannot be communicated effectively through spot markets. Nor will a central market work when processors are interested in procuring product only in the vicinity of their plants. Thus, the California processing tomato industry transacts essentially its entire production through grower-processor contracts. These contracts specify the specific acreage the product is to be grown on, variety of tomato to be grown, delivery dates, and premiums and discounts for various quality characteristics. Price terms in these contracts are set with the intervention of a producer bargaining cooperative.

The Role of Cooperatives in Marketing in California

Cooperatives are firms that are owned by the producers who patronize them, although many cooperatives also do business with nonmembers. California is home to many large and important food-marketing cooperatives. Producers who are members of a marketing cooperative essentially have vertically integrated their operation downstream into the processing and marketing of their production. A number of incentives can account for producer cooperative integration, including avoidance of processor market power, margin reduction, and risk reduction (Sexton and Iskow, 1988).

Cooperatives are the leading marketing firm in several California agricultural industries including almonds (Blue Diamond), walnuts (Diamond), prunes (Sunsweet), citrus (Sunkist) and raisins (Sunmaid). However, the recent years have represented difficult times for some California marketing cooperatives. Tri Valley Growers (TVG), a fruit and tomato processing cooperative, formerly the second largest cooperative in California, declared bankruptcy in the summer of 2000. Around

this same time the Rice Growers Association, a large and long-lived rice milling operation closed its doors, as did Blue Anchor, a diversified fresh fruit marketer.

Reverberations from the failure of these prominent California cooperatives were felt nationally and caused some to wonder whether the model of cooperative marketing was well suited for 21st century agriculture. Indeed cooperatives do face some important challenges competing in the market environment we have described here. As noted, retailers prefer suppliers who can both provide products across an entire category and provide them year around. Cooperatives are traditionally organized around a single or limited number of commodities and member production is likely to be seasonal. Cooperatives can attempt to surmount these difficulties by undertaking marketing joint ventures with, for example, other cooperatives, and sourcing product from nonmembers, including internationally. However, cooperatives may face impediments relative to investor-owned competitors in pursuing such strategies. For example, various laws affecting cooperatives specify that at least 50 percent of business volume must be conducted with members. Joint ventures with firms that are not cooperatives are not afforded legal protection under the Capper-Volstead Act.² Doing business with nonmembers may also adversely affect a cooperative's membership, if it is perceived that most of the benefits of the cooperative can be obtained without incurring the financial commitment associated with membership. This issue was important for TVG when it appeared that tomato producers selling to TVG under nonmember contracts received a better deal than member growers.

Cooperatives may also face challenges in procuring the consistent high-quality production that the market place now demands. Cooperatives usually employ some form of pooling mechanism to determine payments to members. In essence, revenues from product sales and costs of processing and marketing flow into one or more "pools." A producer's payment is then determined by his/her share of the total production marketed through each pool. The problem with some pools is that high-quality and low-quality products are commingled and producers receive a payment based upon the average quality of the pool. Such an arrangement represents a classic adverse selection problem, and its consequence is to drive producers of high-quality products out of a cooperative to the cooperative's ultimate detriment. Cooperatives can obviate this pooling problem through operating multiple pools and/or by designing a system of premiums and discounts based upon quality, but the key point is that investor-owned competitors face no similar hurdles in paying directly for the qualities of products they desire.

Offsetting these limitations on cooperative marketing in the 21st Century at least to an extent is the recognition that the marketing clout producers can attain from joint action may be as important now as ever. As we have documented in this chapter, the food retailing and processing sectors have consolidated. Although producers, too, have generally gotten larger in absolute scale, the typical producer's power in the market place pales in comparison to that of the firms with whom he/she conducts business.

Also worthy of mention is that some cooperatives have evolved the structure of their organization to "keep up with the times." Such cooperatives are usually known as

² Because the horizontal coordination among producers that takes place within an agricultural cooperative could be construed as a violation of the U.S. antitrust laws, the Capper-Volstead Act was passed by Congress in 1922 to provide cooperatives with partial immunity from the antitrust laws.

“new generation cooperatives” or NGCs. Typical features of an NGC include grower contracts that include both delivery rights and delivery obligations. Delivery rights, however, are transferable and can function somewhat analogously to capital stock, i.e., if a cooperative is successful, its delivery rights will increase in value. These rules are intended to give the cooperative assurance of a stable supply but also to regulate the amount of product it must process and sell in line with market conditions. To date, the NGC structure is most common among cooperatives in the midwestern U.S. and has made few inroads in California. Interestingly, TVG underwent a re-organization to an NGC structure in 1995-96. Although it is doubtful that this re-organization had much impact on TVG's ultimate demise, its failure may have made Californians skeptical of the NGC structure.

Two types of cooperative organizations are relatively unique to California. They are information-sharing cooperatives and bargaining cooperatives. Information-sharing cooperatives perform no handling or other traditional marketing activities for their members. Rather, they serve as devices for their members to communicate, share information on production plans and market conditions, and formulate pricing strategies. Industries where these cooperatives have emerged include iceberg lettuce, melons, kiwifruit, table grapes, fresh stone fruits, mushrooms, and fresh tomatoes. The activities undertaken by these cooperatives would ordinarily be illegal under the U.S. antitrust laws but are rendered lawful due to the Capper-Volstead Act, which grants an exemption from the antitrust laws to farmers acting collectively through a cooperative. The major examples of this form of cooperative are industries where the product is highly perishable and production is concentrated in the hands of relatively few grower-shippers. Successful coordination of production and marketing in these industries can be a major advantage in terms of managing the flow of product to the market to avoid the periods of over supply and low prices that have been common in these industries. Membership in these organizations tends to fluctuate, however, and there is little evidence to date that they have been successful in either raising or stabilizing grower prices.⁵

Bargaining cooperatives also engage in little or no actual handling of product. Rather, they function to enable growers to bargain collectively the terms of trade with processors. Iskow and Sexton (1992) identified 10 active bargaining cooperatives in California and 29 nationwide. Prominent California bargaining cooperatives are the California Tomato Growers, California Canning Peach Association, California Pear Growers, Prune Bargaining Association, and Raisin Bargaining Association. These cooperatives are a response to the asymmetry in power that might otherwise characterize dealings between farmers and processors. Bargaining associations are especially common in processed fruit and vegetable industries, where products are generally grown on a contract basis and there is no active spot market. In addition to increasing growers' relative bargaining power, these associations play a valuable role in facilitating exchange and minimizing transaction costs. Rather than having to negotiate terms of trade with each individual grower, a processor need strike only a single agreement with the bargaining association. Generally the bargaining association

⁵ Sexton and Sexton (1994) discuss the experience with an information-sharing cooperative in the California iceberg lettuce industry.

will negotiate first with a single leading processor, with similar contract terms then applying to other processors.

In no case is a cooperative the sole marketer or bargainer in California. Farmers always retain the option not to participate in a cooperative. In fact, many of the benefits that a cooperative provides are available to a grower whether or not he/she is a member of the cooperative. For example, Blue Diamond was a leader in opening new export markets for almonds. However, once these markets were established, other handlers were easily able to sell into them. In industries with cooperative bargaining, a farmer who is not a member of the bargaining association generally receives the same terms of trade as growers who are members. Thus, farmers have an incentive to free ride on the activities of the cooperative.

MANDATED MARKETING PROGRAMS

In addition to undertaking joint action in marketing through cooperatives, U.S. legislation at both the national and state levels allows producers and marketers of many agricultural products to act collectively through a legal structure to control various aspects of the marketing of their products. Enabling legislation for federal marketing orders is provided by the Agricultural Marketing Agreement Act of 1937 (AMAA), while state orders and agreements are governed by the California Marketing Act of 1937, with amendments. California also has more than 20 individual laws for the formation of commodity commissions and councils. There are differences between the use of federal and state marketing programs. Federal marketing orders can cover a production region in more than one state, while state orders are effective only within the state boundaries. Federal marketing orders tend to focus on quality regulations and sometimes volume controls, while California state marketing programs tend to focus on research programs and promotion.

Several California commodities utilize different programs for different activities. For example, California-grown kiwifruit has a federal marketing order program that administers grades and standards and a state commission that conducts advertising and promotion; California walnuts have a federal marketing order with provisions for grades and standards and quantity control and a state commission used only for export advertising and promotion.

California agricultural producers were at the forefront in adopting both federal and state marketing order programs when they first became available in the 1930s.

The mandatory nature of the programs overcame the free-rider problems that had earlier led to a breakdown of cooperative-organized quality and supply control marketing efforts. The popularity of government-mandated commodity programs is clearly reflected by their continued use by a large number of commodity producers. California had 17 federal marketing orders and 48 state marketing programs effective in 1993 (Lee et al., 1996). Those programs covered commodities that accounted for 54 percent of California's 1990 agricultural output, based on value. There are 12 federal orders and 51 California commodity marketing programs effective in 2003. As shown in Table 4, these commodities accounted for 55 percent of California's total agricultural output in 2002. The largest proportional drop in marketing program coverage between 1990 and 2002 was for vegetables (from 55 to 43 percent).

Among the 17 federal marketing orders operating in California in 1993, four were eliminated and coverage of California production was dropped by two. The terminated federal programs included the marketing order for Tokay grapes and the long-standing marketing orders for California-Arizona Navel oranges, Valencia oranges, and lemons. The marketing orders for Northwest winter pears and spearmint oil, while still in effect, no longer apply to California production. There is one new federal order, the Hass Avocado Promotion, Research and Information Order, and another has been proposed for pistachios. Thus, there was a net loss of 5 federal marketing orders for California commodities between 1993 and 2003.

There have also been changes in the coverage of California marketing programs. The marketing orders for apricots and fresh tomatoes have been dropped and there is a new state order for garlic and onion dehydrators and a "Buy California" marketing agreement. The California Egg Commission is no longer operating but there are new California Commissions for dates, rice, tomatoes, and sheep. The total number of California marketing programs went from 48 in 1993 to 51 in 2003 for a net gain of three.

Table 4. Value Shares of California Commodities Under Mandated Marketing Programs, 2002

Category ^a	California Total	Commodities Under Marketing Programs	Ratio of Value Under Programs to Total
	<i>--value of production (\$1,000)--^b</i>		
Field Crops	3,827,859	795,094	0.21
Fruits and Nuts	9,705,335	7,139,711	0.74
Vegetables	6,701,580	2,888,087	0.43
Animal Products	7,090,660	5,586,287	0.79
Nursery	3,310,099	365,945	0.11
Total	30,635,533	16,775,124	0.55

a) Fishery and forestry products are excluded.

b) Commodities listed are based on 2003 marketing programs but value of production data are for 2002, the most recent year that consistent value data were available for all of the categories.

Source: California Agricultural Statistics Service. Summary of County Agricultural Commissioners' Reports, 2002. Sacramento, California. California Department of Food and Agriculture, List of Marketing Programs <http://www.cdffa.ca.gov/mkt/mkt/mktbrds.html>

Government-mandated marketing programs operate under legislation that empowers growers to act collectively to improve their profitability through orderly marketing. The programs are initiated based upon requests by producers to solve particular marketing problems. The Secretary of Agriculture (or her state counterpart) holds public hearings on provisions to be included; the finalized orders must be approved on a producer vote by a super majority, and are then binding on all

producers in the designated geographic area covered by the order.⁴ Marketing order activities are financed by the affected producers and/or handlers, who are required by law to participate in the program. Each producer pays an assessment levied on each unit (quantity or value) of the commodity marketed to provide funds to operate the program.

Marketing orders authorize three broad categories of activities: (a) quantity control, (b) quality control, and (c) market support, such as advertising and research. Quantity or supply control provisions may take the form of producer allotments, allocation of product between markets (e.g., foreign and domestic or fresh and processed), reserve pools, and market flow regulations. Orders may also have quality control provisions that permit the setting of minimum grades, sizes, and maturity standards. Advertising and promotion account for the majority of market support expenditures, with research in a distant second place; other market support activities include container regulations, price posting, and prohibition of unfair trade practices. A listing of active programs and authorized activities for fruits, vegetables and specialty crops appears in Table 5.

Each marketing order or commission program specifies a maximum assessment rate, usually in terms of dollars per unit as a percentage of total value of sales. The Secretary of Agriculture (or California counterpart) approves assessment rates for each fiscal year based on the budget recommendation of the Marketing Program Administrative Committee. To facilitate payment, marketing program assessments are usually collected at the first handler level of the marketing chain. Thus, for fruits and vegetables, the assessments are paid by packing houses and processors on behalf of the producers who deliver the product. Handlers and processors in turn deduct such assessment payments from any money owed to their producers. For example, the California Avocado Commission collected an assessment of 4.25 percent of gross revenues paid to producers during the year ended October 31, 2002. Dried plum growers paid an assessment of \$30 per ton during the 2001-02 marketing year, while the assessment rate recommended by the Cherry Marketing Board may not exceed 50 cents per package, with one-half of the assessment paid by the packer and one-half paid by the grower.

THE ECONOMIC EFFECTS OF MANDATED PROGRAMS

While the primary objective of mandated marketing programs has been to improve producer returns, precise estimates of program impacts have been difficult to obtain. This has often led to discussions among producers concerning the returns realized from their expenditures on such things as advertising and promotion and quality-control programs. Some producers have also questioned the benefits of industry supply control efforts. Because of their possible impacts on other groups, such as consumers and trading partners, and their effects on producers, marketing program provisions have often been controversial. Several California marketing order and commission commodity promotion and research programs have recently been involved in litigation as a small minority of unhappy producers and handlers have turned to the courts with

⁴If the provisions of a proposed order have a direct impact on processor/handlers, they are also subject to an approval vote by the affected handlers.

requests to modify or terminate the programs. Recent court cases involving constitutional challenges include actions against the marketing orders for peaches and nectarines, kiwifruit, plums, apples, grape rootstocks, cut flowers, almonds, milk, cling peaches, and table grapes.

Volume Controls

Marketing order quantity controls can be a powerful economic tool when the commodity group controls most of the production of the commodity and when there are different (separate) markets with different price elasticities of demand. Under these conditions, the commodity group can gain a measure of monopoly power and enhance returns through price discrimination. However, since they are unable to control entry, any short-run price enhancement will lead to a longer-run supply response. It is not surprising that quantity controls have been controversial—monopoly pricing practices reduce the welfare of some consumers and may distort resource allocation decisions, while producers face all of the problems of maintaining a cartel.

Marketing orders for several California commodities include quantity control provisions (Table 5), although the use of quantity controls has decreased over time as a result of problems noted above. The federal marketing orders for citrus, with their prorated provisions, were terminated at the end of the 1993-94 crop year after more than 50 years of almost continuous use. The citrus prorates set the amount of lemons and oranges that could be shipped to the domestic fresh market on a weekly basis. Fruit in excess of a handler's fresh market prorated amount could be exported or processed without limits. The demand facing packers in the fresh market is very inelastic relative to the demands in the processing and export market. Thus, price discrimination against the fresh market, by restricting the flow of product to it, is both possible and profitable.

Short-run producer price enhancement without any controls on entry led to an acreage response for both lemons and Navel oranges. As new plantings reached bearing age, the Administrative Committees were forced to divert increasing proportions of the annual crop to exports and processing to maintain fresh market prices. Producer returns from all markets decreased over time, until new plantings were no longer profitable. However, when compared to a competitive solution, prorated resulted in increased acreage and production of citrus, as well as increased exports and processed products (Thor and Jesse, 1981; Shepard, 1986).

Opponents of the citrus volume regulations, who had been sued in 1983 by the United States for violations of prorated, discovered evidence of over shipments by a large number of competing orange and lemon packing houses. Because of allegations of limitations violations of shipments under the order, a series of lawsuits, investigations, and proposals for penalties under AMAA forfeiture rules threatened to keep the industry in court for years and create economic hardships for many industry participants. To minimize long-term damage to the industry and "to end the divisiveness in the citrus industry caused by over ten years of acrimonious litigation," the Secretary of Agriculture terminated the California-Arizona citrus marketing orders, effective July 31, 1994, and dismissed all litigation brought pursuant to the AMAA.

Table 5. Authorized Activities for California Commodity Marketing Programs^a

Commodity	Grade & Size	Quantity Controls	Advertising & Promotion	Research Effective	Year
<i>Federal Marketing Orders</i>					
Almonds	A	A	I	A	1950
Dates	A	I	A	A	1955
Grapes-California Desert	A	I		A	1980
Kiwifruit	A			I	1984
Hass Avocado			A	A	2002
Nectarines	A		A	A	1958
Olives	A		A	A	1965
Peaches-Fresh	A		A	A	1939
Potatoes, Oregon-California	A			I	1942
Prunes-Dried	A	I		I	1949
Raisins	A	A	A	A	1949
Walnuts	A	I		A	1948
<i>State Marketing Orders</i>					
Alfalfa Seed Production				A	1973
Artichoke Promotion			A	I	1960
Dry Bean	A		A	A	1979
Buy California Marketing Agreement			A	A	2001
Cantaloupe	A		A	A	1988
Carrot (fresh)			A	A	1992
Celery				A	1976
Cherry			A	A	1993
Citrus Research				A	1968
Figs (Dried)	A	A	A	A	1944
Garlic & Onion Dehydrator		A			1999
Iceberg Lettuce Research				A	1973
Melon Research				A	1972
Manufacturing Milk			A	A	1970
Market Milk			A	A	1969
Milk (Fluid)			A	A	1969
Peach (Cling)	A		A	A	1984
Pear	A		A	A	1992
Pistachio Agreement					1994
Plum Order	A		A	A	1994
Dried Plum			A	A	1947
Potato Research				A	1974
Rice Handlers			A		1984
Rice Research				A	1969
Strawberry (Processing)	A		I	A	1960
Tomato (Processing)	A				1986
Wild Rice		I	A	A	1968
<i>State Commodity Commissions</i>					
Apple Commission	I		A	A	1994
Asparagus Commission			A	A	1990
Avocado Commission	I		A	A	1978
Date Commission			A		1996
Cut Flower Commission			A	A	1990
Forest Products Commission			A	A	1991
Grape Commission-Table			A	A	1968
Grape Rootstock Commission				A	1993
Kiwifruit Commission			A	A	1980
Pepper Commission			A	A	1988
Pistachio Commission			A	A	1981
Rice Commission			A		1999
Sheep Commission			A	A	1999
Strawberry Com. (Fresh)			A	A	1955
Tomato Commission			A	A	1996
Walnut Commission			A		1986
Wheat Commission			A	A	1983
Lake County Winegrape Com.			A	A	1992
Lodi-Woodbridge Winegrape Com.			A	A	1991
<i>Councils</i>					
Beef Council			A	A	1957
Dairy Council			A	A	1945
Salmon Council			A	A	1991
Seafood Council			A	A	1991

a) A designates active use; I designates inactive use.

Source: Lee, Alson, Carman and Sutton, pp. 20-23. CA Department of Food and Agriculture site: <http://cdfa.ca.gov/mkt/mkt/mktbrds.html>

Raisins provide another good illustration of volume controls in California. California is the largest volume raisin producer in the world, and this industry has operated under a federal marketing order program with volume controls since 1949. Under the raisin marketing order, annual production is divided between free tonnage and a reserve pool, and the Raisin Administrative Committee (RAC) controls the reserve tonnage. Only free tonnage can be sold on the domestic market, but the RAC can allow packers to buy additional tonnage for free use from the reserve when the RAC determines that such actions are justified by supply and demand conditions.

Until 1977, the majority of raisins in the reserve pool were exported at prices that were much lower than for raisins sold on the domestic market. Raisins from the reserve were also used for the school lunch program, government subsidized exports, other government programs, sales to wineries for distilling into alcohol, donations to charity, and cattle feed. Thus, the raisin industry working through the RAC successfully used the reserve pool to practice price discrimination in separate domestic and export markets. Conditions and markets changed, however, and beginning in 1977, exports were considered free tonnage shipments, and the initial free tonnage was increased to serve favorable export markets. Since 1977, the RAC has often exported reserve pool raisins at prices competitive with world prices but below prices on the domestic market.

Finally, the experience of the California almond industry illustrates how changing market conditions can alter the effectiveness of volume controls. The federal marketing order for California almonds includes provisions for market allocation and a reserve pool. At the beginning of each marketing season, the Almond Board of California recommends to the Secretary of Agriculture a maximum annual quantity to be sold in domestic and export markets (the market allocation) and the quantity that cannot be sold (the reserve pool). The reserve may be designated as either unallocated or allocated reserve. The unallocated reserve is essentially forced storage; nuts can be released from the unallocated reserve as the season progresses or carried over to the following season. The allocated reserve must be utilized in noncompetitive outlets such as almond butter, almond oil, airline samples, or cattle feed.

The reserve provision of the almond marketing order was used to encourage export sales through 1972, while maintaining higher prices in the domestic market than in the export market. This price discrimination ended when export markets became an important outlet for California almonds (over two thirds of the crop is now exported annually), with price elasticities tending to equalize between domestic and export markets. Recent work indicates that the price elasticity of demand for almonds is now more elastic in the domestic market than in major export markets, leading to the result that short-run revenue maximization through price discrimination could involve restricting sales to export markets (Alston et al., 1995). Recent models of acreage response to changing returns indicate that U.S. and Spanish producers each increase production when returns appear favorable (Murua, Carman and Alston, 1993). Thus, if the Almond Board were to use the reserve to practice price discrimination and raise world almond prices, increased prices would stimulate production in Spain as well as the United States. As a consequence of these various considerations the almond industry has not implemented volume controls for the past several years.

Quality Controls

All existing federal marketing orders for California fruits, vegetables, and nuts include provisions for grades and minimum quality standards. However, only ten of the California State marketing programs include quality standards and inspection provisions, and just seven actively use the provisions.

Given typical seasonal price relationships for fresh fruit, with high early-season prices, there are strong incentives to ship fruit as early as possible, even though it may not be fully matured. Most consumers are unable to judge the maturity of fruit from appearance and may find that fruit that “looks good” does not “taste good.” The result is an adverse selection problem. Sellers are aware of the product’s characteristics, but buyers are unaware. In these settings, low-quality products can drive high-quality products from the marketplace.

Indeed, representatives of many commodity groups believe that shipments of immature fruit have a negative impact on total sales, because consumers may delay repeat purchases after being dissatisfied with their original purchases. Maturity standards based on sugar content, firmness, and color are used by several marketing orders to determine when fruit is mature enough to be shipped.

Minimum quality standards may: (1) increase the retail demand for a product, resulting in higher prices and/or increased sales; (2) reduce marketing margins, with benefits accruing to both producers and consumers; and (3) reduce supply, which with inelastic demand can increase total revenue to producers. Any effective minimum quality standard will restrict the quantity of commodity marketed, but supply control is not the usual focus of such standards. Federal marketing order regulations on grade, size, quality or maturity also applies to imports of the same commodities from other countries during the period the marketing order is in effect.

The use of some minimum quality standards has been controversial. Concerns include charges that quality standards are a hidden form of supply control, that quality standards waste edible fruit with the primary impact being on the poorest consumers, and that quality standards are sometimes not equitable because of regional variations in production conditions. While empirical analyses of the economic impact of minimum standards of grade, size, and maturity for California commodities are limited, those available indicate that it is probably relatively small (U.S. GAO, 1985).

Advertising and Promotion

California federal and state marketing orders, commodity commissions and councils budgeted over \$140 million for demand expansion activities during the 2002/03 or 2003/04 fiscal years—mainly generic advertising and promotion. Promotion has accounted for about three-fourths of commodity group total expenditures. For fruits, nuts and vegetables, the largest 2003 promotional budgets were for almonds (\$13.9 million), table grapes (\$12.1 million), avocados (\$9.8 million), walnuts (\$7.1 million), pistachios (\$6.1 million), dried plums (\$5.2 million), and strawberries (\$4.8 million). Groups allocating over 75 percent of their budgets to promotion for the period 1970 through 1994 included walnuts, raisins, plums, table grapes, dried plums, and avocados (Lee et al., 1996).

The purpose of commodity group expenditures on generic advertising and promotion is to increase the demand for the commodity so that more commodity can be sold for the same price, or the same amount can be sold for a higher price. The rationale for mandatory support by all producers is based on the distribution of documented program benefits and the “free-rider problem.”⁵ Research completed and underway documents significant increases in product demand as a result of commodity advertising and promotion programs, with net monetary benefits to producers being much greater than costs. For example, Alston et al. (1997) estimated that the elasticity of demand with respect to promotion for California table grapes was 0.16. Using this promotion coefficient, they estimated that the promotional activities of the Table Grape Commission had increased per capita consumption by about 1.5 pounds over that which would have existed in the absence of a promotional program. This increase was about one-third of recent total per capita consumption. The benefits to producers were very high in both the short- and long-run. The short-run marginal benefit-cost ratio was estimated at over 80:1—for every \$1 spent on the program, the industry gained net benefits of \$80. When producer supply response was factored into the analysis, the benefit-cost ratios decreased. Using a supply elasticity of 5, the average benefit-cost ratio was about 10:1 and the marginal benefit-cost ratio was about 5:1. Studies of the estimated returns from advertising and promotion programs for other California commodities include avocados (Carman and Craft, 1998), prunes (Alston et al., 1998), almonds (Crespi and Sexton, 2001), eggs (Schmit, Reberte and Kaiser, 1997), raisins (Kaiser and Liu, 2001), and walnuts (Kaiser, 2002). Each of these studies found that advertising and promotion increased the demand for the product and that program returns exceeded costs by a significant margin.

The U.S. government has funded agricultural commodity groups, as well as private firms, to conduct promotional programs in export markets. The Market Access Program and its predecessor programs, the Market Promotion Program, and the Targeted Export Assistance Program, have provided matching funds for the promotion of a number of California commodities. Federal allocations of funds to 15 commodity boards, commissions, and other groups promoting only California fruits, nuts, and vegetables totaled \$18.67 million in fiscal year 2002. These funds accounted for 18.7 percent of \$100 million awarded to all organizations. Organizations that promote products produced in other states as well as California (e.g., Cotton Council, U.S. Apple Association, U.S. Dairy Export Council, U.S. Rice Producers) also received large allocations. California organizations receiving 2002 awards greater than \$1 million included Blue Diamond Growers/Almond Board of California, California Prune Board, California Table Grape Commission, California Walnut Commission, Raisin Administrative Committee, Sunkist Growers, Inc., and Wine Institute.

Research

Research and development provisions are included in most of the California marketing programs. In 1992, there were 28 programs with research expenditures totaling almost

⁵ It is not economic for an individual commodity producer to advertise, even with extremely high returns, as can be shown by a simple example. Suppose that returns from a generic advertising program are \$200 for each dollar spent and there are 1,000 equally small producers of the commodity. If an individual producer spends \$100, the benefits to the industry will be \$20,000 but since the benefits are distributed equally based on sales, the individual will obtain a return of only \$20 for his \$100 expenditure.

\$8.5 million (Lee et al., 1996). This increased to 38 California programs with a total 2002/03 or 2003/04 budget of \$20.2 million. The largest research budgets were for citrus (\$2.8 million), rice (\$2.2 million), market milk (\$1.9 million), almonds (\$1.85 million), avocados (\$1.6 million), fresh strawberries (\$1.6 million), and walnuts (\$1.0 million). Overall, research expenditures increased from about 7.5 percent of total 1992 commodity group expenditures to just over 10 percent of 2003 expenditures. In terms of the total farm level value of production, research budgets averaged just over 0.1 percent of the 2001 value of covered commodities.

Summary statistics on the economic impacts of commodity group research expenditures are limited, but those available indicate attractive rates of return. Most of the research funded by commodity groups operating under state marketing orders and commissions is done at the University of California. A study valuing California agricultural research concluded that the average annual internal rate of return for public investment in California agricultural research and extension for 1949-85 was about 20 percent (Alston, Pardey and Carter, 1995). Consider, for example, the case of strawberries. California has become the world's pre-eminent strawberry producer, now accounting for about 80 percent of U.S. fresh and processed production. California's record high average yields of 30.75 tons per acre in 1991, the highest in the world, are due largely to sustained research efforts over a long period of time. These efforts, which included variety testing, culture, soil fumigation, disease-free plants, drip irrigation, mulching, and annual replanting, are documented in Alston, Pardey and Carter (1995, pp. 76-90). California Strawberry Advisory Board grants accounted for 42.5 percent of all state funds for strawberry research during the 15-year period from 1978 to 1992.

The distribution of the returns from production research is an issue that has been studied extensively by agricultural economists. Alston, Norton, and Pardey (1995) provide an excellent summary of this work. Depending upon the relative price elasticities of demand and supply, consumers may receive half or more of the short-run benefits from production research. Huang and Sexton (1996) demonstrated recently that market power can have an important effect on both the level and distribution of benefits. Processors with market power may be able to capture a large share of the benefits at the expense of both consumers and producers. To the extent that the benefits from producer-funded research accrue to consumers and processors, it diminishes the farm sector's incentive to fund such research.

Future Prospects for Mandated Marketing Programs

As Table 5 shows, some commodity programs have been effective for a long period while others are of more recent origin. Many programs have been terminated as a result of changing economic and political relationships. Despite the turnover, the number of government-mandated commodity programs has grown over time, and the group approach to solving commodity marketing problems remains popular. The periodic renewal votes conducted for most programs reveal their popularity, with positive votes typically above 90 percent.

A number of marketing programs have, however, encountered problems. As a group, the programs using quantity controls to practice price discrimination have lost

governmental and legislative support, due to perceived adverse impacts on U.S. consumers. The programs with the strongest potential for increasing producer prices, including hops, lemons, Navel oranges, and Valencia oranges, have been terminated by the Secretary of Agriculture. Those orders with quantity controls nowadays use them infrequently. Informed observers agree that it will be very difficult to gain approval for a new marketing order with strong quantity controls.

Programs compelling producer and handler support of commodity advertising programs have faced withering legal challenges in recent years based upon the argument that they represent an undue restriction on commercial free speech under the First Amendment to the U.S. Constitution. Two recent rulings on the issue by the U.S. Supreme Court have done little to clarify matters.⁶ Additional litigation is working its way through the court system. If the courts find ultimately that producers and handlers cannot be compelled to support an industry's advertising program, it will likely fail due to free-rider problems. If the courts decide in favor of mandatory support, current programs will continue and new programs may emerge. There will, however, be increased monitoring of program costs and benefits to assure program supporters that their funds are being well-spent.

Research funding pressures may require commodity groups to increase their support for research programs, if they want research to be done. The mandated programs provide a proven means for commodity-based research support, and they may take on an increased research role, as has been done by the California strawberry industry.

CONCLUSIONS

Marketing-related expenditures account for the majority of retail food expenditures for nearly every major commodity. Thus the performance of the food marketing sector is a major determinant in the United States of both food costs and farmer income. This chapter has highlighted the institutions and strategies that California marketing firms have utilized to respond to consumers' demands and to the challenges of increasing global competition. California agribusiness has successfully substituted technology and information for labor, enabling the state to compete despite relatively high labor costs. Firms have also reduced marketing costs through increased vertical coordination.

California food marketers have embraced the globalization of food markets. They have expanded exports and developed innovative arrangements for international sourcing, particularly for fresh fruits and vegetables. Timely responses to marketing and consumer trends have enabled California agriculture to maintain and, in many instances, increase market share relative to other agricultural regions in the United States.

⁶ Recently, the U.S. Supreme Court upheld a lower court's ruling in *U.S. v. United Foods* [U.S. 00-276 (2001)] that marketing orders created primarily for generic promotion and advertising violated the First Amendment of the U.S. Constitution. However, marketing orders whose regulations extend beyond simple promotion activities, appear to be legal (*Glickman v. Wileman et al.*, [521 U.S. 457 (1997)]), because, in the Supreme Court's view, generic promotion in those industries arises as part of a broad pattern of regulation. As Crespi and Sexton (2001) have argued, this distinction drawn by the Court, based upon the degree of extant regulation in an industry, is probably a prescription for further law suits, as litigants argue whether the circumstances of their industry better fits the mushroom or the tree-fruit decision.

Importantly, the industry has evolved and maintained its competitiveness largely without active government intervention. Direct government price and income supports apply to only a few major California crops, notably rice, cotton, and dairy. The role of state and federal government in the mandatory marketing programs discussed in this chapter is merely that of a facilitator. Government supplies the legal framework for industries to undertake collective action, but decisions on whether and how to use these programs are made by the industries, and they are self-funded. Undeniably, California owes much of its success in agriculture to its rich soil and desirable climatic conditions, but the importance of private enterprise, operating in free markets backed by a stable legal environment, should not be understated.

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