

Chapter 13. Marketing California's Agricultural Production

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Abstract

Efficient marketing of California's agricultural output is critical for the long-run survival of the industry. Marketing costs typically account for more than 75 percent of the retail price of food products due to processing, packing, transportation, retail sales, and other marketing functions. California producers are relatively distant from many important markets and they have high input costs, especially for labor, land, and water. They have been able to overcome these issues and effectively compete in national and international markets through constant technical and economic innovations. California producers have embraced mandated marketing programs as a tool to fund production, marketing, and nutritional research, to develop and fund product grades and standards, to coordinate product shipments, to fund demand-enhancing advertising and promotion programs, and to provide current information on crop production, prices, and shipments. California now has 61 government-mandated commodity programs, including 38 marketing orders and 20 commissions that recently collected and spent over \$317 million on programs to improve their returns.

Author's Bio

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Introduction

Marketing California's agricultural output presents unique opportunities and challenges. California's climate permits production of the most diversified mix of crops in the United States, including a large variety of specialty products that are not grown extensively in the other 49 states. Because of the large variety and sheer volume of products, seasonality of production, customer preferences, product features, and distance to major markets, marketing this annual output is complex, costly, and critically important to the long-term maintenance of a profitable and dynamic agricultural economy.

The California Department of Food and Agriculture estimates that the state produces over 400 crop and livestock commodities and is the leading U.S. producer of 74 (*California Agricultural Statistics Review*, 2015–2016). Among these commodities, California is the sole producer (99 percent or more) of 14 crops, with nut crops (almonds, walnuts, and pistachios) being the most important in terms of cash income. California's cash income from agricultural commodities marketed during 2015 totaled \$47.07 billion. The horticultural sector accounted for approximately 65 percent of total cash income, with fruit and nut crops contributing \$17.98 billion (38 percent), vegetables and melons contributing \$8.85 billion (19 percent), and nursery products and floriculture adding \$3.92 billion (8 percent). Livestock and poultry (25 percent), field crops (5 percent), and all other crops (5 percent) accounted for the remaining 35 percent of commodity cash income.

California's leading position in U.S. fruit, vegetable, and tree nut production 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, the discussion of marketing institutions, programs, and strategies draws heavily on examples from this sector.

California producers and supply chain intermediaries face many challenges in providing high-quality, safe, nutritious, and readily available specialty crop products to national and international consumer markets. Many of California's fruits and vegetables are highly perishable and

bulky, the majority of markets are distant, and production is seasonal. In addition, the major markets are mature, meaning that population growth rates and the income elasticity of demand for food are low, so that aggregate food consumption expands very slowly, if at all.

U.S. consumers are generally well fed, the share of per-capita income allocated to food has decreased over time, and firms are essentially competing for "share of stomach." This competition has intensified given the high rate of new product introductions and the expanded, year-round availability of formerly seasonal items, often through imports. These factors have led to a greater array of substitute products, increased services as part of the product bundle, and increased competition for shelf space as retailers attempt to optimize product assortments.

A growing segment of U.S. consumers is focusing on the nutritional and health benefits of food products when making their purchasing decisions. Producers, commodity firms, and marketing organizations are well aware of this market segment and continue to respond with changes in the supply chain that emphasize choice of crops, production practices, distribution, and communication with their target consumers. Government diet recommendations emphasize increased consumption of fruits and vegetables, grower organizations are funding research on the nutritional attributes of their products and the health benefits from their consumption, and firms at all levels of the marketing channel are promoting nutrition, health, and fitness.

Dissemination of favorable research results, through public relations and promotion, about the contributions to health and disease prevention of almonds, walnuts, pistachios, blueberries, avocados, strawberries, and grapes are associated with increases in demand for these commodities. A research-backed health claim can be a powerful marketing tool, but the FDA's standards for approval of such a claim are high. The demand for certified organic products increased, and organic production has shifted from small to larger growers as retailers have expanded their offerings (Klonsky and Richter, 2011). The U.S. Department of Agriculture's (USDA) National

Agricultural Statistics Service (NASS) 2014 Organic Survey found that California led the nation in organic sales, accounting for \$2.2 billion (40 percent) of the total \$5.5 billion United States organic sales¹ (*USDA Census of Agriculture, Organic Survey*).

California's agricultural bounty presents marketing 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—almonds, lemons, olives, lettuce, navel oranges, prunes, raisins, strawberries, table grapes, pistachios, processing tomatoes, and walnuts—California producers and marketers traditionally had unique opportunities to exercise control over the markets for those commodities. However, the expanding world supply of many commodities has reduced California's share, increasing competition and presenting new marketing challenges.

¹ Washington ranked 2nd (\$515 million) and Oregon was 4th (\$237 million) for U.S. organic sales in 2014.

The Importance of Marketing

This chapter documents the importance of marketing for both U.S. and California agricultural products and highlights the institutions that have emerged and the strategies that have been pursued by California's food marketing sector to compete effectively in constantly evolving national and international markets.

Marketing functions account for the largest share of each U.S. dollar spent for food, and the percentage of total food costs attributed to marketing has been increasing over time. Food marketing costs thus will continue to have an important impact on the welfare of both farmers and consumers. 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 are purchased for consumption at home and mainly originate on U.S. farms. USDA tracks retail food prices and the associated producer revenues for nine major commodity groups including meats, poultry, eggs,

dairy products, fats and oils, fresh fruits, fresh vegetables, processed fruits and vegetables, and bakery and cereal products.

Carman, Cook and Sexton (2003) used the original Economic Research Service (ERS), USDA marketing bill series to trace the farm share of the market basket for all food from 1950 through 2000. They noted that the farm share of the market basket declined from 41 percent in 1950 to 31 percent in 1980, 24 percent in 1990, and 15.8 percent in 2000. Using data through 2001, they pointed out that meat, dairy and poultry products, which traditionally had farm values of more than 50 percent of the retail value, all returned less than half of the retail value to farmers. Because of measurement problems and discontinuation of several data series used for the share calculations, ERS replaced the marketing bill series with a new series named the food dollar series.

Table 1. Distribution of U.S. Food Marketing Costs for Each Dollar Spent on: All Food, Food at Home, and Food Eaten Away From Home, Each with Farm Share, 2015

Marketing Cost Categories	All Food	Food at Home	Food Away from Home
	-----cents per food dollar-----		
Agribusiness	2.2	3.5	0.7
Farm Production	8.6	13.5	3.0
Food Processing	15.6	24.8	5.0
Packaging	2.5	3.0	2.1
Transportation	3.5	5.1	1.6
Wholesale Trade	9.3	14.4	3.4
Retail Trade	12.7	23.3	0.5
Foodservices	34.4	1.0	72.1
Energy	4.0	4.5	3.6
Finance and Insurance	3.4	3.6	3.2
Advertising	2.6	2.3	3.3
Legal and accounting	1.3	1.1	1.6
Total	100.0	100.0	100.0
Farm Share	15.6	24.1	5.3

Source: Economic Research Service (ERS), U.S. Department of Agriculture (USDA) Food Dollar Series, <https://www.ers.usda.gov/data-products/food-dollar-series/>

The new food dollar series is composed of three primary data series (Canning). They include: (1) the marketing bill series; (2) the industry group series; and (3) the primary factor series. The marketing bill series divides the food dollar between farm and marketing shares. The industry group series identifies the distribution of the food dollar among 10 distinct food supply chain industry groups. Finally, the primary factor series identifies the distribution of the food dollar in terms of U.S. worker salaries and benefits, rents to food industry property owners, taxes and imports. Each of the three primary series is disaggregated into two commodity groupings (food and food & beverage) and three expenditure categories (total food, food at home, and food away from home).

For example, a trend affecting U.S. food marketing is the changing ratio of food expenditures at home and away from home, with an increasing portion of total food expenditures occurring away from home. This is important because marketing costs are higher per dollar of food expenditures made away from home. While the overall farm share of all food expenditures was 15.6 percent in 2015, the farm share for food expenditures made away from home was only 5.3 percent versus a farm share of 24.1 percent for food expenditures at home.

The present supply chain and institutional framework used by California producers to market diverse products have evolved over time and continues to change. They are a function of market development, the changing structure of competition, forward-thinking, and informed leadership.

California Agricultural Marketing Cooperatives

Cooperatives are firms owned by the producers who utilize the firm's services, although many cooperatives also do business with nonmembers (cooperative law specifies that at least 50 percent of business volume must be conducted with members). Commodity producers who are members of a marketing cooperative can be viewed as having vertically integrated downstream into the packing or processing and marketing of their production. A number of incentives can account for producer cooperative integration, including avoidance of processor market power and the reduction of both margins and risks (Sexton and Iskow, 1988).

Marketing cooperatives have had an important role in the growth and development of California's specialty crop sector. In fact, marketing cooperatives are closely linked with the development of many important California crops even as their roles have changed over time. Many consumers continue to identify the commodity with a cooperative brand, such as Blue Diamond (almonds), Calavo (avocados), Diamond (walnuts), Sunsweet (prunes), Sunkist (citrus), and Sunmaid (raisins). The market share of California marketing cooperatives has tended to decrease over time as production practices, competition, and markets have evolved. Large and once-dominant firms that no longer operate as cooperatives include Calavo and Diamond (both converted to public firms listed on the stock exchange); Tri-Valley Growers, a fruit and vegetable processor; the Rice Growers Association, a rice miller; and Blue Anchor, a diversified fresh fruit sales organization. The latter three declared bankruptcy in 2000.

The other four marketing cooperatives listed above rank among the 100 largest U.S. cooperatives in 2016 and 2015, as measured by gross revenue (USDA). In 2016, Blue Diamond Growers had revenues of \$1.674 billion (#10); Sunkist Growers, Inc. had revenues of \$1.208 billion (#18); Sunmaid Growers of California had revenues of \$383 million (#78). In 2015, Sunsweet Growers, Inc. had revenues of \$315 million (#98). Other California cooperatives in 2016's top 100 include California Dairies, Inc. with revenues of \$3.002 billion (#6) and Pacific Coast Producers with revenues of \$634 million (#47).

While cooperatives continue to be important in marketing California commodities, the loss of those mentioned above raised concerns among many observers about the future of cooperatives in the 21st century. All firms must adjust to a changing competitive environment; the question is whether or not marketing cooperatives can make the needed adjustments. Changes in food distribution, particularly at the retail level, pose challenges. Large retailers prefer to deal with suppliers who can provide products across an entire category during the whole year while satisfying product specifications such as the use of particular inputs, methods of production, and product traceability.

Traditionally, cooperatives are organized around a single or limited number of commodities and production is likely

to be seasonal. Cooperatives can attempt to surmount these difficulties by undertaking marketing joint ventures and sourcing product from nonmembers, including internationally. Dealing with nonmembers, however, can create legal and equity issues for cooperatives that investor-owned competitors do not face. It is interesting to note that among the first actions taken by both Diamond and Calavo after converting to investor-owned firms were broadening of product lines and year-round and international sourcing of perishable product.

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." The producer's share of the product marketed through each pool then determines his/her payment. The problem with some pooling 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 tends to drive producers of high-quality products out of the cooperative to the cooperative's ultimate detriment. Cooperatives can solve this pooling problem by operating multiple pools and/or designing a system of premiums and discounts based upon quality, but the key point is that investor-owned competitors face similar hurdles in paying for the qualities of products they desire. Despite these limitations, large, well-managed marketing cooperatives can, at least, partially offset the market power of large food retailers.

The Role of Mandated Marketing Programs

The widespread use of government-mandated marketing programs is a distinguishing feature of marketing California agricultural products. California producers were at the forefront in adopting both federal and state marketing order and agreement programs authorized by the federal Agricultural Marketing Agreement Act of 1937 (AMAA) and the California Marketing Act of 1937, with amendments. 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 1937 AMAA authorizing marketing orders and agreements has been supplemented by federal legislation for individual commodities authorized by Congress and signed by the President as well as by the Commodity Promotion, Research and Information Act of 1996 that gives the USDA broad-based authority to establish national generic promotion and research programs for nearly all commodities either at its own initiative or upon the request of an industry group.² Commodity commissions and councils, each established by a specific law passed by the State Legislature and signed by the governor, supplement California's Marketing Act.

The procedures and requirements for establishing a government-mandated marketing program are spelled out in the enabling legislation and available on government websites. Basically, a group of producers and/or handlers of a particular commodity requests these programs, the Secretary of Agriculture or the state equivalent approves it, an industry vote gives further approval, and an assessment on all producers finances the program for the covered commodity. A critical requirement for obtaining a government-sponsored marketing program is the existence of strong and effective industry leadership. The leadership for several of California's early mandated marketing programs came from marketing cooperatives but, as cooperative influence waned, individuals and other groups provided the leadership. This leadership must work with commodity producers and handlers to define the nature of the commodities' economic problems and the suitability of available provisions for solving these problems.

The proposed legislation must be approved or enacted by government, typically after a series of public hearings, and then submitted to producers and handlers for a vote. The program submitted for an industry vote will include details on the provisions included, geographic coverage, assessment rates, operating procedures, governing structure, and requirements for approval and termination. Requirements for periodic evaluation of program performance and/or continuation are often included. The Secretary of Agriculture can terminate or suspend any federal marketing order that does not effectuate declared

² Prior to 1996, all federal check-off programs to fund generic advertising and research were authorized by specific legislation for each individual commodity.

policy or whenever the Secretary determines that a majority of producers favor termination.

Marketing orders authorize three broad categories of activities: (a) quantity controls, (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 based on location or product form (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 establishment 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.

California producers utilize Federal and state marketing orders and agreements, commodity commissions and councils for solutions to their marketing problems and as a competitive tool to improve crop returns through research and demand expansion programs. Being able to select different programs operating under different legislative frameworks provides a flexible approach to tailoring a solution to the problem situation. The Agricultural Marketing Agreement Act of 1937, as amended, provides the framework for Federal marketing orders and agreements for fruits, vegetables, nuts and specialty crops.

A Federal marketing order can cover production in one or several states and may contain provisions for one or more of the following: generic advertising and sales promotion; production, processing and marketing research; quality regulations with inspection; supply management or volume control; the standardization of containers or packs; and the prohibition of unfair trade practices. California marketing orders and agreements, authorized by the California Agricultural Marketing Act of 1937, are available for a wider range of commodities and allow for more activities than federal orders but only cover California production. California legislation permits programs for advertising and promotion, research, the prohibition of unfair trade practices, product inspection, stabilization pools and the regulation of grades and standards.

California commodity commissions and councils are each established by a specific law passed by the state legislature and signed by the governor. While the provisions available to each commission are numerous, most concentrate on advertising, promotion and research. Councils tend to concentrate on education programs, promotion and research. The establishment of a commission typically requires an industry referendum, and the voting requirements are usually the same as for a marketing order. Councils have been established without an industry vote. California commodity commissions and councils have more program and budget autonomy than do marketing orders. They develop their own operating plans and budgets, with CDFA concurrence, and can hire executives and elect commission members without the CDFA's prior approval. Because of their flexibility, several existing commissions are replacements for marketing orders.

Each marketing order or commission program specifies a maximum assessment rate, usually in terms of dollars per unit of weight or as a percentage of total revenue. The Secretary of Agriculture (or California counterpart) approves assessment rates based on the budget recommendation of the marketing program administrative committee. To facilitate payment, the first handler level in the supply chain (channel of distribution) usually collects the marketing program assessments. Thus, for fruits, nuts, and vegetables, the assessments are paid by packinghouses and processors on behalf of the producers who deliver the product. Handlers and processors, in turn, deduct the assessments from payments to their producers.

Examples of recent levels of assessment for California programs include an assessment rate of \$.04 per kernel weight pound for walnuts; California almonds also have an assessment rate of \$.04 per pound effective August 1, 2016, through July 31, 2019, when the rate is scheduled to return to \$.03 per pound; the California Table Grape Commission had an assessment rate of \$.006087 per pound for the year ended April 30, 2016, and the California Avocado Commission had an assessment rate of \$.023 per dollar of sales on all varieties of avocados produced in California, effective from November 1, 2016, through October 31, 2017. Note that California avocado producers also paid an assessment of \$.025 cents per pound to the Hass Avocado Board for all Hass avocados sold.

Table 2. Number of Mandated Marketing Programs by Type, California, 1985–2016

Mandated Marketing Programs in California	Year			
	1985	1995	2005	2016
Federal Marketing Order	17	13	11	9
CA Marketing Order/Agreement	21	28	29	29
CA Commodity Commission	7	16	20	20
CA Commodity Council	2	4	3	3
Total	47	61	63	61

Source: Data for 1985 and 1995 are from Lee et al. (1997); 2005 data are from Carman (2007a)

Scope of Programs Covering California Commodities

Government-mandated marketing programs cover commodities accounting for about two-thirds of the total value of California's agricultural output. In 2004, for example, the value of production of California commodities covered by 63 active marketing programs was almost \$21.2 billion out of a total output of \$31.8 billion. California producers paid marketing assessments of over \$226 million in 2004–2005 and budgeted \$154 million for advertising and promotion, \$25 million for research, and almost \$8.8 million for inspection programs. The number of active programs has changed over time in response to changing marketing issues. Overall, the trend in California has been an increase in the total number of programs, with the number of federal marketing orders decreasing and the number of California commodity commissions increasing (Table 2). More than half of the current programs have been established since 1980. Note that the number of programs has stabilized over the past decade. Current program coverage for California crops includes nine federal marketing orders, 29 California marketing orders and agreements, 20 commodity commissions, and three commodity councils for a total of 61 programs.

California commodity producers have been able to choose from several mandated marketing programs, with the selection depending on the problems faced and the goals of the particular commodity group. As noted, the programs chosen have tended to change over time as the nature of marketing problems changed. For example, increasing imports free-riding on U.S. commodity promotion and research programs were a catalyst for the Commodity

Promotion, Research, and Information Act of 1996 that facilitates assessments on imports to support domestic commodity promotion and research programs. The increasing number of California commodity commissions, each established by a specific law passed by the State Legislature and signed by the governor, can be explained by their increased flexibility in program provisions and group activities when compared to either federal or state marketing orders.

Commodity groups have changed programs over time, and some participate in more than one mandated marketing program. For example, California avocado growers conducted their promotion and research under a state marketing order program from 1961 until 1980 when they switched to a commodity commission. Then, faced with growing imports that were free-riding on their programs, California avocado growers, working through their commission, were instrumental in gaining passage of the Hass Avocado Promotion and Research Order (HAPO) in 2002. Now all Hass avocados sold in the U.S. (including imports) pay an assessment to support promotion and research programs.³

The California walnut industry has had a federal marketing order since 1948 that has supported domestic promotion and research programs. They added the

³ Note that the Hass variety accounts for over 95 percent of annual U.S. fresh avocado sales. Other varieties, often referred to as "green skins", are not widely available and typically sell at a significant discount relative to the Hass variety. Florida, which has its own federal avocado marketing order, is the main source of the other varieties available in the U.S. market. Green skin varieties typically account for less than 1.0 percent of California production and imports.

Table 3. Federal Marketing Orders for California Commodities: Budgeted Expenditures by Category, 2016–2017*

Federal Marketing Order Programs	Expense Category				Total Budgeted Expenditures
	Administration	Promotion	Inspection	Research	
Almonds	\$14,380,292	\$47,802,089		\$14,678,121	\$76,860,502
Dates	\$52,500				\$52,500
Grapes – CA Desert	\$80,000			\$28,500	\$108,500
Kiwifruit	\$108,450	\$2,500		\$10,000	\$120,950
Olives	\$513,000	\$823,500	\$98,000	\$390,830	\$1,825,330
Pistachios	\$547,900			\$125,000	\$672,900
Prunes - Dried	\$1,037,705	\$5,283,205		\$580,150	\$6,901,060
Raisins	\$1,625,750	\$3,577,178		\$35,000	\$5,237,928
Walnuts	\$1,769,170	\$19,447,830	\$825,000	\$2,098,000	\$24,140,000
Total	\$20,114,767	\$76,936,302	\$923,000	\$17,945,601	\$115,919,670

Source: Budget data for individual federal marketing orders are from two sources: the orders' administrative committees and USDA, AMS information provided in response to FOAI request 2018-AMS-01243-F

*The data in the expenditure categories provide a broad overview of each program's activities but should not be regarded as an exact accounting for several reasons. Expenditures vary by program and often do not fit consistently into the four categories listed, some programs allocate what are essentially overhead expenses to research and promotion activities while others treat the same expenses as administration, and different programs may classify a particular activity, such as marketing research, in administration, research, or promotion.

California Walnut Commission in 1986 to take advantage of cost sharing U.S. government export promotion programs, with both programs administered by the same staff. Prunes also have two programs with the federal marketing order for dried prunes that emphasizes domestic promotion, and the state marketing order for dried plums that does export marketing activities. Pistachios have both federal and state marketing orders with research accounting for most program spending. Pistachios also had a commodity commission that focused on promotion, but it was terminated in 2007 because growers supporting continuation represented only 41 percent of the voted volume (Cline, 2007). Raisins also have two programs—a federal marketing order and a state marketing order.⁴

National Research and Promotion Programs

California producers also participate in National Research and Promotion Programs, commonly referred to as National Check-Off Programs. As noted on the USDA,

⁴ Add the following footnote at end of sentence. Dried prunes and dried plums are the same product. Prunes is the traditional descriptor but some prefer to use dried plums after motivational research found negative connotations associated with prunes.

Agricultural Marketing Service website, there are currently 22 of these programs, which establish a framework to pool resources to develop new markets, strengthen existing markets, and conduct important research and promotion activities.⁵ Two of the national programs, the Paper & Packaging Board and the Softwood Lumber Board, serve large manufacturing companies. California agricultural producers participate in 15 of the remaining 20 national boards, councils, and programs including those for eggs, lamb, beef, Christmas trees, cotton, fluid milk, Hass avocados, Highbush blueberries, mushrooms, dairy products, honey, pork, processed raspberries, watermelon, and potatoes. The most recent annual budgets and assessment revenues for the 22 programs totaled over \$639 million. Imports are subject to assessments to fund research and promotion for 17 of the 22 programs.

Federal and State Marketing Orders

The AMAA, as amended, provides the framework for federal marketing orders and agreements for fruits,

⁵ For details on the individual programs see: <https://www.ams.usda.gov/rules-regulations/research-promotion>

Table 4. California Marketing Order and Agreement Programs: Budgeted Expenditures by Category, 2016–2017*

California Marketing Order Programs	Expense Category				Total Budgeted Expenditures
	Administration	Promotion	Inspection	Research	
Alfalfa Seed Research	\$34,170			\$28,134	\$62,304
Artichoke	\$82,340	\$3,700		\$114,000	\$200,040
Dry Bean	\$135,160	\$53,060		\$81,000	\$269,220
Cantaloupe	\$105,700	\$113,000	\$155,000		\$373,700
Fresh Carrot	\$107,600	\$144,900		\$399,697	\$652,197
Celery Research	\$71,950			\$199,597	\$271,547
Cherry Mktg & Research	\$242,200	\$1,103,437		\$380,000	\$1,725,637
Citrus Nursery	\$62,164	\$26,425		\$303,161	\$391,750
Citrus Research	\$1,488,796			\$8,686,340	\$10,175,136
Dried Fig	\$528,550	\$820,884		\$4,200	\$1,353,634
Garlic & Onion Dehydrator	\$148,960		\$257,767	\$0	\$406,727
Garlic & Onion Research	\$78,800			\$137,730	\$216,530
Leafy Greens Research	\$348,650	\$0		\$1,204,097	\$1,552,747
Melon Research	\$106,050	\$0		\$102,160	\$208,210
Milk Processor	\$643,450	\$16,775,397			\$17,418,847
Market Milk	\$2,100,000	\$36,688,888		\$1,950,000	\$40,738,888
Cling Peach Grower	\$134,300	\$1,183,522		\$276,654	\$1,594,476
Pear	\$415,500	\$979,590		\$170,000	\$1,565,090
Pistachio Research	\$260,200			\$5,370,000	\$5,630,200
Dried Plum	\$1,367,000	\$6,778,096		\$930,000	\$9,075,096
Potato	\$75,660			\$70,566	\$146,226
Raisin Marketing	\$487,900	\$37,500		\$40,000	\$565,400
Rice Research	\$318,025			\$3,845,243	\$4,163,268
Wild Rice	\$40,200	\$68,862		\$41,000	\$150,062
Processing Strawberry	\$563,639		\$672,230	\$50,000	\$1,285,869
Processing Tomato	\$558,000		\$4,901,967	\$223,500	\$5,683,467
California Marketing Agreements					
California Grown	\$95,000	\$1,489,188			\$1,584,188
Leafy Green Handler	\$471,294	\$698,484	\$1,382,716		\$2,552,494
Wine Grape Inspection	\$99,235		\$1,861,600	\$75,000	\$2,035,835
Total	\$11,170,493	\$66,964,933	\$9,231,280	\$24,682,079	\$112,048,785

Source: Current California marketing program budget information provided by California Department of Food and Agriculture Marketing Branch, Sacramento, CA

*The data in the expenditure categories provide a broad overview of each program's activities but should not be regarded as an exact accounting for several reasons. Expenditures vary by program and often do not fit consistently into the four categories listed; some programs allocate what are essentially overhead expenses to research and promotion activities while others treat the same expenses as administration, and different programs may classify a particular activity, such as marketing research, in administration, research, or promotion.

Table 5. California Commodity Commission and Council Programs: Budgeted Expenditures by Category, 2016–2017*

California Commodity Commissions	Expense Category				Total Budgeted Expenditures
	Administration	Promotion	Inspection	Research	
Apple	\$363,050	\$212,250		\$50,000	\$625,300
Asparagus	\$149,800	\$46,555		\$1,000	\$197,355
Avocado	\$3,375,000	\$8,710,000		\$647,000	\$12,732,000
Blueberry	\$159,800	\$209,800		\$40,000	\$409,600
Cut Flower	\$516,908	\$581,940		\$37,500	\$1,136,348
Date	\$91,300	\$219,900		\$497,400	\$808,600
Grape Rootstock	\$84,217			\$650,000	\$734,217
Olive Oil	\$155,500	\$60,000	\$95,000	\$191,000	\$501,500
Pepper	\$75,440			\$93,708	\$169,148
Rice	\$1,727,750	\$4,995,332	\$0	\$20,000	\$6,743,082
Sea Urchin	\$71,700	\$22,150		\$15,000	\$108,850
Sheep	\$75,333	\$137,084		\$6,364	\$218,781
Strawberry	\$2,477,491	\$6,317,358		\$4,394,640	\$13,189,489
Table Grape	\$790,537	\$15,195,204		\$1,599,312	\$17,585,053
Walnut	\$1,340,500	\$14,906,337		\$3,155,000	\$19,401,837
Wheat	\$334,000	\$263,681		\$330,000	\$927,681
Wine Grapes					
Lake County	\$163,189	\$252,776		\$187,380	\$603,345
Lodi	\$824,671	\$1,619,000		\$151,500	\$2,595,171
Sonoma	\$586,075	\$1,719,516		\$444,245	\$2,749,836
Councils					
Beef Council	\$812,250	\$1,088,455			\$1,900,705
Dairy Council	\$832,304	\$5,581,862		\$29,677	\$6,443,843
Salmon Council	\$38,122	\$0		\$0	\$38,122
Total	\$15,044,937	\$62,139,200	\$95,000	\$12,540,726	\$89,819,863

Source: Current California marketing program budget information provided by California Department of Food and Agriculture Marketing Branch, Sacramento, CA

*The data in the expenditure categories provide a broad overview of each program's activities but should not be regarded as an exact accounting for several reasons. Expenditures vary by program and often do not fit consistently into the four categories listed, some programs allocate what are essentially overhead expenses to research and promotion activities while others treat the same expenses as administration and different programs may classify a particular activity, such as marketing research, in administration, research or promotion.

vegetables, nuts, and specialty crops. A federal marketing order can cover production in one or several states and may contain provisions for one or more of the following programs: generic advertising and sales promotion; production, processing, and marketing research; quality regulations with inspection; supply management or volume control; standardization of containers or packs; and the prohibition of unfair trade practices. California marketing orders and agreements are available for a wider range of commodities and allow for more activities than

do federal orders but are only applicable to California production. California legislation permits programs for advertising and promotion, research, prohibition of unfair trade practices, product inspection, stabilization pools, and regulation of grades and standards.

The number of federal marketing orders applicable to California commodities decreased over the last three decades as producer and processor interest moved away from supply control programs. There are currently nine

federal marketing orders applicable to California-produced commodities, down from the 17 that were effective in 1985 (Table 2). As shown in Table 3, the nine commodity programs' most recent annual budgets totaled over \$115.9 million with the majority of the funds spent on advertising and promotion. The distribution of 2016–2017 program expenditures was 66.4 percent for promotion and 15.5 percent for research as compared to 2004–2005 program expenditures of 59.6 percent for promotion and 8.6 percent for research (Carman, 2007a). Total budgeted expenditures increased from \$41,634,024 in 2004–2005 to \$115,919,670 in 2016–2017, an increase of 278 percent. Comparison of budgets for the two periods reveals that almonds and walnuts, each of which experienced significant growth in acreage, production, and total crop income over time, accounted for a large portion of the increase.

There has been little variation in the number of California marketing orders since 1995 (Table 2), while total budgets have increased. Prior to the year 2000, overall budget increases tended to fund advertising and promotion programs. Spending during the most recent decade has moved away from promotion and toward research in both absolute and percentage terms. California state marketing order and agreement budgets totaled \$101.4 million during 2004–2005, with \$71.4 million allocated to advertising and promotion and \$13.1 million to research programs (Carman, 2007a, p. 180). The total of the most recent budgets is just over \$112.0 million, with the advertising and promotion budgets decreasing to \$64.8 million and the research budgets increasing to \$24.6 million (Table 4).

Different commodities emphasize different program activities. Among the largest programs, dairy (milk processor and market milk) dominates in the advertising and promotion expense allocation while the marketing orders for citrus, pistachios, and rice dominate commodity research spending.

Table 5 lists the most recent budgeted expenditures for California's commodity commissions and councils. The overall number of commissions decreased from 20 to 19 between 2005 and 2017 while councils remained steady at three. In terms of specific commodities, the Forest Products, Kiwifruit, Pistachio, and Tomato Commissions ceased operations while producers initiated new commissions for blueberries, olive oil, and Sonoma wine grapes. Overall,

California commodity commission budgets increased from \$83.9 million in 2004–2005 (Carman, 2007a) to \$89.8 million in 2017. The distribution of budgeted expenditures changed from 68.9 percent promotion and 10.0 percent research in 2004–2005 to 69.2 percent promotion and 14.0 percent research in 2017. Government-mandated marketing programs that focus on California commodities spent over \$226.7 million in 2004–2005 with 67.9 percent of the total expenditures on promotion and 11.0 percent on research (Carman, 2007a). The total amount budgeted for federal marketing orders and California state marketing programs increased to almost \$317.8 million in 2017, with 64.8 percent of expenditures on promotion and 17.3 percent on research (Tables 3, 4, and 5).

The Economic Effects of Mandated Programs

An objective of mandated marketing programs, as stated in the enabling legislation, is to improve producer returns through orderly marketing. Determination of the degree to which each program has met its objectives can sometimes be difficult to determine. Further, it almost always leads to serious discussions among producers concerning returns from advertising and promotion, the effectiveness of minimum quality and maturity standards, the benefits of industry supply controls, and the returns from industry-funded research. Possible impacts on other groups, including consumers and trading partners as well as overall effects on economic welfare, add to the controversy.

Disagreement over the impacts and effectiveness of mandated marketing program provisions have resulted in numerous public hearings and frequent litigation as critics have sought to modify or terminate specific programs. Legal challenges have included actions against provisions in the marketing orders for peaches and nectarines, kiwifruit, plums, apples, grape rootstocks, cut flowers, almonds, milk, cling peaches, California/Arizona citrus (lemons, Navel oranges & Valencia oranges), and table grapes. In recent years, four court cases, three concerning advertising and promotion and one on volume controls, were decided by the U.S. Supreme Court as discussed below.

Volume Controls

Marketing order provisions that control the amount of product marketed can be a powerful economic tool when the commodity group controls most of the production and marketing of the commodity, demand is inelastic, and/or 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 by restricting the supply marketed, or by practicing price discrimination between markets. However, since marketing orders allow producers to control the amount of product marketed but not entry or the amount of product produced, any short-run price enhancement leads to longer-run supply response. It is not surprising that volume controls have been controversial—monopoly-pricing practices reduce the economic welfare of some consumers as well as distorting resource allocation decisions, while producers face all of the problems of maintaining a cartel. Marketing orders allow California commodity groups to control the quantity of product marketed by one or more methods: (a) market allocation, (b) reserve pools, and (c) market controls.

Market allocation programs control the amount of product going to a primary market with the remainder going to uncontrolled markets. In practice, controls were usually on the more inelastic fresh market, with uncontrolled product being processed or exported. In the case of the state marketing order for cling peaches (used only for canning), supply was controlled using a “green drop,” tree removal, and cannery diversion (disposal of fruit that had been picked). Almonds, dates, raisins, and walnuts have implemented market allocation.

Reserve pools may require diverting a portion of a crop to a secondary (or noncompeting) market, or setting aside a portion of the crop for return to the market when prices are more favorable. The impact of a reserve pool depends on disposition of the product. If the product is diverted to a secondary market, the pool’s impact is the same as a market allocation program; if the pool product is returned to the primary market, the impact is similar to a market flow program. The almond, walnut, raisin, and prune industries have utilized reserve pools. Market flow controls regulate the amount of product reaching a specified market during a given time period. Citrus prorates that

controlled weekly shipments of California/Arizona lemons or oranges to the domestic fresh market has been the principal use of this provision. The continuous use of weekly prorates essentially converts these flow controls to an allocation program where the crop is allocated between the domestic fresh market (with the most inelastic demand) and other outlets consisting of processing or exports.

While quantity control provisions were very popular during the early years of marketing orders, their use has decreased over time as a result of problems associated with monopoly pricing and lack of supply control. Six of California’s nine marketing orders contain provisions for supply controls, but none are presently in use and there is little prospect for their use in the future. A brief review of supply controls for citrus, raisins, and almonds provides some insights concerning problems limiting their future use.

The Secretary of Agriculture terminated the federal marketing orders for citrus at the end of the 1993–1994 crop year, after more than 50 years of almost continuous use, because of a large number of lawsuits for violations of the prorate rules. The citrus prorates set the amount of lemons and oranges for shipping to the domestic fresh market on a weekly basis. Fruit in excess of a handler’s fresh market prorated quantity could be exported or processed without limits. The fresh market demand facing lemon and orange packers is very inelastic relative to the demands in the export and processing markets. Thus, price discrimination in the domestic fresh market was both possible and profitable by restricting weekly fresh market sales.

Increased producer prices without any controls on entry (new plantings) led to increased new plantings for both lemons and Navel oranges. As these plantings reached bearing age and production increased, the administrative committees were forced to direct increasing proportions of the annual crop to exports and processing to maintain domestic fresh market prices. Average producer returns from all markets decreased over time as total production increased, until new plantings were no longer profitable. When compared to competitive market equilibrium, prorate resulted in increased acreage and production of citrus, as well as increased exports and processed products (Thor and Jesse, 1981; Shepard, 1986).

The economic impacts of marketing order prorate on the California / Arizona lemon industry were the focus of research studies by Smith (1961); French and Bressler (1962); Lenard and Mazur (1985); Kinney, Carman, Green, and O'Connell (1987); Carman and Pick (1988, 1990); and Richards, Kagan, Mischen, and Adu-Asamoah (1996). These studies found that weekly quantity controls could be used to enhance short-run prices and increase producers' revenues; that, over time, higher prices resulted in a supply response with increased cyclical acreage, production, and prices; in equilibrium, total lemon acreage tended to be greater with prorate; supply response to short-run price enhancement required increased diversions over time to processing and export markets to maintain total crop revenues; restrictive quantity controls increased consumer prices and reduced consumer surplus; that, because of supply response, long-term producer benefits from lemon prorate were likely quite limited; and the way prorate is used might be a determinate of the size of lemon marketing margins.

Some opponents of the citrus volume regulations, who had been sued in 1983 by the United States for violations of prorate, discovered evidence of over-shipments by a large number of competing orange and lemon packing houses. A series of lawsuits, investigations, and proposals for penalties under AMAA forfeiture rules threatened to keep the industry in court for many years and create economic hardships for industry participants, prompting the Secretary of Agriculture to terminate the California / Arizona citrus marketing orders on July 31, 1994, "to end the divisiveness in the citrus industry caused by over 10 years of acrimonious litigation."

California raisins provide another example of the long-term use of marketing order volume controls. Under the federal raisin marketing order, first effective in 1949, annual production was divided between free tonnage and a reserve pool controlled by the Raisin Administrative Committee (RAC). Only free tonnage could be sold on the domestic market, but the RAC could allow packers to buy additional tonnage for free use from the reserve when the RAC determined that supply and demand conditions justified such actions. The RAC disposed of the reserve raisins in "noncompeting" market outlets including exports, government programs (school lunch and

charitable food distribution), sales to wineries for distilling into alcohol, donations to charity, and cattle feed.

Until 1977, prices for the majority of exported raisins in the reserve pool were much lower than prices received for free tonnage sold on the domestic market. Thus, the RAC sought to restrict sales in the domestic market where demand is inelastic and to sell the excess in export markets where demand is much more elastic. 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.

The federal raisin marketing order has not implemented a reserve program since 2009 and is unlikely to do so in the future as a result of the U.S. Supreme Court's decision in the "Raisin Case." This case, decided in 2015, stemmed from the RAC's decision to set aside 47 percent of the 2002–2003 raisin crop. Marvin and Lena Horne were raisin growers and packers located in Kerman, California, and they objected to the program as an illegal taking of their property. After they refused to comply with the reserve provisions, they faced penalties of \$695,000 for their noncompliance since 2002.

The Hornes' case eventually made its way to the U.S. Supreme Court, which ruled in an 8–1 decision that the raisin marketing orders' supply-management system violates the Takings Clause in the U.S. Constitution's Fifth Amendment. The Supreme Court also found that there is no difference between real and personal property and set aside the Hornes' fines and civil penalties. The Supreme Court's decision fueled numerous articles in the popular press concerning the need for and future of marketing order programs. As noted by Crespi, Saitone, and Sexton (2015), the raisin marketing order had unique features relative to other authorized volume-control provisions. They concluded, "Most importantly, the court's opinion does not challenge in any way the existence of mandatory marketing programs and the function they most often perform, such as funding research and promotions, and implementing grades and standards."

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 for sale in domestic and export markets (the market allocation) and the quantity that are not for sale (the reserve pool). The reserve may be designated 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 many years.

Quality Controls

All existing federal marketing orders for California fruits, vegetables, and nuts include provisions for grades and minimum quality standards. However, only 10 California marketing programs include quality standards and inspection provisions and just seven actively use the

provisions. The purpose of minimum quality standards is to maintain or enhance demand for a commodity by keeping inferior products off the market, thus avoiding the “lemons” problem, which occurs when a product has unobservable characteristics for which the seller has much better information than the buyer. Fresh fruit prices normally decline over the season, giving growers strong incentives to ship fruit as early as possible, despite possible lack of maturity. Most consumers are unable to judge the maturity of fruit from appearance and may find that fruit that “looks good” does not “taste good.” While the individual producer obtains a high price for this fruit, consumer dissatisfaction can adversely affect prices and subsequent sales of high-quality product by other producers later in the season. Indeed, representatives of many commodity groups believe that shipments of immature fruit have a negative impact on total sales and overall average prices because consumers delay repeat 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.

The economic impact of minimum quality standards may be to: (1) increase the retail demand for a product, resulting in higher prices and/or increased sales; (2) reduce marketing margins—by reducing waste, with benefits accruing to—with benefits accruing to both producers and consumers; and (3) reduce supply, which can increase total revenue to producers if demand is inelastic. Any effective minimum quality standard will restrict the total quantity of commodity marketed, but supply control tends to be a byproduct rather than the focus of such standards. Federal marketing order regulations on grade, size, quality, or maturity also apply to imports of the same commodities from other countries during the period the regulations are effective for the domestic product.

The use of some minimum quality standards has been controversial. Concerns include charges that quality standards are a hidden form of supply control, wasting edible fruit with the primary impact being on the poorest consumers, and that quality standards are sometimes not equitable because of seasonal and 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).

Assuring food safety is the newest use of minimum quality standards and inspection by mandated marketing programs. The purpose of these standards is to enhance product demand by reducing the chances of a food-safety incident, thereby increasing consumer confidence and preventing the costs of product recall or rejection. There are three California marketing programs currently stressing food safety: the Leafy Greens Products Handler Marketing Agreement (LGMA), the federal marketing order for pistachios, and the federal marketing order for almonds. The LGMA is a unique and rigorous science-based food safety system that protects public health by reducing potential sources of contamination and establishes a culture of food safety on the farm.⁶ The LGMA emphasizes research-based standards and industry-wide training programs with mandatory government audits.

The main provisions of the federal marketing order for pistachios set standards and require testing for quality and aflatoxin, a cancer-causing mold that can contaminate many nuts and grains. Producers' concerns about the possible negative effects of an aflatoxin poisoning event were the major factor leading to the creation and adoption of the marketing order for pistachios, with support by more than 90 percent of the growers in a 2004 vote. Analysis of the pistachio marketing order program by Gray et al. (2005) projected significant positive returns from the growers' assessments, with benefit-cost ratios ranging from 3:1 to greater than 6:1, with 60 percent of the overall benefits going to domestic consumers.

Similarly, the Almond Board of California initiated a pasteurization program in 2006 in response to two food safety events. In 2001 a Salmonella outbreak in Canada was traced back to raw almonds from three orchards in California. Then in spring 2004, foodborne illnesses in Oregon from Salmonella were traced to raw almonds purchased from a retailer who obtained all supplies from one California handler. The handler initiated a voluntary recall that involved approximately 15 million pounds of almonds. All raw, natural almonds entering the domestic food distribution system are now pasteurized, and it is used in other markets, as requested, based on their local food safety preferences. In addition, California almonds transitioned from a Voluntary Aflatoxin Sampling Plan

program to a Pre-Export Checks (PEC) program in August 2015. PEC was developed by the California almond industry to provide an aflatoxin-sampling plan for the analysis of ready-to-eat products equivalent to that used by the European Union (EU) for official testing of incoming consignments. The program ensures the industry is not vulnerable to inconsistent or arbitrary controls (ABC, 2016).

Advertising and Promotion

Generic advertising and promotion account for the majority of funds collected by mandated marketing programs in the United States. The purpose of these expenditures is to increase demand for the advertised commodity so that the same amount of commodity sells for a higher price and/or more sells for the same price. The distribution of program benefits and the "free-rider problem" provide the basis for the rationale for mandatory support by all producers.⁷ Research has documented significant increases in product demand and prices as a result of commodity advertising and promotion programs, with the net monetary benefits to producers being much greater than costs (Kaiser et al., 2005). For example, promotions led to statistically significant increases in demand and price in case studies for eight California crops (table grapes, eggs, prunes, avocados, almonds, walnuts, raisins, and strawberries) and benefit-cost estimates for four national checkoff programs (dairy, beef, pork, and cotton). Kaiser et al. (2005) wrote that "the overwhelming conclusion . . . is that mandated commodity marketing programs have been very profitable for California's agricultural producers. In every case, the evidence suggests that one can be reasonably confident that the benefits have well exceeded the costs and that it would have been profitable for producers to have increased expenditures on the programs."

Producer support for promotion programs is strong, but not unanimous, and litigation over mandatory assessments

7 It is usually not economical for small, individual commodity producers 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 that there are 1,000 equally small producers of the commodity. If an individual producer were to spend \$100, the benefits to the industry would be \$20,000 but since the benefits are distributed equally based on sales, the individual will obtain a return of only \$20 for this \$100 expenditure.

6 Interested readers can access information on the LGMA on the website: <http://www.caleafygreens.ca.gov/>

for advertising and promotion has occupied a number of programs since the 1980s. Several large growers have sued to avoid making payments for reasons that range from philosophical opposition to government interference in marketing their products, a belief that they could obtain a better return promoting their own brand, and basic disagreements with the promotion message or operation of the program. Three cases concerning the constitutionality of generic promotion programs have been heard by the U.S. Supreme Court (Kaiser et al., 2005). In the 1997 case of *Glickman v. Wileman Bros. & Elliott, Inc., et al.*, the Supreme Court ruled that federally mandated generic advertising for California peaches, plums, and nectarines did not violate the First Amendment of the U.S. Constitution. In the 5–4 ruling, the Court noted that the business entities that are compelled to fund generic advertising do so as part of a broader collective enterprise in which the regulatory scheme already constricts the freedom to act independently.

However, in 2001, the Supreme Court ruled in *U.S. v. United Foods*, that the national Mushroom Promotion Act of 1990 violated the First Amendment, setting off a flood of litigation against other promotion programs, with lower courts striking down several. Then in 2005, the Supreme Court agreed to hear a third promotion program case on an Eighth Circuit Court ruling that the national beef checkoff program was unconstitutional. In *Livestock Marketing Association v. USDA*, the Supreme Court ruled (May 23, 2005) that the national beef check-off program is constitutional. The ruling, which overturned lower court decisions, stated that the beef promotion messages were government speech that is not subject to certain First Amendment challenges. This ruling helped to settle pending litigation for several generic promotion programs and seemed to increase producer interest in promotional programs.

In addition to producer-funded promotion by marketing orders and commissions, the U.S. government also provides funds to many of the same organizations to expand agricultural commodity exports. The USDA's Foreign Agricultural Service's Market Access Program (MAP) provided \$173.5 million in fiscal year 2017 funding to 70 nonprofit organizations and cooperatives. Included was over \$30 million to California groups, with the majority of the funds directed to important export

commodities (almonds, walnuts, pistachios, table grapes, raisins, citrus, prunes, and wine). California producers also benefitted from grants to national organizations supporting exports of dry beans, poultry and eggs, wheat and grains, rice, cotton, and potatoes. The Foreign Agricultural Service also allocated Foreign Market Development Program (FMD) funds totaling \$26.6 million in fiscal year 2017 to 26 trade organizations that represent U.S. agricultural producers. The FMD focuses on generic promotion of U.S. commodities, rather than consumer-oriented promotion of branded products, and organizations that represent an entire industry or are nationwide in membership and scope receive preference.

A recent study of the MAP and FMD programs indicates that they contributed \$309 billion to farm export revenue between 1977 and 2014, an average of \$8.2 billion per year (Williams et al., 2016). This study also found that from 2002 through 2014, the programs boosted average annual farm cash income by \$2.1 billion, annual U.S. economic output by \$39.3 billion, annual gross domestic product (GDP) by \$16.9 billion, and annual labor income by \$9.8 billion. In addition, the programs generated economic activity that directly created 239,000 new jobs, including 90,000 farm sector jobs.

Research

There were 28 California mandated marketing programs with research expenditures totaling almost \$8.5 million in 1992 (Lee et al., 1996); this increased to 45 programs with expenditures of over \$21.2 million in 2003–2004 (Kaiser et al., 2005), and further to 48 programs with expenditures over \$25 million in 2004–2005 (Carman, 2007a). The research portion of California state programs increased to \$37.22 million for 44 active programs in 2016–2017 (Tables 4 and 5). The share of total program expenditures dedicated to research increased from about 7.5 percent in 1992 to about 11 percent in 2004–2005, and further to 18.4 percent in 2016–2017. Historically, research funded by California marketing programs focused on production problems and issues. A sampling of research topics includes new variety development, insect and pest management, irrigation and water management, disease control, pollination, harvest methods/machinery, crop management, and postharvest quality control. More recently, California marketing programs have maintained production-oriented research

while increasing funds devoted to nutrition and health research.

There are numerous examples of the benefits to producers from research expenditures by mandated marketing programs. Research has produced cost savings from the reduced use of inputs (water, pesticides, and fertilizer) and changes in the input mix, yield increases, reductions in postharvest losses, improved crop characteristics, and new management techniques. Several California commodity groups have funded research at UC that has helped them become the most efficient producers in the United States and the world. Included are almonds, walnuts, pistachios, strawberries, lettuce, and grapes (Alston and Zilberman, 1998). California producers have gained a short- to intermediate-term competitive edge from these research-enabling improvements and, over time, benefits have flowed to consumers in the form of increased supply and availability, improved quality, and lower prices.

The California Walnut Commission became the first California-mandated marketing program to specifically fund health and nutrition research. In 1990, the commission contracted with Loma Linda University for research on the protective effects of walnut consumption on the risk of coronary heart disease. The motivation for walnut nutrition research was to counter the popular perception, at that time, that walnut consumption was unhealthy because of their high oil content. Likewise, the Almond Board of California initiated a Nutrition Research Program and established a Nutrition Subcommittee in 1995. In 1997, the California Avocado Commission began to communicate the nutritional benefits of avocados through national public relations and outreach efforts. In 2003, the California Strawberry Commission funded its first nutrition research projects. These early changes in research emphasis soon yielded results that have helped to improve the impact of advertising and promotion programs, increase consumer knowledge of the nutritional composition of major specialty crops, and increase demand for these same crops.⁸

The California walnut industry submitted its research results for a heart health claim to the U.S. Food and Drug Administration (FDA), and the almond industry submitted its as part of a petition filed by the International Tree Nut

Council Nutrition Research and Education Foundation to the FDA for a heart health claim for nuts. (Walnuts were also included in the International Tree Nut Council petition.) The FDA approved a qualified health claim for walnuts, and another for almonds and other selected nuts, on July 15, 2003, which states: "Scientific evidence suggests but does not prove that eating 1.5 ounces per day of (specify nut) as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease."

Commodity health and nutrition research has tended to focus on analyses detailing each commodity's chemical and nutritional composition, including the amount and type of fat, calories, vitamins, phytochemicals, antioxidants, and minerals. The presence of particular components, already associated with favorable health outcomes has helped focus research on important health topics. Many commodity groups are seeking evidence that consuming their product may reduce the risk of heart disease or that product components may help to lower the risk of certain cancers. In addition, it is important to document whether or not commodities contains antioxidants known to slow the aging process and protect against heart disease and various forms of cancer. Several commodities have examined the role they might play in diets to control weight gain and if they can be part of a healthy diet for managing and controlling diabetes. California commodities devoting substantial funds supporting research related to health and nutrition include walnuts, almonds, pistachios, avocados, strawberries, table grapes, and blueberries.

Information Programs

Pricing efficiency in agricultural commodity markets requires current information on supply and demand factors affecting prices, with more information preferred to less. Typically, this information is not easy to obtain and, when available, it is often expensive. Access to current data can be a source of market power and can provide a competitive advantage. Public market information for agricultural commodities has decreased over time in response to changing channels of distribution and reduced government funding. Terminal market price and arrival data have decreased because these markets have become less important as large buyers deal directly with larger grower-shippers; market reports have also been reduced and suspended in response to government budget

⁸ Carman (2007b) includes a discussion of the health and nutrition research programs for these four organizations.

reductions. In the continuing search for market information, developments in information technology and the spread of personal communication devices offer potential breakthroughs for marketing firms. California producers are developing information programs through their commodity organizations.

In addition to having an organized commodity group, an important and often overlooked benefit of mandated marketing programs is the value of the information gathered, organized, and disseminated in administering each program. These data on production, prices, bearing and nonbearing acreage, reported by region, are useful for determining trends, estimating annual demand functions, forecasting production, and measuring aggregate economic contributions, but contribute little to day-to-day pricing negotiations and decisions. Efforts to collect and disseminate information on daily prices by grade and shipments are in progress. A current example is the information program conducted by the California Blueberry Commission (CBC).

The CBC is a relatively new program. California blueberry producers voted to establish the CBC in 2009, and founded the commission on March 1, 2010. An important activity of the commission was to fund the Blueberry Marketing Resource Information Center (BMRIC), which collects and provides important real-time marketing data to the industry. BMRIC also publishes summaries of weekly shipments, pack-out volume, and daily f.o.b. prices by size of package (container) in their annual reports.⁹ While these data do not cover all California production, they are representative of commercial production and are readily available to registered users. Note that the California Avocado Commission operates a similar program with a similar name, the Avocado Marketing Resource Information Center (AMRIC).

The Hass Avocado Board, which collects a \$0.025 cents per pound assessment on all Hass avocados sold in the United States to fund promotion and research, also conducts a web-based program to exchange crop and marketing information among 100 packers and over 20,000 producers who serve the U.S. market. This program collects, tracks, analyzes, and disseminates information relevant to

marketing Hass avocados in the United States. It provides all market participants with 24-hour access to market data that drive decisions about growing, shipping, distribution, and marketing Hass avocados. In an evaluation of the information program, Carman, Li, and Sexton (2010) found evidence that improved market information had contributed to reduced price variability that benefited both avocado producers and consumers.

Information-sharing cooperatives, relatively unique to California, can reduce marketing costs and improve pricing efficiency. These cooperatives provide a means of communication regarding production plans and pricing strategies that would ordinarily be illegal under U.S. antitrust laws, but lawful under the Capper-Volstead Act. Information-sharing cooperatives are helpful for highly perishable commodities whose production is concentrated in the hands of relatively few grower-shippers, including iceberg lettuce, melons, table grapes, fresh stone fruits, mushrooms, and fresh tomatoes. Successful coordination of production and marketing in these industries can be a major advantage in terms of avoiding the periods of over supply and low prices. Sexton and Sexton (1994) includes a discussion of experience with an information-sharing cooperative in the California iceberg lettuce industry.

Information websites that provide promotional materials to consumers as well as retailers, foodservice, and media are maintained by most of California's mandated marketing programs.¹⁰ Review of websites reveals a wide range of content including such things as press releases, nutrition and health information, recipes, advertising and promotional copy, program descriptions, data on prices and shipments (ranging from aggregate to detailed), links to blogs, information on production, product availability, care of the product, point-of-sale displays and other retail materials, fact sheets, image libraries, links to research results, promotional and training videos, plus other product-related information. These websites are both interesting and informative.

10 Note that 45 of California's 51 mandated programs maintain active websites. The California Department of Food and Agriculture provides a directory of commodity program websites with links at: <https://www.cdfa.ca.gov/mkt/mkt/BoardCommissionSites.html>

9 The California Blueberry Commission only represents growers that produce 5 acres or more of blueberries. An example of some of the summary data published is available in Carman (2017).

Conclusions

Marketing California's agricultural output is complex and expensive. The costs of performing the physical functions of moving products from the farm to the final consumer have grown absolutely and as a proportion of total consumer expenditures, reflecting consumer demand for new product attributes and services. Another reason is that the share of meals consumed away from home has increased, and marketing costs are higher for food away from home.¹¹ The institutional framework for marketing California food products continues to evolve as new retail formats compete with traditional supermarkets and large-scale general merchandise retailers increase their share of food sales. Menu and ingredient choices by large-scale fast-food restaurants, limited dining, and take-out establishments can have major impacts on agricultural producers and the food supply chain. Decisions made to gain a competitive edge, such as deciding to offer breakfast items or to extend the hours in which they are offered, can significantly increase demand for basic ingredients (eggs, bacon, sausage, etc.), or banning use of certain inputs such as antibiotics fed to livestock can add significant costs to meet the new requirements.¹² California commodity producers continue to support mandated marketing programs, but their focus has changed from federal marketing orders with supply control provisions to California commodity commissions with an emphasis on research and promotion.

Growing interest in the diet, health, and possible disease preventative properties of food products provide examples of attributes desired by segments of consumers. There are also growing demands for organically and locally grown products that may be a proxy for a desire to support small farms amidst concerns about the environmental impacts

of production and consumption of particular products.¹³ Mandated marketing programs provide a framework for discovering and verifying product dimensions that can be directed toward market segments using effective promotion and public relations programs. Health and nutritional research programs conducted on behalf of commissions representing walnuts, almonds, avocados, and strawberries have demonstrated the positive impacts that producer-funded marketing programs can have on product demand (Carman, 2007b). Other commodities that have health and nutrition programs to provide input to their promotion programs include table grapes, blueberries, dried plums, and dates.

Developing information technology and artificial intelligence may offer significant improvements in pricing and productive efficiency from decisions on commodity production, distribution, and marketing. Collecting and sharing harvest, inventory, packing, shipment, and pricing data can achieve an "orderly marketing" objective for mandated marketing programs. Producer-funded information programs, such as for avocados and blueberries, can contribute to a reversal of trends that have reduced the availability and timeliness of government market and price information. The widespread availability of marketing information and data is a theoretical requirement for competitive markets. Industry marketing programs operating with government sanction have an exemption from antitrust laws so that producers and shippers may share market information and stabilize shipments and prices. Producers and consumers can benefit from decreased price variability when price transmission is asymmetric, as is the case for many perishable commodities (Carman, Li, and Sexton).¹⁴ Information programs that smooth the flow of product from producers to final consumers can reduce price variability, leading to smaller marketing margins that benefit producers with higher average f.o.b. prices and consumers with lower average retail prices.

11 Even though marketing costs are higher for food consumed away from home, savings for the household due to the opportunity costs of meal preparation may increase net household income.

12 Saitone, Sexton, and Sumner examine the economic effects of limitations on the use of antibiotics in U.S. pork production. They found that, in the absence of demand growth, less pork is sold due to higher costs in the restricted segment, and both pork consumers (on average) and producers are harmed.

13 See Philpott and Lurie for some of the issues related to almonds' use of water during drought years and Darnton and Rickenbrode for issues related to deforestation in Mexico and increased greenhouse emissions from increased avocado imports.

14 With asymmetric price transmission, one finds that retail prices respond quicker and more fully to shipping-point price increases than to shipping-point price decreases. As a result, retail price margins tend to increase with larger and more frequent price changes or decrease with smaller and less frequent price changes

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