



Agricultural and Resource Economics ARE UPDATE

Giannini Foundation of Agricultural Economics, University of California

Vol. 21, No. 5 May/June 2018

ALSO IN THIS ISSUE

How Does Meeting the Dietary Guidelines for Americans 2015–2020 Benefit U.S. Fruit and Vegetable Growers?
Karen Jetter and Kjersti Nes. 5

Can CalFresh Cut Costs and Better Serve California’s Agricultural Counties?
Alexandra E. Hill and Charlotte Ambrozek. 9

California Agriculture: Dimensions and Issues

Philip L. Martin, Rachael E. Goodhue, and Brian D. Wright

California has led the nation in farm sales since 1948, when Los Angeles County had more farm sales than any other U.S. county. The major reason California’s farm sales of \$46 billion in 2016 were almost \$20 billion higher than Number 2 Iowa at \$27 billion is the dominance of high-value fruit, nut, and vegetable crops. This article summarizes the analyses of agricultural economists at UCB, UCD, and UCR of the land, labor, and water inputs needed to produce the state’s farm commodities, highlights the status of major crops and livestock, and outlines the challenges facing the state’s agriculture, from climate change and trade to research.

California Agriculture: Dimensions and Issues is the third edition of the Giannini Foundation’s effort to provide an introduction to California agriculture. We are grateful to the authors who prepared chapters in their areas of expertise.

California Agriculture

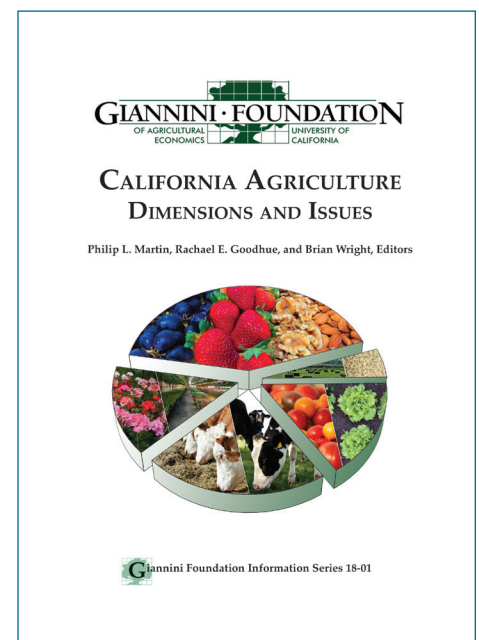
The value of California crops was \$35.4 billion in 2016 and the value of livestock was \$10.5 billion. Three-fourths of California’s farm sales are fruits and nuts, vegetables and melons, and horticultural specialties such as flowers, nursery plants, and mushrooms—so-called FVH crops. Many of these high-value and high-risk crops require unique growing conditions and irrigation, as well as large numbers of seasonal farm workers.

California’s leading commodities in 2016 were milk worth \$6.1 billion; grapes, \$5.6 billion; almonds, \$5.2 billion; cattle, \$2.5 billion; and lettuce, \$2 billion (Figure 2). These five commodities accounted for almost half of California’s farm sales, and the top 20 commodities were worth \$34 billion or three-fourths of the state’s farm sales. The value of milk fell 50% between 2014 and 2016, the value of almonds fell by 45%, and the value of berries fell by 25%.

The four leading farm counties accounted for 52% of the state’s farm sales:

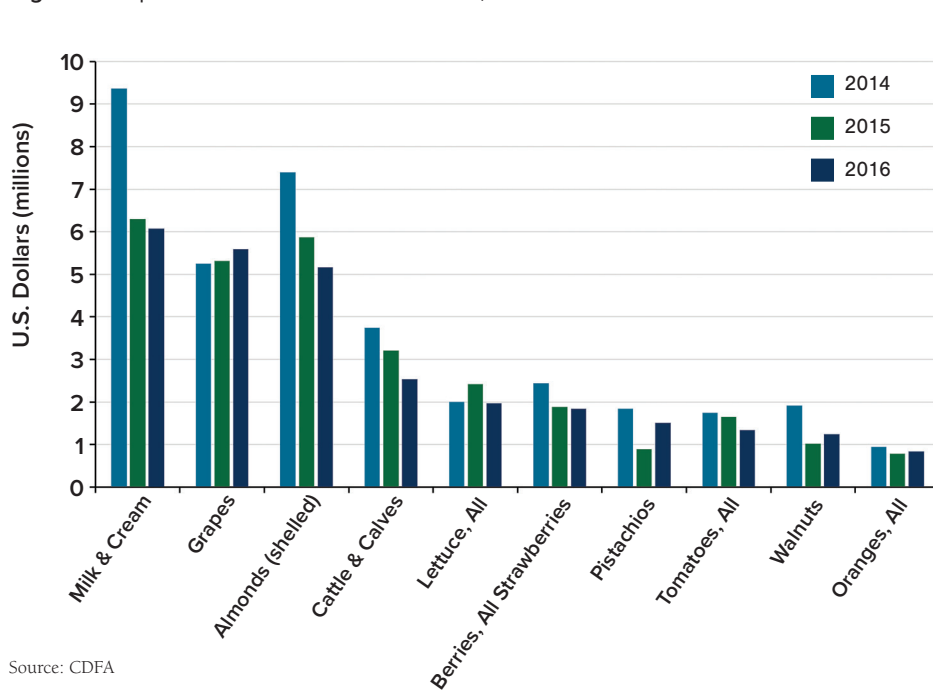
Kern County had farm sales of \$7.2 billion; Tulare County, \$6.4 billion; Fresno County, \$6.2 billion; and Monterey County, \$4.3 billion. Kern County accounted for 25% of the state’s grape sales, 21% of almond sales, and 42% of pistachio sales.

Figure 1. Cover of California Agriculture: Dimensions and Issues



The new edition of *California Agriculture: Dimensions and Issues* is now available online at giannini.ucop.edu/publications/cal-ag-book/

Figure 2. Top Ten Commodities in California, 2015



Source: CDFA

Tulare County dairies accounted for a quarter of the state’s milk and cream and most of the state’s orange sales, while Fresno County accounted for a quarter of the state’s almonds.

Most California farm commodities are consumed outside the state, including in other countries. Farm exports of \$20 billion in 2016 were 43% of the state’s farm sales, led by \$4.5 billion worth of almonds, \$1.5 billion worth of wine, and \$1.4 billion worth of dairy products. The major destinations for California’s agricultural exports were the EU, taking \$3.5 billion worth of California farm commodities; Canada, \$3.3 billion; China, \$2 billion; Japan, \$1.4 billion; and Mexico, \$1 billion.

Land, Labor, and Water

California’s agricultural history differs from that of most states, beginning with the distribution of land. The Spanish and Mexican governments granted large parcels or ranchos of 50,000 or more acres to selected individuals. When California became a U.S. state in 1850, farming consisted largely of cattle grazing and dryland or non-irrigated wheat farming on vast ranchos.

Fruit production became profitable in the 1870s, after the transcontinental railroad lowered transportation costs and interest rates, and irrigation facilities were developed to produce oranges, peaches, plums, and pears. California’s Mediterranean climate allowed the production of a wide range of crops, from grains and cotton to fruits and vegetables, most of which were produced on large farms with relatively sophisticated operators.

Less than 10% of the state’s 100 million acres of land are cropland, and 80% of the state’s cropland is irrigated. California has the highest farm land prices in the U.S., reflecting the production of high-value commodities and the profits from alternative uses, such as developing land for housing. Prices for almond orchards, the largest acreage crop, were \$30,000 to \$40,000 an acre in 2018, depending on soil quality and access to water. The most expensive farm land is Napa vineyards, which can sell for \$200,000 an acre or more.

Hired farm workers do most of the work in California agriculture, and their number is rising as the expansion

of labor-intensive commodities such as berries offsets mechanization in raisin grapes and shrinkage in commodities such as asparagus. Average annual employment, a measure of full-time equivalent jobs, was 421,000 in 2015, and twice as many people, almost 850,000, worked for wages on the state’s farms sometime during the year. Over 90% of California farm workers were born in Mexico, and over half are not authorized to work in the United States.

Farmers normally use about 33 million acre-feet of water on 8 million acres of irrigated land, an average of 4 acre-feet (an acre-foot is 43,560 square feet or about a football field covered with 1 foot of water). In normal water years, about 60% of the water used by farmers is surface water that is stored in dams or reservoirs and conveyed via canals to farmers, and 40% is groundwater pumped from underground aquifers. In dry years, these shares are reversed, explaining why the 2012–15 drought lowered groundwater levels and led to legislation requiring the development of plans to sustain underground aquifers.

Major Commodities

Fruits and nuts account for 40% of the state’s farm sales. The eight-county San Joaquin Valley is the U.S. fruit and nut bowl, with most of California’s citrus, peaches and nectarines, grapes, and almonds, walnuts and pistachios.

Fruits and nuts are following different trajectories. Fresh fruit consumption has been declining, reflecting reduced consumption of oranges and peaches and nectarines, a turn away from fruit juice, and declining sales of canned and dried fruit. Many fruit farms are relatively small, prompting most fruit growers to join cooperatives such as Sunkist and Sunsweet to market their fruit. Marketing orders regulate the production of many fruits, collecting small fees from first handlers of

commodities to set minimum quality standards, conduct research, and promote consumption.

California has 850,000 acres of vineyards, two-thirds devoted to wine grapes. California crushes over 4 million tons of wine grapes a year to produce 10% of the world's wine. California has five distinct wine regions: North Coast, Central Coast, Northern San Joaquin, Southern San Joaquin, and other. The North Coast, including Napa and Sonoma counties, accounts for one-eighth of the state's wine grape tonnage but over 40% of the revenue from wine grapes, while the Southern San Joaquin accounts for 40% of the state's wine grape tonnage but only one-eighth of the value of wine grapes.

Orchards without workers most of the year can have crews of dozens or hundreds during pruning and harvesting seasons. Fruit farmers often use labor contractors to recruit crews of 20 to 50 workers for these labor-intensive phases of production. Their declining ability to bring crews when requested explains why labor accounted for half of the 80 issues identified by the California Fresh Fruit Association as top priorities over the past decade.

Tree nuts—almonds, walnuts, and pistachios—are major success stories, with production and prices rising together over the past quarter century. California has over 2 million acres of tree nuts, meaning that one-quarter of its irrigated land is producing nuts that are mostly exported. Most tree nuts are grown south of the Sacramento-San Joaquin River Delta, explaining the keen interest of nut farmers in the WaterFix proposal to move more water 35 miles from north to south via tunnels to limit damage to Delta fish.

Berries: California's berry industry includes two major subsectors: strawberries that are usually planted

each year, and cane or bush berries (such as blueberries and raspberries) that can produce berries for a decade or more, although most growers replant cane berries after several years. California produces over 80% of U.S. strawberries and raspberries, and has a rapidly expanding blueberry sector. Berries are high-value and high-risk crops, generating revenues of over \$50,000 an acre but exposing growers to disease, labor, and market risks. Land, disease, and labor constraints may slow the berry industry's expansion after two decades of rapid growth.

Vegetables: California produces over half of U.S. fresh vegetables, and the six most valuable are broccoli, carrots, celery, lettuce, bell peppers, and fresh tomatoes, with broccoli and lettuce accounting for almost two-thirds of the value of the state's major fresh vegetables. These fresh vegetables are produced by a relative handful of large grower-shippers; that is, businesses that plant and harvest crops and supply fresh vegetables to buyers year-round by moving production between California and Arizona. Many fresh vegetables are consumed raw, putting the spotlight on food safety after outbreaks of illness linked to *E. coli* O157:H7, which occurred in spinach in September 2006 and in romaine lettuce in April 2018.

Dairy: California has 20% of U.S. dairy cows and produces more than 20% of U.S. milk, most from megadairies with 1,000 or more cows. Feed accounts for over half of the cost of producing milk, and rising feed costs and falling milk prices have shrunk the number of dairies in the state. California dairies rely on hired workers, and some are considering moving to nearby states due to California's minimum wage headed for \$15 an hour by 2022, and requirements to provide farm workers overtime pay after 8 hours a day or 40 hours a week.

Livestock: Cattle and calves are an unusual sector of California agriculture, relying on low-cost public lands to feed cows and their calves and moving year-old stocker cattle mostly out-of-state to fatten them for slaughter. Many yearling cattle leave the state in trucks and return as beef, posing challenges for the state's cattle industry as regulations on trucking are tightened. California has 10% of U.S. sheep, and the sheep industry is grappling with similar challenges of finding low-cost forage and sending lambs out of state for fattening and slaughter.

Nursery and Cannabis: Nurseries that produce plants for homes, parks, and farms, and greenhouses and open air farms that produce flowers, generate about 10% of California's farm sales. Nurseries are located near their primary customers—new homeowners. Los Angeles, Orange, and San Diego counties have 40% of the state's residents, and San Diego accounts for one-third of the state's nursery sales. Both the nursery and floriculture sectors were hard hit by the 2008–09 recession. The nursery industry is making a comeback, but fresh flowers are increasingly imported.

Cannabis is a unique commodity—perhaps the most valuable in the state. Production of 15 million pounds a year and grower prices of \$1,000 a pound make marijuana's farm value \$15 billion a year, equivalent to one-third of the state's farm sales. California voters approved Proposition 64 in November 2016 to legalize the production, sale, and use of recreational marijuana, encouraging the state to enact laws to regulate and tax the industry. With marijuana that is grown indoors and in greenhouses commanding higher prices, licensed growers with such facilities are poised to expand the legal and regulated market. However, most of the state's marijuana is likely to remain outside this system and will continue to be

shipped in violation of federal law to consumers outside California.

Marketing, Trade, and Innovation

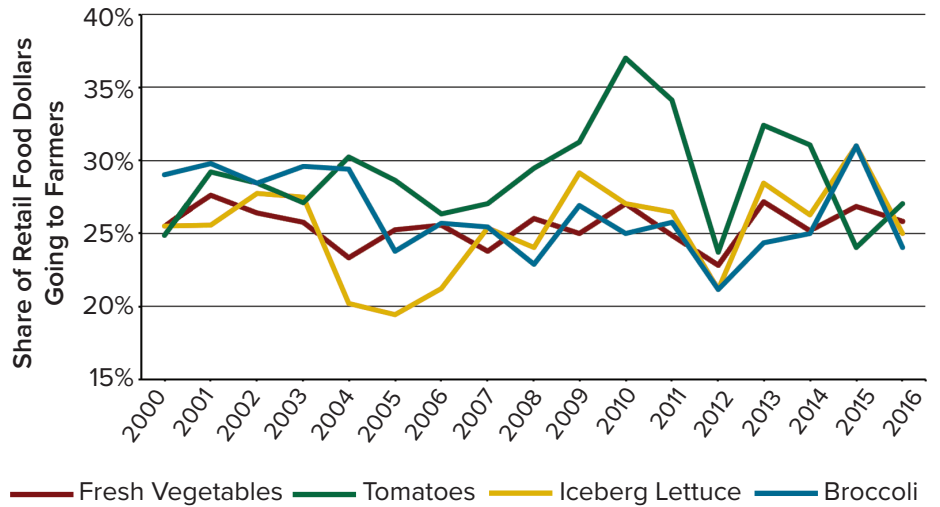
Consumer demand determines what farmers produce, and the rising demand for many fresh fruits and vegetables explains why California farm production and sales have risen. About 13% of typical household (the government term is consumer unit) expenditures are on food. Only \$4,000 of these food expenditures are for food eaten at home, and the \$3,000 spent on food away from home largely reflects convenience, service, atmosphere and other factors.

Farmers get a relatively small share of the retail food dollar, from 50% for fresh milk to less than 10% for the wheat used to make bread. The farm share of average retail prices for many fruits and vegetables is 20–40%, even though farmers increasingly prepare fresh fruits and vegetables for retail sale (Figure 3). This rate of return is a source of frustration to farmers who often pick and pack commodities in clamshells or bags for consumers.

Farmers have tried many times to increase the demand for particular commodities and to raise their share of the retail price. Many commodities have marketing orders, which are grower-approved agreements enforced by federal and state governments to set quality standards for produce that is marketed. Assessments or fees are collected for each box or carton shipped to market, and marketing boards spend the money collected from growers on research and promotion, such as the Got Milk or Dancing Raisins campaigns.

California exports commodities worth 40% of the state's farm sales, led by almonds, dairy products, walnuts, and wine. Unlike corn and grain, most of the commodities exported from California are not supported

Figure 3. Farm to Retail Price Spreads, Fresh Vegetables, 2000–2016



Source: USDA, www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx

by federal government programs, making the state's farmers more keen on free trade than other U.S. farmers. Trade is a two-way street, raising incomes abroad that increase demand for California fruits and nuts but also inspiring farmers in other countries to produce high-value crops to export. China, the world's largest producer of most fruits and vegetables, provides an example of the opportunity and challenge of expanding demand and supply for the commodities that dominate California agriculture.

California has high-tech agriculture supported by an educational and industrial complex that educates students, conducts research, and transfers innovations to farmers. Many innovations respond to specific challenges, such as the high cost of water encouraging Southern California farmers to adopt drip irrigation. California is a leader in precision agriculture, using technologies to adjust inputs to reflect the specific needs of particular plants and animals.

Whither California Agriculture

California has a highly-regulated business environment with affluent consumers, a desirable climate, and soils suited to producing many crops.

California agriculture has innovative farmers who have benefited from a robust state education and agricultural research system for developing, improving, and adapting innovations.

Suggested Citation:

Martin, Philip L., Rachael E. Goodhue, and Brian D. Wright. "California Agriculture: Dimensions and Issues." *ARE Update* 21(5) (2018): 1–4. University of California Giannini Foundation of Agricultural Economics.

Authors' Bios

Philip L. Martin is an emeritus professor and Rachael E. Goodhue is professor and chair, both in the Department of Agricultural and Resource Economics at UC Davis. They can be reached by email at plmartin@ucdavis.edu and goodhue@primal.ucdavis.edu, respectively. Brian D. Wright is a professor in the Department of Agricultural and Resource Economics at UC Berkeley and director of the Giannini Foundation of Agricultural Economics. All three authors are members of the Giannini Foundation of Agricultural Economics.

The new edition of *California Agriculture: Dimensions and Issues* is available online at <https://giannini.ucop.edu/publications/cal-ag-book/>