

## CHAPTER 11. CALIFORNIA BERRIES

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### ABSTRACT

California's berry industry generates 7 percent of California's farm sales from less than 1 percent of the state's farmland. The berry industry includes two major subsectors: strawberries that are usually planted each year and cane or bush berries, such as blueberries, raspberries, and blackberries. Cane berries can produce berries for a decade or more, although most growers replant them after several years. California produces over 80 percent 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.

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California's fresh berries were worth \$3.7 billion in 2017, including 84 percent from strawberries and 12 percent from raspberries.

Photo Credit: Jon Bovay, UC Davis, 2013

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## CALIFORNIA BERRIES

Demand for fresh berries has been rising with their perceived health benefits as well as year-round availability and convenient packaging, making berries the highest-value fresh produce item sold in U.S. supermarkets. In 2017, strawberries represented 47 percent of the \$6.4 billion in U.S. retail fresh berry sales, followed by blueberries at 26 percent, raspberries at 14 percent, and blackberries at 9 percent (Cook, 2017).<sup>1</sup>

U.S. strawberry consumption per person doubled from 4 to 8.3 pounds between 2001 and 2017, while blueberry consumption quadrupled from 0.5 pounds to 2 pounds. Raspberry and blackberry consumption are each less than a pound per person per year, but their rate of increase is much faster, up eightfold since 2001 (Cook, 2017).

California's fresh berries were worth \$3.7 billion in 2017, including 84 percent from strawberries and 12 percent from raspberries (Table 11.1). While all berries have grown in value, bush berries increased on a percentage basis. Monterey County accounted for 22 percent of the value of strawberry sales in 2016, followed by Ventura County with 19 percent. The value of raspberries exceeded the value of all peaches and was four times the value of pears.

Total wages paid to berry workers were almost \$1.1 billion in 2018, including 73 percent paid to strawberry workers.

The strawberry share of total wages has been falling as the other berry sectors have grown. The average weekly wages of other berry workers were higher than their weekly earnings in strawberries until 2015. However by 2018, strawberry workers earned an average \$604 a week, while workers employed in other berries earned an average \$559.

California and Mexico can produce the four major berries almost year-round. Most of the strawberries available to U.S. consumers are produced in California, while most blackberries, blueberries, and raspberries are imported. The share of imports in U.S. strawberry consumption is 14 percent, compared to 53 percent for blueberries<sup>2</sup> and 55 percent for raspberries (there are no data on blackberries, but almost all U.S. blackberry imports are from Mexico). Mexico's strawberry exports peak between December and March,<sup>3</sup> and Mexican raspberry exports peak between October and May.<sup>4</sup> Most blackberry imports are from Mexico, except during the summer months when California and Oregon are producing.

2 Chile is the leading supplier of imported blueberries, followed by Canada, Mexico, Peru, and Argentina. Chile exported 103,000 metric tons of blueberries in 2016/17, two-thirds to the U.S., while Peru exported 40,000 metric tons, 55 percent to the United States. Peru's blueberry exports are rising fast, often due to investments by Chilean firms and shipments by sea to the United States. The La Libertad region of northwestern Peru is ideal for growing blueberries, but housing for workers is scarce.

3 Mexico exports one-third of the strawberries that it produces, almost all to the United States.

4 The U.S. produced about 80,000 metric tons of raspberries in 2016, and imported 60,000 metric tons, almost all from Mexico.

1 Cook (2017) reported that fresh berries worth \$6.4 billion in 2017 were 20 percent of the \$31 billion in U.S. retail fresh fruit sales. Total retail fruit sales are not fully counted but are at least \$31 billion. Berries are high-value commodities; they were only eight percent of the quantity of fresh fruit sold in U.S. supermarkets.

**Table 11.1. California Berries, 2017**

	Acres	Tons	Value (\$ Millions)	CA Share of U.S.	CA Share of Total Berries
				Percent	
Blueberries	6,600	31,500	138	7	4
Raspberries	9,000	75,200	452	88	12
Strawberries, All	38,200	1,462,200	3,100	89	84
<b>Subtotal</b>	<b>53,800</b>	<b>1,568,900</b>	<b>3,690</b>	<b>100</b>	<b>100</b>

Source: CDFA, *California Agricultural Statistics Review, 2017-2018*. Available at: <http://www.cdfa.ca.gov/Statistics/PDFs/2017-18AgReport.pdf>

Note: CA share is based on value of commodity.

## CANE OR BUSH BERRIES

There were 15,000 U.S. farms with 113,200 acres of blueberries in the 2017 Census of Agriculture (COA), including 246 farms that each had 100 or more acres and accounted for over half of the total blueberry acreage. There were 7,800 U.S. farms with 23,250 acres of raspberries, and 9,000 farms with 16,700 acres of blackberries, dew berries, and marionberries, but no size distribution data.

California had 6,400 acres of blueberries in 2016 that produced 605,000 hundredweight (cwt) of blueberries worth \$109 million. Between 2007 and 2016, acreage almost tripled (from 2,300 in 2007), production rose almost fourfold (from 165,000 hundredweight in 2007), and the value of blueberries rose almost fourfold (from \$30 million in 2007).

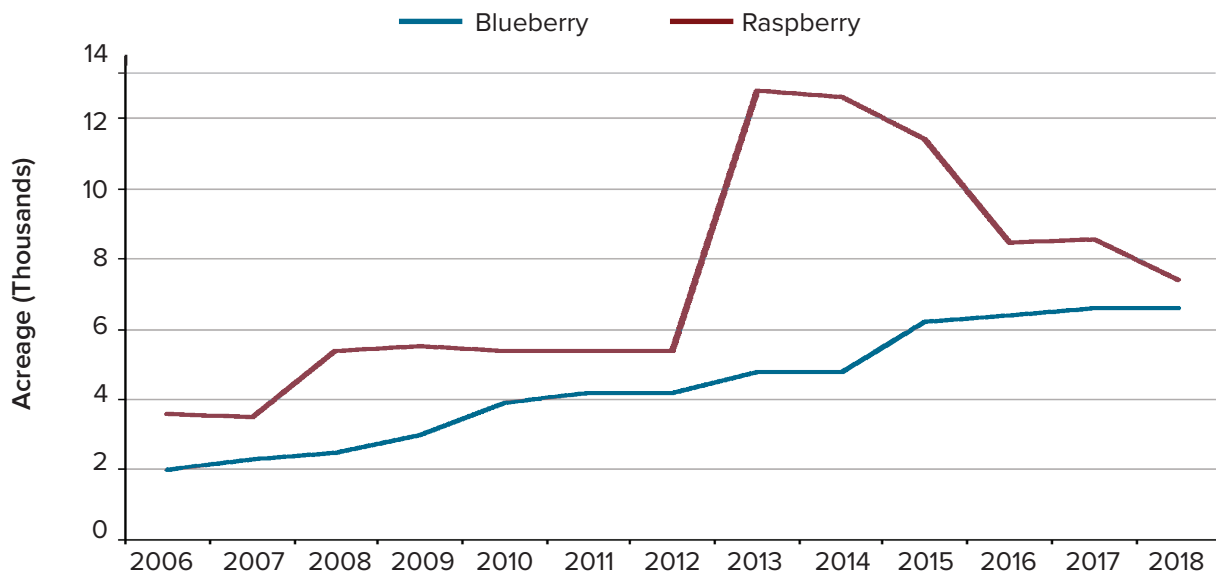
California accounts for a much higher share of U.S. raspberry and strawberry production than of blueberries. Blueberry production is concentrated in eight states, led by Michigan and Georgia with almost half of the cultivated blueberry acreage in the United States. California blueberry acreage is increasing rapidly, as growers take advantage of rising consumer demand and the development of blueberry varieties suitable for California production areas (Figure 11.1). California is second to Oregon in the value of blueberries produced.

California has the highest yields of blueberries—10,000 pounds per acre—worth an average \$2.60 per pound in 2018 for the fresh market. This explains why the value of California blueberries was much higher than the value of Georgia blueberries, where yields of 4,100 pounds per acre were worth \$2 a pound for the fresh market.

A 2009 UC Cooperative Extension (UCCE) cost and return study estimated 1,000 hours of labor were needed to pick 10,000 marketable pounds of blueberries per acre, suggesting that pickers average 10 pounds an hour working for piece-rate wages of about \$0.85 a pound or \$8.50 an hour when the state's minimum wage was \$8. Blueberries, especially those used for processing, are more amenable to machine harvesting than other berries. However, machines damage more fruit and prices for processing blueberries are significantly lower than fresh market prices. Improvements in mechanical harvesters and a decrease in the gap between fresh and processing blueberry prices would speed the adoption of mechanical blueberry harvesters (Gallardo and Zilberman, 2016).

Most berry workers are not organized into unions. However, Klein Management (Gourmet Trading Company) blueberry workers in McFarland, California, voted 347 to 68 in

Figure 11.1. California Blueberry and Raspberry Acreage, 2006–2018



Source: California County Agricultural Commissioners' Report. Available at: [https://www.nass.usda.gov/Statistics\\_by\\_State/California/Publications/AgComm/index.php](https://www.nass.usda.gov/Statistics_by_State/California/Publications/AgComm/index.php)



favor of representation by the United Farm Workers (UFW) in May 2016 after a brief strike over wages; the Agricultural Labor Relations Board (ALRB) said that 627 workers were eligible to vote. The workers, who were mostly from Oaxaca, Mexico, complained that Klein Management reduced the piece rate from \$0.95 a pound at the beginning of the season to \$0.70 a pound as production increased. The UFW reported a contract with Klein Management covering blueberry workers.<sup>5</sup>

California had 9,700 acres of red raspberries in 2016 that produced 2.1 million hundredweight of raspberries worth \$358 million. California leads the U.S. in the production of fresh red raspberries, while Washington leads in the production of red raspberries for processing.

Raspberries are a perennial crop that can produce for a decade or more, but are commonly replanted on a two- or three-year cycle. Coastal raspberry growers switched in the 1980s from florican spring-bearing varieties to proprietary primocane fall-bearing varieties that thrive, even with inadequate chill, to achieve two harvests a year (Tourte et al., 2016). Most of the raspberries in coastal California are grown under protected structures, typically plastic-covered, high-hoop tunnels. The impacts of this switch are apparent in Table 11.2, which shows that harvested acreage increased by a factor of six between 1985 and 1995, and continued to increase after 1995.

Raspberries are handpicked into 6-ounce plastic clam shells; 12 filled clamshells make a 4.5-pound flat. Piece rates vary, but average \$6.50 per flat or tray, with pickers averaging two to four flats an hour. Yields average 4,750 trays an acre and, at an average grower price of \$15 a tray, revenues are over \$71,000 an acre. Total costs of production for second-year raspberries are \$48,000 an acre, including 80 percent for harvest costs (Tourte, Bolda, and Klonsky, 2016). Net returns can be \$25,000 per acre or more.

Raspberry production expanded into land that was previously pasture and thus had few pathogens and little pest pressure, which facilitated organic production; the limits of such expansion may have been reached. Pre-plant soil fumigation is used within conventional production systems, making organic production more dependent on new acreage.

In 2016, the ALRB found that Premier Raspberries (Dutra Farms) unlawfully required its 800 employees to agree to arbitration of labor disputes, a provision of employee contracts that the ALRB found violated state labor laws giving workers the right to organize and bargain collectively with their employers or refrain from union activities.<sup>6</sup> After a brief strike, Premiere Raspberries workers voted 269 to 236 in favor of UFW representing them in an August 9, 2017 election, and the ALRB certified the UFW October 11, 2017.

6 The ALRB found that a similar arbitration policy at strawberry grower T.T. Miyasaka was unlawful.

5 See: <https://ufw.org/overwhelming-vote-ufw-blueberry-workers-mcfarland-ranch-627-workers/>.

**Table 11.2. California Raspberries, 1985–2015**

	1985	1995	2005	2015
Harvested Acreage (acres)	266	1,627	4,145	10,345
Yield (tons/acre)	4.24	7.02	12.02	10.57
Value of Production (\$1,000)	9,377	63,452	233,756	471,190
Revenue (\$/acre)	35,252	39,000	56,395	45,548

**Table 11.3. California Blackberries, 1985–2015**

	1985	1995	2005	2015
Harvested Acreage (acres)	NA	3	41	2,088
Yield (tons/acre)	NA	NA	2.78	4.72
Value of Production (\$1,000)	NA	17	538	60,768
Revenue (\$/acre)	NA	5,667	13,125	29,103

Source for Tables 11.2 and 11.3: California County Agricultural Commissioners' Report. Available at: <http://bit.ly/34kdTkN>

Premiere Raspberries challenged the certification of the UFW as the bargaining representative of its workers by engaging in a technical refusal to bargain in order to have courts review the ALRB's certification of the UFW as the representative of its workers. However, the ALRB ordered mandatory mediation and conciliation to generate a UFW-Premiere Raspberries collective bargaining agreement. Premiere Raspberries refused to implement the agreement, prompting the UFW to call a strike in September 2018 that involved picketing Well-Pict, which distributes Premiere Raspberries.

California's blackberry acreage has increased rapidly, but most U.S. blackberries are imported from Mexico. A 2013 UC Cooperative Extension cost study includes time for establishment and five production-harvest cycles. Most varieties are florican bearing and produce fruit for six to eight weeks in summer. Growers normally plant several varieties to harvest from mid-June through September.

Harvest labor costs are a significant portion of cash operating costs. The 2013 cost study assumed that pickers receive a seasonal average piece rate of \$4.25 per five-pound tray, with growers adjusting piece rates upward at the beginning and end of the season when yields are lower. Total costs of production for second-year blackberries are estimated to be \$43,000 an acre, including 70 percent for harvest costs (Tourte et al., 2016). Net returns can be \$12,000 per acre or more.

## STRAWBERRIES

California dominates the production of U.S. fresh strawberries, accounting for almost 85 percent of the \$2.7 billion in strawberry cash receipts in 2018 from two-thirds of U.S. strawberry acreage. California's long growing season, high yields, and high quality allow most of the state's strawberries to be sold fresh, increasing the value of California's strawberries.

Table 38 of the 2017 COA reported 8,964 U.S. farms with 60,162 acres of strawberries, including 130 farms that each had 100 or more acres and accounted for two-thirds of total strawberry acreage. The midpoint acreage of strawberry farms was 180 in 2012, meaning that half of strawberry acres were on farms with 180 acres or more and half were on farms with less than 180 acres (MacDonald, Hoppe, and Newton, 2018).

As shown in Figure 11.2, California's strawberry acreage has been declining but, as Table 11.4 shows, production continues to increase because of higher-yielding varieties. California had 34,000 acres of strawberries in 2018, including 4,000 acres of organic strawberries, but production is expected to set new records. Due to the end of methyl bromide fumigation before planting, farmers are planting new varieties that yield more despite pressure from soil-borne diseases.<sup>7</sup>

Plant breeders are developing disease-resistant strawberries, and growers are seeking ways to produce strawberries

<sup>7</sup> Over 80 percent of strawberry acreage is planted in the fall for winter, spring, and summer strawberry harvesting.

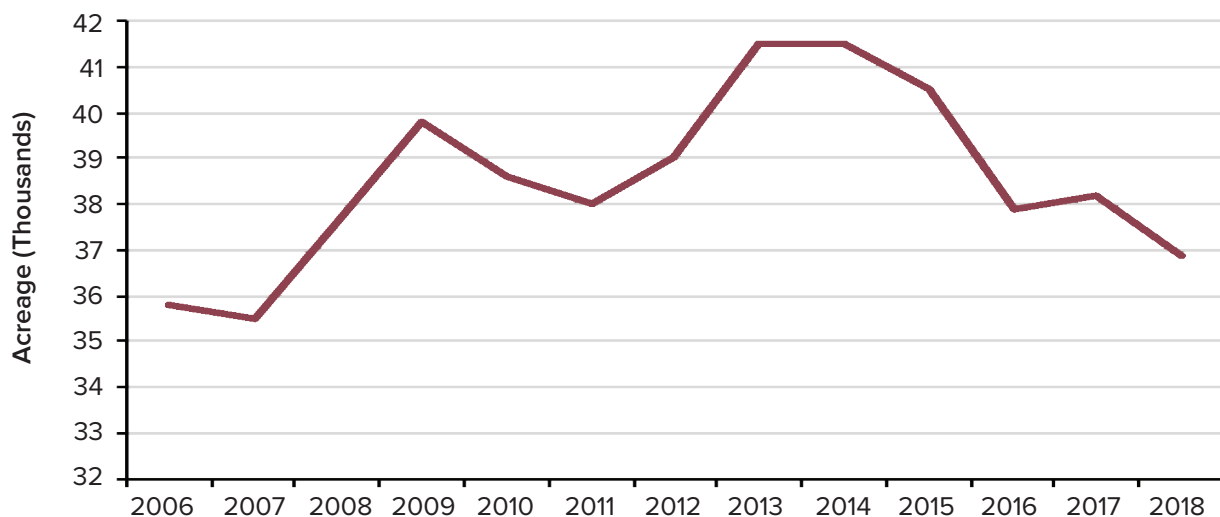
**Table 11.4. California Strawberries, 1985–2015**

	1985	1995	2005	2015
Harvested Acreage (acre)	15,085	18,995	33,928	40,022
Yield (ton/acre)*	22.14	19.90	28.89	32.34
Value of Production (\$1,000)	725,005	890,744	1,405,433	2,442,681
Revenue (\$/acre)	48,061	46,894	41,424	61,033

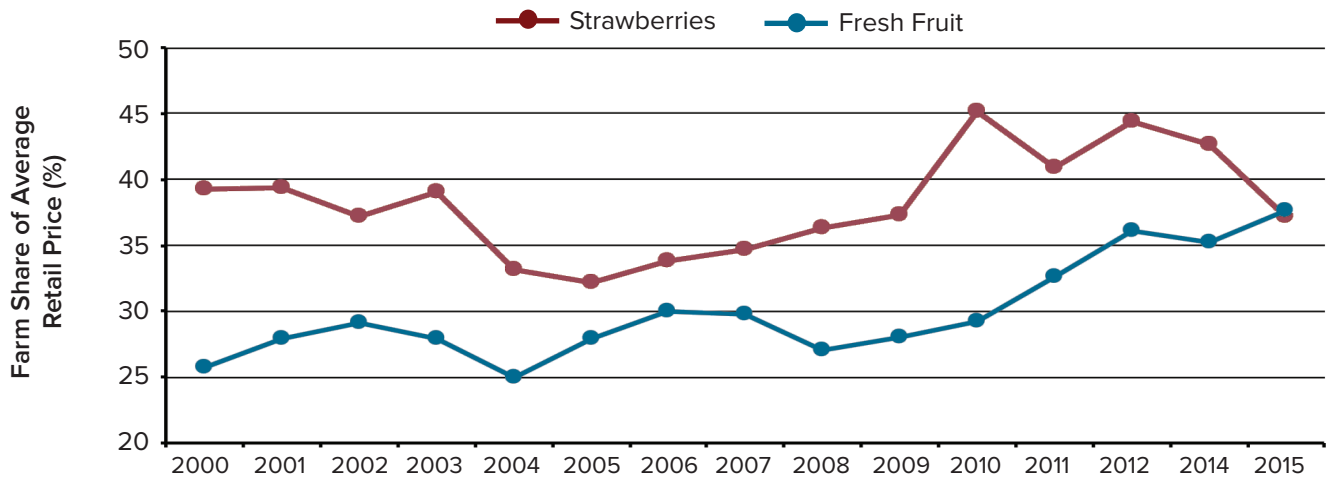
Source: California County Agricultural Commissioners' Report

Note: \*Yield data for fresh market strawberries.

**Figure 11.2. California Strawberry Acreage, 2006–2018**



Source: California County Agricultural Commissioners' Report

**Figure 11.3. Farm to Retail Price Spreads, Fresh Fruit and Strawberries, 2000–2015**

Source: USDA, Economic Research Service. Available at: [www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx](http://www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx)

Note: No data for 2013.

with less hand labor (Holmes, Mansouripour, and Hewavitharana, 2020).

Four firms, led by Driscoll's, market most fresh strawberries.<sup>8</sup> Driscoll's is also the dominant marketer of raspberries, accounting for 90 percent of U.S. raspberry sales from farms in California and Mexico.<sup>9</sup> Naturipe Farms is the leading U.S. marketer of blueberries, and also markets other berries. Both Driscoll's and Naturipe market blackberries from Central Mexico.

Figure 11.3 shows that farmers receive an average of 38 percent of the retail price of strawberries, more than the average 30 percent farm share of the retail price of fresh fruit. Apple and grape growers receive about 25 percent of the average retail price of these commodities, and fresh orange growers receive an average of 16 percent of the retail price. Note that the farm share of retail fresh fruit prices rose in recent years, while the farm share of strawberry prices fell to 37–38 percent in 2015.

<sup>8</sup> Driscoll's markets about a third of U.S. fresh berries, and two-thirds of organic fresh berries.

<sup>9</sup> Goodyear (2017) reported that Driscoll's controlled a third of U.S. strawberry sales. The Reiter family reportedly owns 70 percent of Driscoll's, and Reiter Farming provides a third of the Driscoll's berries.

## VARIETIES AND FUMIGATION

The University of California's Public Strawberry Breeding Program developed many of the major strawberry varieties planted in California fields. The diffusion of the program's 30 patented varieties, including Albion, the most widely planted strawberry, helped to raise average yields from 6 tons an acre in the 1950s to over 30 tons an acre today. UC-developed varieties are planted on about 60 percent of the state's acreage, and proprietary varieties on 40 percent. UC licenses its strawberry patents to nurseries and received about \$7 million in revenue from its strawberry patents in 2015.

Between the 1960s and 2016, strawberries were often planted on land that was covered first with plastic and injected with 300 to 400 pounds of methyl bromide per acre to fumigate the soil. This practice killed plant pathogens, nematodes, weeds, and soil-borne pests, which raised strawberry yields (Tourte et al., 2016).<sup>10</sup> By fumigating the soil before planting, strawberries could be grown on the same land year-after-year, allowing yields to rise to 30 tons an acre by 2010; yields of organic strawberries are much lower—15 to 17 tons an acre.

Methyl bromide depletes the ozone layer that protects the earth. And the Montreal Protocol called for an end

<sup>10</sup> Chloropicrin, first applied in the 1950s, was often mixed with methyl bromide to fumigate the soil.



to methyl bromide use by 2005. Because technically and economically viable alternatives were not easily found, the strawberry industry was able to receive critical-use exemptions that allowed continued use of methyl bromide until 2016. Methyl bromide has been replaced by chloropicrin and/or 1,3-dichloropropene to fumigate soil used for conventional strawberries, but these chemicals are not as effective as methyl bromide. Some diseases have re-emerged, prompting experiments with non-fumigant alternatives such as steam, anaerobic soil disinfestation (ASD), and crop rotations.

Soil fumigation is regulated by federal, state, and local (county) governments. Many strawberries are grown in densely populated areas, prompting increasingly stringent buffer zones for preplant soil fumigation (Goodhue, Schweisguth, and Klonsky, 2016). Soil fumigations cannot be conducted within one-eighth of a mile of a school, and applicators are required to notify nearby property owners and post warnings on the fumigated acreage. Growers can sometimes reduce buffer zones by dividing a field into multiple application blocks.

## LABOR AND WAGES

Strawberries are likely the most labor-intensive crop in California, involving about 1.5 workers per acre and 50,000 to 60,000 workers statewide, mostly to harvest strawberry fields twice a week. The strawberry harvest begins in the southern part of the state and moves north. From January through March, Florida also supplies strawberries. Most strawberry growers are specialized, but some Salinas vegetable growers have added strawberries. This contributes to the \$725 million value of strawberries in Monterey County in 2016, which is second only to lettuce (\$1.3 billion) in value.

Strawberries are soft fruits that are susceptible to damage in handling, and a strawberry field may be picked 40 to 50 times a season. Labor represents 60 percent of strawberry production costs (Tourte et al., 2016), prompting efforts to make hand harvesters more productive. Many growers place slow-moving conveyor belts in front of workers so that they can place full flats of berries on the belt. This practice eliminates the need for workers to walk full flats to the end of the row to receive credit for their work, thus giving them more time to pick. To harvest strawberries,

workers push a light wheelbarrow containing the plastic clamshells in which strawberries are sold while they pick from two adjacent elevated rows.

Two major wage systems are used to pay berry workers: hourly wages and piece rates. Most farm jobs pay hourly wages, but most berries are picked for piece rate or incentive wages. Piece-rate earnings are the product of the rate per unit of work accomplished times the number of units completed, such as \$2 for picking a flat of strawberries times six trays an hour or 48 trays a day, yielding \$12 an hour or \$96 a day. Piece-rate wages keep grower costs constant regardless of variation in worker productivity, unless growers elect to keep low-productivity workers and make up their earnings to the minimum wage. Most workers are paid piece-rate wages, such as \$1.75 a tray or flat, with a guarantee of at least the minimum wage (\$12 an hour in 2019). Some growers offer workers an hourly wage of \$5 an hour and a piece rate of \$1.10 a flat that has 12 twelve-ounce pints or 8 one-pound clamshells. Workers typically pick five to seven flats an hour, earning more than the minimum wage. Piece rates are lower in fields with conveyor belts that serve up to 60 pickers because workers can pick faster.

The combination of the government-set minimum wages and employer-set piece rates creates minimum productivity standards, or the number of trays workers must pick per hour or day to earn the minimum wage. Employers must “make up” the earnings of slow pickers so that they receive at least the minimum wage or terminate slow pickers. In 2014, when the state’s minimum wage was \$9 an hour and the Adverse Effect Wage Rate for H-2A guest workers was \$11 an hour, surveys found two major wage systems: \$5 an hour plus \$1.10 a tray, and \$1.70 a tray. Figure 11.4 shows that workers who were paid only a per-tray piece rate had to pick more trays per hour than those who were paid a combination per hour and per tray piece rate.

Many of the workers who harvest strawberries are limited-Spanish speakers from southern Mexican states such as Oaxaca and Chiapas. There are often several members of a family and their relatives in a crew, so that strawberry crews are more diverse than the solo male work crews that dominate the harvest of tree fruits, meaning there is more variance in productivity among strawberry harvesters.

**Table 11.5. California Strawberry and Other Berries, 2006–2018**

	Average Employment		Total Wages (\$1,000)		Average Weekly Pay (\$)	
	Strawberries	Other Berries	Strawberries	Other Berries	Strawberries	Other Berries
2006	21,622	3,059	411,165	69,508	366	437
2007	23,652	3,488	483,831	77,893	393	429
2008	26,165	4,060	531,696	92,377	391	438
2009	27,211	4,441	553,971	95,777	392	415
2010	26,934	5,275	568,954	122,525	406	447
2011	27,088	6,103	595,540	142,953	423	450
2012	27,073	6,981	650,248	176,023	462	485
2013	26,727	8,876	666,975	234,274	480	508
2014	25,939	9,719	698,466	265,284	518	525
2015	25,975	10,618	716,825	289,569	531	524
2016	25,501	10,942	780,319	285,017	588	501
2017	25,376	10,241	780,506	275,926	591	518
2018	24,897	10,018	782,029	291,150	604	559
Percent Change Over Time						
2006–18	15	227	90	319	65	28
2006–12	25	128	58	153	26	11
2011–18	–8	44	20	65	31	15

Source: U.S. Department of Labor, Bureau of Labor Statistics, QCEW. Available at: [www.bls.gov/cew](http://www.bls.gov/cew)

Most strawberry harvesters are hired directly by farmers rather than brought to farms by contractors, and many farmers keep older and slower workers on their payrolls in order to retain their younger and faster relatives.

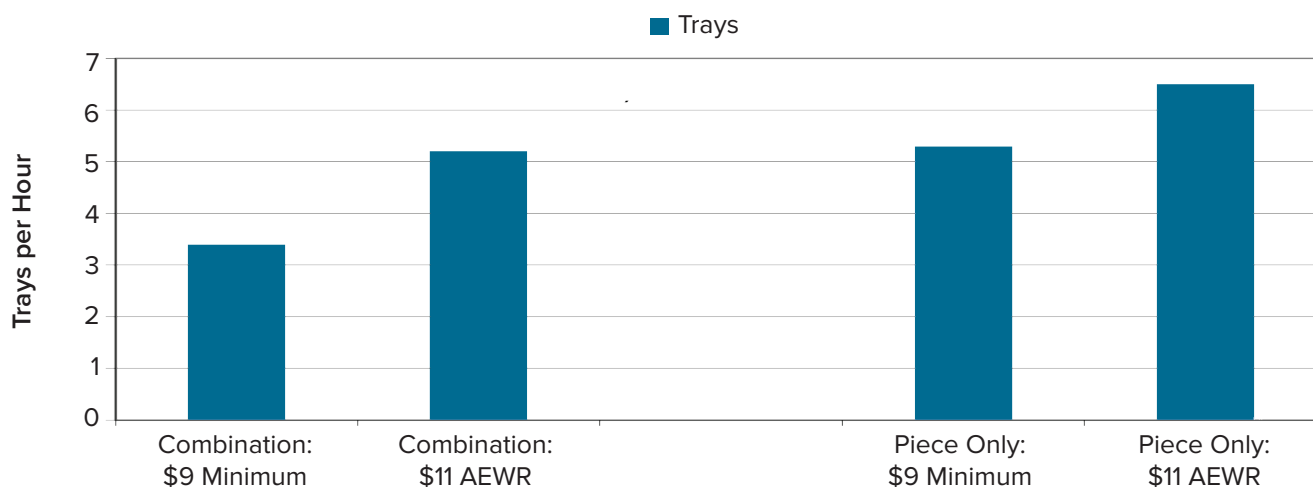
The strawberry labor market is “fluid,” with workers often changing employers. Some workers monitor yields to determine where they are most likely to maximize their piece-rate earnings, and seek jobs at the best fields. In the past, some growers refused to rehire workers who quit during the season and went elsewhere, but since the slowdown in unauthorized Mexico-U.S. migration after the 2008–2009 recession, few growers maintain no-rehire-during-the-season policies.

Strawberry harvesting crews typically include 60 workers, and the key figure is the crew supervisor who is responsible for ensuring that the crews include 50 to 60 workers. Crew supervisors are responsible for recruiting additional workers to replace those who move to other farms.

The arrival of fewer unauthorized newcomers from Mexico has prompted many growers to use the H-2A program to employ legal Mexican guest workers. Many of these H-2A workers are provided by Fresh Harvest, a labor contractor based in the Imperial Valley that is the state’s largest employer of guest workers.<sup>11</sup> Perhaps half of the Salinas-Watsonville strawberries were picked by H-2A workers in 2017. Berries were the most common type of job filled by H-2A workers in FY19, accounting for 10 percent of the 258,000 farm jobs certified to be filled with guest workers.

The combination of fewer unauthorized newcomers and more H-2A guest workers, who must be paid an Adverse Effect Wage Rate that is higher than the state’s minimum wage (\$13.92 in 2019 when the state’s minimum wage was \$12 an hour), has put upward pressure on earnings. Average employment in California’s strawberry industry (NAICS 111333) rose from 21,600 to 25,000 between 2006 and 2018—up 15 percent. However, as Table 11.5 shows,

11 See <http://freshharvestusa.com/>

**Figure 11.4. Minimum Productivity Standards to Pick Strawberries, 2014**

Source: U.S. Department of Labor. Available at: <https://www.dol.gov/agencies/eta/foreign-labor/performance>

average strawberry employment rose 25 percent between 2006 and 2012, and has since fallen. Other berry employment (blackberries, blueberries, and raspberries) rose much faster, up 227 percent over the decade and, as with strawberries, rose faster between 2006 and 2012 than between 2012 and 2018. There were seven full-time equivalent strawberry jobs for each other berry job in 2006, but only 2.5 in 2018, demonstrating the rapid growth in other berry employment.

Total wages paid to berry workers were almost \$1.1 billion in 2018, including 73 percent paid to strawberry workers. The strawberry share of total wages has been falling. These employment and earnings data are from 12 monthly snapshots, as employers report employment and earnings for the pay period that includes the 12th of each month. Most berry workers are not employed the entire year, so their annual earnings are less than what a full-year worker would earn. Unpublished data from the Employment Development Department for 2015 found 38,800 workers who were primarily employed in strawberry farming, meaning their highest earnings were from strawberry establishments (Martin, Hooker, and Stockton, 2017). They earned a total of \$690 million in 2015 or an average of \$17,850. However, for workers who had only a job in strawberries in 2017, average earnings were \$23,800, reflecting year-round workers, managers, and supervisors.

There were 16,150 who were primarily employed in "other berries" in 2015. They earned a total of \$270 million or an average of \$16,700. However, workers employed only in "other berries" earned an average \$9,150, suggesting that there were many workers employed only short periods in "other berries." It should be noted that there are no data on the commodity of workers brought to farms by labor contractors. There were 294,000 workers who had their highest earnings with labor contractors in 2015, and they earned an average \$9,900, the lowest of any category.

Several efforts are underway to mechanize strawberry harvesting, which is difficult because the fruit is soft and fields must be re-picked repeatedly during the season. The \$100,000 Spanish Agrobot has 16 mechanical arms to pick strawberries and place them on a conveyor belt as it moves down rows with hardened sides that guide the machine and pick the berries growing over the hard sides. Another version of the Agrobot will have 60 arms to harvest strawberries grown on raised, hydroponic beds instead of low, dirt fields. The British-based Autonomous Strawberry Harvesting and Management Robot (AUTOPIC) project aims to develop a robotic picker to harvest soft fruit on a 24/7 basis.<sup>12</sup>

<sup>12</sup> See <https://www.ictagrifood.eu/>

## SHARECROPPING

Strawberries may be the only major California commodity in which the majority of growers are Hispanic, in part a legacy of sharecropping.<sup>13</sup> Some strawberry marketers made contracts with farmers who planted strawberries on leased land, received technical help while plants grew, and harvested and delivered the crop to the marketer, who deducted any loans advanced to the farmer and marketing costs. If yields and prices were high, the sharecropper farmer made a profit; if not, sharecroppers could lose money because marketers were repaid for their loans and costs before forwarding the balance to growers.

A federal suit filed in 1975, *Real v. Driscoll's Strawberry Associates (DSA)* alleged that 15 sharecropper farmers were employees of Driscoll's. The farmers sought payment of the minimum wage from DSA, which prepared the land, provided the plants and irrigation equipment, and monitored the development of the berries. Sharecropper farmers harvested the berries, delivered them to Driscoll's, and received the "net proceeds" after deductions for pre-harvest loans and marketing costs. A federal district court dismissed the farmers' claim but, after the U.S. Court of Appeals for the 9th Circuit overruled that decision and allowed the minimum-wage case to proceed, DSA settled with the 15 farmers in 1981.<sup>14</sup>

Cucumber sharecroppers near Gilroy made similar arguments, asserting that they were employees entitled to workers compensation despite contracts identifying them as independent contractors. This *S.G. Borello* case went to the California Supreme Court, which in 1989 declared that the "sharefarmers" were employees.<sup>15</sup> The Supreme Court

laid out a six-factor test to distinguish employees from independent contractors:

- (1) who controls the work,
- (2) what is the farmer's opportunity for profit or loss,
- (3) what investment does the farmer make in equipment,
- (4) what skills are required of the farmer,
- (5) how permanent is the relationship between farmer and marketer, and
- (6) is the farmer's service integral to the marketer's business?

The *Real* and *Borello* cases reduced strawberry sharecropping. One legacy is the hundreds of relatively small growers, often ex-harvesters, who sign contracts with berry marketers to raise patented plants, harvest the berries, and deliver them to the marketer. Marketers no longer advance funds, but other entities may make loans that are repaid when the berries are sold. The practical problem for a small grower with 5 or 10 acres is that when yields are low and berries are sold at low prices, checks from marketers may not provide sufficient funds to pay the 10 to 20 workers needed to harvest the berries. Despite these challenges, many harvesters want to become small growers, and some have become successful large berry growers.

## UNIONIZATION AND CERTIFICATION

Workers at VCNM Farms, which marketed its berries through Well-Pict, voted to be represented by the UFW in August 1995. Before a contract was negotiated, VCNM destroyed its remaining crop and went out of business, an action deemed unlawful by the ALRB. VCNM paid \$113,000 to the displaced workers in March 1996.<sup>16</sup>

Since much of the land used to grow strawberries is leased, and many strawberry farms are partnerships that may be reconstituted from year-to-year, the UFW concluded that it would have to organize the entire strawberry industry rather than individual farms. The UFW in April 1996 announced a "Five Cents for Fairness" campaign to raise then-prevailing strawberry piece rates of \$1.20 per flat or

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13 There are no official data, but industry observers say that 55 percent of strawberry growers (not acreage) are Hispanic, 25 percent are of Japanese ancestry, and 20 percent are non-Hispanic white. Before World War II, Japanese farmers grew more than 90 percent of California's strawberries, but plant and soil diseases and the internment of Japanese during WWII took many out of the industry.

14 See <https://openjurist.org/603/f2d/748/ca-79-3000-real-v-driscoll-strawberry-associates-inc-d-j>.

15 See <https://bit.ly/2lvdpjY>.

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16 Stuart Silverstein, "The Strawberry Jam: Dispute Between Growers and Farm Workers Heats Up," *Los Angeles Times*, December 27, 1996. [http://articles.latimes.com/1996-12-27/business/fi-12876\\_1\\_strawberry-growers](http://articles.latimes.com/1996-12-27/business/fi-12876_1_strawberry-growers).



\$5 an hour and \$0.10 per 12-pint, 12-ounce flat.<sup>17</sup> The UFW noted that a worker picking 10 flats an hour earned \$6 per hour when the state's minimum wage was \$4.75.

Increasing the piece rate by five cents a pint would have raised the piece rate from \$1.20 to \$1.80, a 33 percent wage increase. If workers maintained a 10-flat an hour picking rate, average worker earnings would have raised to \$10.80 an hour, more than twice the minimum wage in 1995.

The UFW deployed 40 full-time organizers in summer 1996 to organize 15,000 workers employed on 270 strawberry farms in the Salinas-Watsonville area. The UFW called strawberries "La Fruta del Diablo" (the fruit of the devil) because of the stooping required to pick them. The UFW's effort in strawberries drew support from the AFL-CIO and national media attention, and opposition from the Strawberry Workers & Farmers Alliance.

The UFW's organizing campaign failed to achieve election victories and union contracts despite union-friendly investors purchasing the largest strawberry grower, Coastal Berry, which did not oppose efforts to unionize its 1,000 workers.<sup>18</sup> Coastal Berry workers in summer 1997 complained of "harassment" by UFW organizers, and an August 1998 election saw the UFW lose to the local Coastal Berry Farm Workers Committee, 410 to 523. There were several more elections, and the UFW lost the June 3-4, 1999 election to the Committee on a 598 to 688 vote.<sup>19</sup>

Coastal Berry had operations in Northern and Southern California, and the UFW won 311 to 266 in Oxnard, while losing 268 to 416 in Watsonville. The ALRB allowed Coastal Berry's Northern and Southern California farms to be considered separate bargaining units, and recognized the UFW as the bargaining agent for Coastal Berry's southern workers and the Committee for Coastal Berry's northern workers. The UFW eventually won the right to represent all Coastal Berry workers and Coastal Berry was sold to Dole in 2004; Dole stopped berry farming in 2017. The UFW had one strawberry contract in 2018, with Swanton Berry.

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17 Many strawberries are picked into flats or trays that contain 12 dry pints each weighing 12 ounces, or a total of 144 ounces or 9 pounds of strawberries; full trays weigh 10.5 to 11 pounds, including the weight of the tray. Some strawberries are picked into one-pound clamshells.

18 See <https://migration.ucdavis.edu/rmn/more.php?id=210>.

19 See <https://migration.ucdavis.edu/rmn/more.php?id=383>.

Instead of union contracts, some berry farms have been certified as in compliance with farm labor protocols aimed at protecting farm workers. The Equitable Food Initiative (EFI),<sup>20</sup> launched in 2012 by Oxfam America and the United Farm Workers (UFW) union with the support of Costco, has standards covering labor protections, food safety, and environmental sustainability. EFI's labor standards call for full compliance with federal, state, and local labor laws, and go beyond labor laws to require farm workers to be "trained in their rights and responsibilities, educated about the standards and constructive methods of communicating with their employers, and afforded opportunities for professional development."

The EFI facilitates worker involvement through "an authorized worker liaison team or through traditional labor union representation." Workers are paid while they are being trained, both men and women are on liaison teams, and collective bargaining agreements take precedence over EFI standards if their provisions exceed EFI standards (Martin, 2016). Trained supervisors and workers, the multi-stakeholder teams at the heart of EFI, extend their knowledge to the farm's entire workforce to ensure compliance. Costco rewards certified growers with preferential access to its buyers.

The EFI aims to reassure consumers that their food is safe and was picked by workers who were treated well; EFI notes that hundreds of workers trained to identify food-safety issues are better than government inspectors or third-party auditors who visit farms periodically. Several Andrew & Williamson's strawberry farms in California have been certified, as well as berry and vegetable operations in Mexico.

EFI aims to be a one-stop shop for growers seeking certification of their compliance with labor, food safety, and sustainability protocols, but being certified by EFI does not exempt farms from inspections by government agencies that enforce labor, food safety, and environmental laws. EFI staff are supported by foundation grants to publicize the program, train leadership teams on farms, and work with growers and buyers.

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20 See [www.equitablefood.org](http://www.equitablefood.org).



The effects of EFI on farm worker earnings, productivity, and turnover have not been evaluated. Some anecdotal evidence suggests that certified growers believe that worker turnover has decreased in response to higher pay, worker feelings of belonging to an organization that cares about them, and end-of-season bonuses (Martin, 2016).

## TRADE

In 2017, the U.S. supply of fresh strawberries was 3 billion pounds, including 367 million pounds or 12 percent imports.<sup>21</sup> U.S. consumption was 2.7 billion pounds or 8.3 pounds per person, and 290 million pounds of U.S. strawberries were exported, almost all to Canada. The U.S. is a net importer of fresh strawberries, most of which are from Mexico.

Mexico had 28,000 acres of strawberries in 2018, double the acreage of a decade earlier, with strawberry production concentrated in Michoacán (60 percent of Mexican production), Guanajuato, and Baja California; Irapuato, calls itself “Mexico’s strawberry capital.” There are 150,000 workers employed in Mexico’s berry sector, which also includes blackberries,<sup>22</sup> blueberries, and raspberries, most of which are exported to the United States.

Over 85 percent of Mexico’s fresh berries are exported, and Mexico’s export-oriented berry industry continues to expand with the help of U.S. and Chilean partners, producing berries worth almost \$1.3 billion in 2017.<sup>23</sup> Florida strawberry growers, who compete most directly with Mexican producers, experience variable weather that can

lead to fluctuations in supply and grower prices. Some Florida growers blame imports from Mexico for variable prices, but Mexican exporters counter that Florida produces mostly conventional rather than organic strawberries, and sells most of its berries east of the Mississippi River, limiting competition with Mexican berries sold in the western states.

Mexico is the source of about half of U.S. fruit imports and three-fourths of its vegetable imports; fruits and vegetables were 54 percent of the \$23 billion in agricultural imports from Mexico in 2016. The U.S. exported farm commodities to Mexico worth \$18 billion, meaning that the U.S. had an agricultural trade deficit with Mexico.

Mexico produced about 850,000 metric tons of berries in 2016, including 55 percent strawberries, 29 percent blackberries, and 13 percent raspberries (Cook, 2017). One-third of Mexican strawberries and almost all of its raspberries and blackberries are exported to the United States. Chile, Canada, and Peru are the leading sources of imported blueberries, but Mexican blueberry exports are expanding rapidly, especially during the early spring period.

The import share of berries varies, but Mexico supplies almost all imports of strawberries (100 percent of imports), raspberries (98 percent), and blackberries (95 percent). The growth in strawberry imports from Mexico has led to a stabilization of strawberry production in Florida. By contrast, the availability of Mexican raspberries appears to have enlarged the U.S. market, much as the availability of Mexican avocados expanded U.S. avocado consumption.

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21 An additional 494 million pounds of strawberries were frozen in 2016 and, with 384 million pounds of frozen strawberry imports plus 236 million pounds of beginning stocks, the supply of frozen strawberries was a billion pounds. (ERA FTS 364. Table 11).

22 Mexico’s 10,000 hectares of blackberries produced about 30 percent of the world’s crop in 2016. <http://www.freshplaza.com/article/156566/Mexico-Blackberries-will-continue-to-grow-throughout-the-world>.

23 Robbie Whelan, “Mexico’s Berry Bounty Fuels U.S. Trade Dispute,” *Wall Street Journal*, October 7, 2017. The WSJ reported a total 88,000 acres of berries in Mexico, and quoted a Georgia blackberry grower who complained that Mexico was selling 12 six-ounce clamshells for \$10 when his cost of production was \$12 for a flat, citing his labor costs of \$200 a day as the reason for higher U.S. costs. Few U.S. harvest workers average \$200 a day; \$100 a day is far more typical.

## CONCLUSION

California has a vibrant fresh berry industry that accounts for 7 percent of the state's farm sales from less than 1 percent of the state's irrigated crop land. High-value fresh berries are capital-intensive and risky. Berry marketers are the key players, developing proprietary varieties that are leased to growers, providing advice to growers, and marketing the berries. Most marketers source berries from around the U.S. and abroad so that they can supply fresh berries year-round to the shrinking number of super-market chains and food-service buyers.

Fresh berries are among the most labor-intensive and risky commodities produced in California. Currently, harvest costs account for 50 to 70 percent of total production costs. By 2022, the minimum wage will raise to \$15 an hour. This effect is amplified in agriculture due to overtime laws that require growers to pay 1.5 times the usual wages after eight hours or 40 hours a week. Growers who face a minimum wage of \$15 an hour in 2022 are looking for ways to make workers more productive, as with conveyor belts in fields that reduce walking. Further ahead, some growers hope to harvest strawberries by machine, while others hope that blueberry harvesting machines will improve to allow harvesting fruit for the fresh market.

Berry growers today face the challenge of finding sufficient harvesters at a time of reduced Mexico to U.S. migration. Picking berries seasonally is often a first U.S. job for Mexican-born workers from rural areas with little education, and fewer are arriving as the Mexico-U.S. border becomes more difficult to cross illegally. Some strawberry growers are turning to the H-2A guest worker program, which allows them to employ legal guest workers from Mexico. They face the challenge of finding housing for guest workers in coastal areas with high housing costs and restrictive regulations that reduce the ability to build more.

Trade poses challenges and opportunities for California's berry industry. Rising incomes abroad increase the demand for California berries, while free-trade agreements and improved varieties and technologies that are transferred abroad facilitate imports from countries with lower wages. Mexico's export-oriented berry industry is expanding rapidly, and berries that once complemented California

production are increasingly competing with the state's berries. Direct competition between California and Mexico is likely to increase as Mexico expands production under protected culture structures that reduce risks and increase yields, and will likely first affect Southern California berry operations.

California's fresh berry industry has expanded rapidly, and overcome the challenge of losing access to the most common soil fumigant after a half century. Labor and pests are the top challenges facing the industry. New varieties continue to be developed in response to disease, labor, and other challenges. The berry industry's past successes in overcoming barriers to producing high-quality fresh fruit suggest that berry growers will be able to overcome today's disease, labor, and water challenges.

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