Chapter 4. Immigration and Farm Labor: Challenges and Opportunities

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Abstract

Hired workers do most of the work on U.S. farms, three-fourths were born abroad, and about half are unauthorized. Hired farm workers are most closely associated with the production of fruits and vegetables, and most are employed on 10,000 large farms across the United States. Farm employers are adjusting to the slowdown in Mexico-U.S. migration with the 4-S strategies of satisfying current workers to retain them, stretching them by providing them with productivity-increasing aids, substituting machines for workers, and supplementing current workers with H-2A guest workers. Immigration policy is the major determinant of which 4-S strategy will dominate.

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Many of California's fruit and vegetable crops are labor-intensive, requiring a steady farmworker labor force.

Photo Credit: Rachael Goodhue, UC Davis

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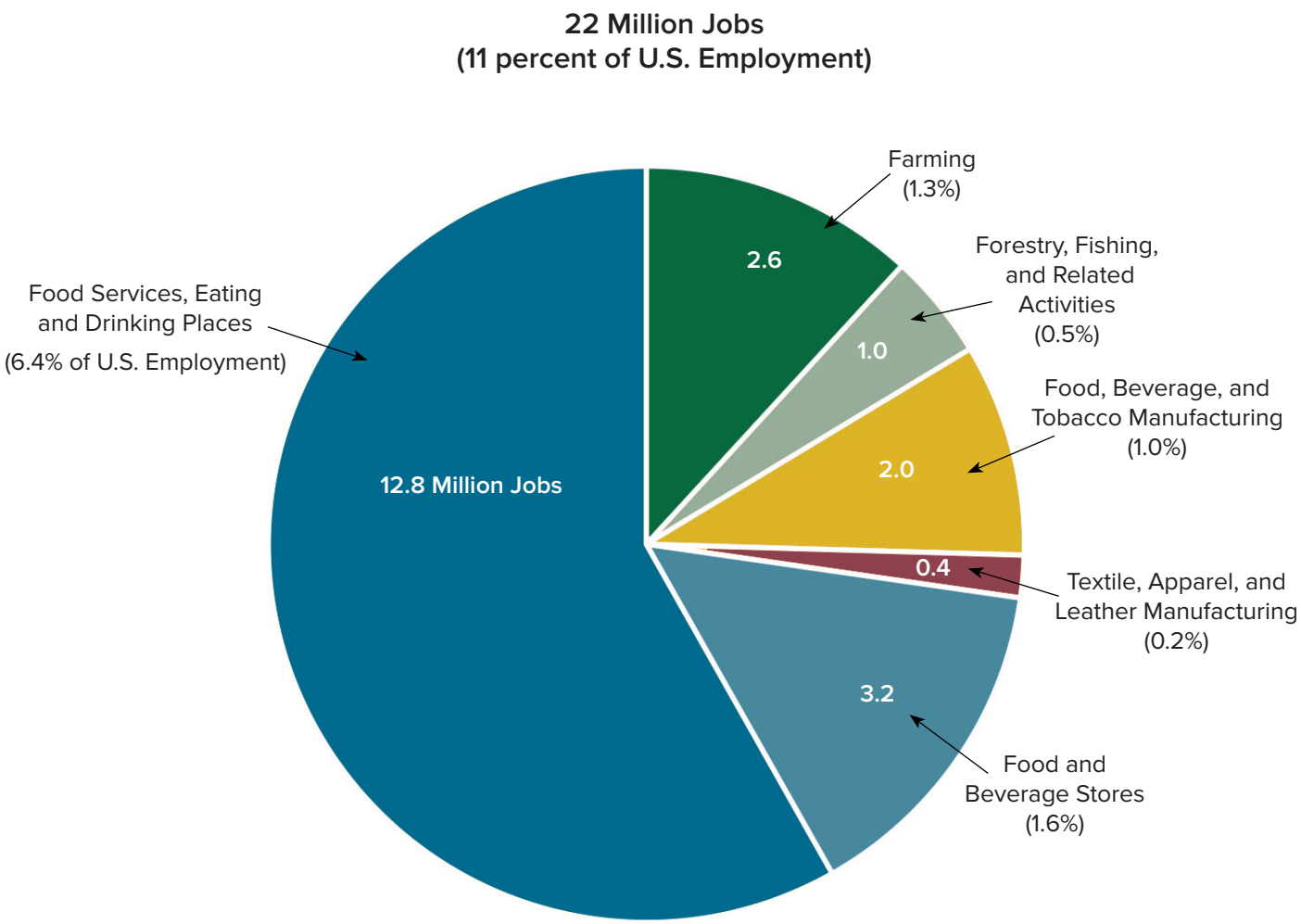
Fruit and Vegetable Agriculture

Agriculture is the production of food and fiber on farms, and serves as the keystone of the larger food system that includes input industries such as seed, fertilizer, and equipment firms, as well as the output sector that packs, processes, and distributes food and fiber to consumers in the U.S. and abroad via grocery stores and restaurants. Relatively few food-system jobs are on farms, about a sixth, while two-thirds are in food services and restaurants.

Food-system jobs are shifting from farming and food manufacturing to services that distribute, prepare, and serve food (Figure 4.1). The average number of jobs for hired workers on farms has been relatively stable at about 1.3 million over the past several decades, as the expansion of labor-intensive commodities such as strawberries creates new jobs to replace those lost as labor-saving mechanization eliminates jobs in commodities such as raisin grapes. Some jobs that nonfarm workers previously did in packing houses, farm workers now perform in the field, such as the preparation of lettuce and melons for the market.

Figure 4.1. U.S. Employment* in Agriculture and Related Activities, 2018



Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of Economic Analysis. Available at: https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy.aspx

Note: *Full- and part-time jobs.

Table 4.1. U.S. Average Agricultural Employment (Thousands)

	2006	2016	2026	2006–2016	2016–2026
Sector	Thousands of Workers			Percent Change	
Ag Wage and Salary	1,219	1,501	1,518	23	1
Ag Self-Employed	893	850	828	-5	-3
Total Ag	2,112	2,351	2,346	11	0
Hired Share of Total Employment	58%	64%	65%		

Source: U.S. Bureau of Labor Statistics, Table 1. Available at: https://www.bls.gov/opub/mlr/2017/article/projections-overview-and-highlights-2016-26.htm
Note: BLS projections based on CPS; agricultural sector, including forestry, fishing, and logging.

The U.S. Department of Labor projects stable farm employment. Hired workers did almost two-thirds of U.S. farm work in 2016, that is, wage and salary workers were two-thirds of average employment, reflecting the fact that many farmers also have nonfarm jobs. The number of farmers and unpaid family members has been falling, while average farm worker employment is rising slightly, so that the share of hired workers in agricultural employment is rising (Table 4.1).

Three Farming Systems

The major farm labor issue is seasonality: agriculture's biological production process requires more workers at some times of the year than others. There are many seasonal jobs, from teaching to professional sports, and most offer some type of monetary or other benefits to compensate for seasonality. Seasonal farm jobs are unusual because they offer few monetary or other benefits to compensate for the fact that seasonal workers are employed less than full time in agriculture; that is, farmers expect workers to be available when they are needed to work at the minimum wage or slightly more.

The U.S. developed three major types of farms, and each obtained workers to meet seasonal labor demands in a different way. Diversified family farms in the northeastern and midwestern states relied on large farm families and an occasional hired hand to produce crops and livestock, and family farms became fewer and larger as labor-saving technology spread and more family members worked off the farm.

In the southeastern states, plantations relied on slaves to produce non-perishable and long-season cotton and tobacco for export to Europe. Most plantations had at least 400 acres and 20 slaves, and the price of slaves fluctuated with the prices of the commodities they helped to produce.[1] Slaves were replaced by sharecroppers until cotton harvesting machines in the 1940s and 1950s prompted the migration of many sharecroppers to northern and midwestern cities.

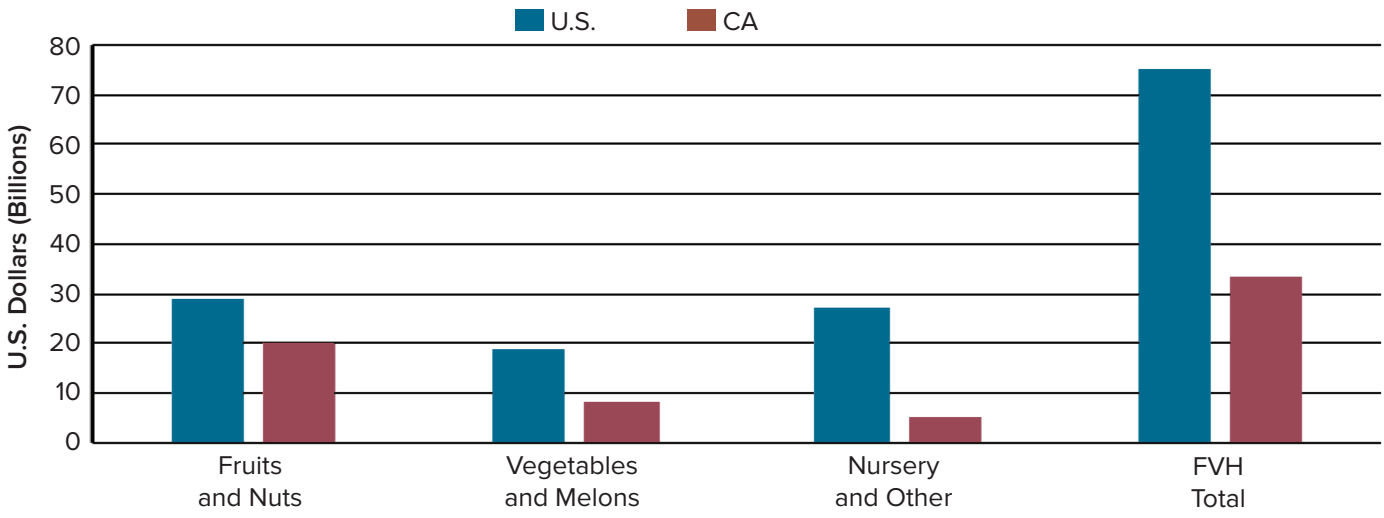
In western states such as California, first the Spanish and later the Mexican government made large land grants of 50,000 acres or more to individuals for cattle grazing and dryland wheat farming.[2] California became a state in 1850, and after the transcontinental railroad in 1869 lowered transportation costs and interest rates, fruit production became more profitable than cattle and wheat. California in the 1870s was expected to become an Iowa of family fruit farms, relying on large families to meet peak seasonal labor demands.

Large ranchos were not broken up into family farms for two interconnected reasons. First, Chinese workers who had been imported to help build the transcontinental railroad were laid off, driven out of San Francisco and other cities, and became seasonal farm workers who "came with the wind and went with the dust"—that is, they were paid only when they worked. Second, the low wages paid to Chinese workers were capitalized or incorporated into the price of farm land, giving California some of the most expensive U.S. farm land despite its distance from most

1 For more details on these farming systems, see Martin, 2003 (Chapter 2).

2 Dryland wheat farming meant planting in the fall and, if there was sufficient rain, harvesting in the spring.

Figure 4.2. U.S. and California Fruit, Vegetable, and Horticultural (FVH) Sales, 2018



Source: USDA, Economic Research Service. Available at: http://www.ers.usda.gov/

consumers.[3] Families who did their own work had to pay high prices to buy farm land but earned the equivalent of the low wages paid to Chinese workers, explaining why few family farms developed (Fuller, 1991).

The Chinese Exclusion Act of 1882 suspended Chinese immigration, but Japan legalized emigration in 1885, and Japanese newcomers soon replaced the Chinese as the core of the seasonal farm work force. They were followed by Punjabis and other South Asians early in the 20th century, Mexicans during World War I, Filipinos in the 1920s, Dust Bowl migrants in the 1930s, and Mexicans since. These waves of immigrants made it unnecessary to break up the large farms that developed from land grants and entrepreneurs who assembled large farms,[4] resulting in a system of factories in the fields that rely on hired workers born elsewhere.

FVH Commodities

California looms large in farm labor discussions because the state produces many labor-intensive fruits and vegetables. There are two major agricultural sectors, crops and animal products, and each accounted for about half of U.S. farm sales of $372 billion in 2018, when crops were worth $196 billion and animal products $176 billion.

Many U.S. states mirror this 50–50 split between crop and livestock agriculture,[5] but not California, a state where crops predominate. California has been the leading farm state since 1950 because of its production of high-value fruit and vegetable crops. California's farm sales of $50 billion in 2018 included $39 billion worth of crops and $11 billion worth of animal products.

The U.S. produced about $64 billion worth of fruits and nuts, vegetables and melons, and other horticultural crops, including nursery crops and flowers in 2017 (Figure 4.2). These so-called FVH crops included $29 billion worth of fruits and nuts, $20 billion worth of vegetables and melons, and $16 billion worth of other horticultural crops. California produced $31 billion worth of FVH crops in 2017, including $20 billion worth of fruits and nuts, $8 billion worth of vegetables and melons, and $3 billion worth of other horticultural crops; that is, California accounted for 68 percent of the value of U.S. fruits and nuts, 42 percent of vegetables and melons, and 18 percent of other horticultural crops.

3 In 1888, for example, California orchard land was worth $200 to $300 an acre, while land used to produce wheat was worth $25 to $50 an acre. Fruit generated more revenue per acre, but also had higher production costs.

4 The Tejon Ranch (http://tejonranch.com) in the southern San Joaquin Valley, with 270,000 acres that were originally four Mexican land grants, is an example of a large farm that has persisted.

5 For example, in the state second to California in farm sales, Iowa, farm sales of $31 billion were divided 55:45 percent between crops and animal products in the 2012 Census of Agriculture.

Strawberries

Strawberries are an example of a labor-intensive commodity produced mostly in California whose production expanded to meet consumer demand. For most of the 20th century, fresh strawberries were a seasonal commodity produced locally. New varieties, shippers who made contracts with berry farmers around the state so that they could supply fresh berries year-round, and the availability of berry pickers encouraged a near tripling of U.S. strawberry production over the past quarter-century.

The California climate is ideal for strawberries, and few foreign suppliers can deliver fragile and perishable strawberries to U.S. consumers at competitive prices, explaining why California produces over 90 percent of U.S. strawberries. Strawberries must be picked once a week or more, and a normal strategy is to have 1.5 pickers per acre, so that the 40,000 acres of California strawberries require 60,000 workers.

Strawberries are picked directly into the pint or pound clamshells in which they are sold. Farmers typically receive about 40 percent of the average retail price, and labor is 30 to 40 percent of production costs, so that a $2 pound of strawberries in a retail store means 80 cents for the farmer and 28 cents for the worker.[6]

There are many wage payment systems, such as $5 an hour plus $1 per 12-pint or 9-pound flat, or simply $1.75 per flat. All workers are guaranteed the state's $13 an hour minimum wage in 2020, and most pick six or more flats per hour, earning more than the minimum wage. Few strawberry workers migrate around California. Instead, most live in the coastal valleys where strawberry production is concentrated, and many 60-person picking crews include several family members and their relatives.

The strawberry industry is unusual in several respects. The majority of growers (but not most producers) are of Hispanic or Japanese ancestry. Many of the Hispanics moved up from farm worker to farmer with the help of berry marketers such as Driscoll's or Naturipe that contract with farmers to produce berries from varieties patented by these marketers. Farmers use these shipper contracts to rent land and equipment, receive advice from marketers on how to farm, and deliver the berries to the marketer, who deducts any loans and marketing charges and sends the balance to the grower. The California Supreme Court's Borello 1989 decision found that some smaller growers were employees of the marketers rather than independent farmers, forcing changes in how marketers interact with the growers who grow, pick, and deliver berries.[7]

The second feature of the strawberry industry is its response to the slowdown in Mexico-U.S. migration. With many family groups among strawberry pickers, workers normally carpool to work. They wheel small carts with a flat or tray of clamshells between two elevated rows of plants that develop through plastic and send out vines with berries, so that one worker picks from two rows.

6 Price spreads from farm to consumer are at: www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657.

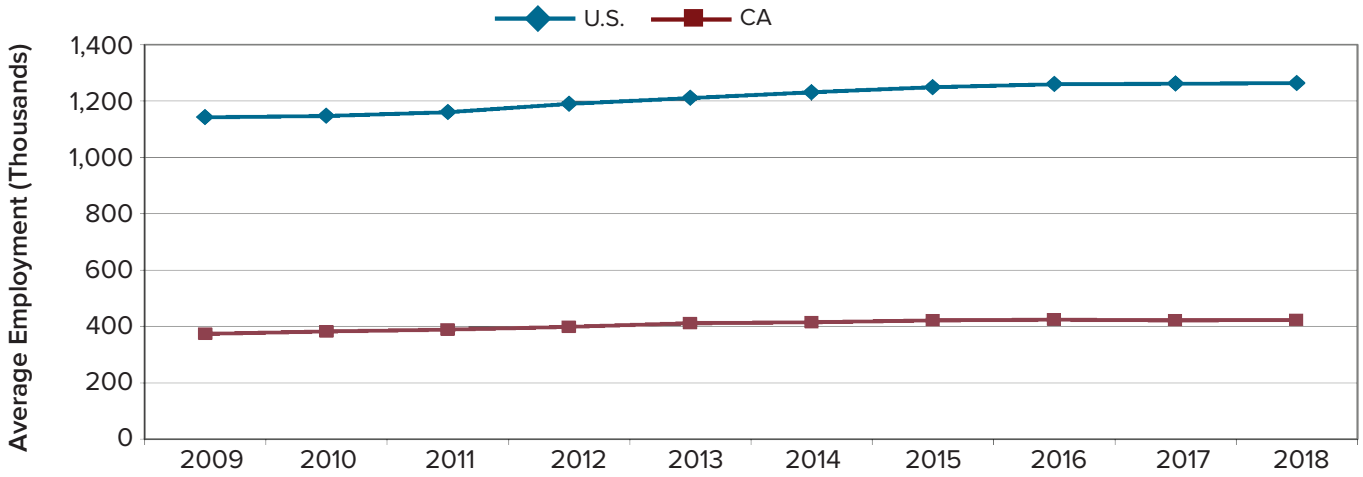
Costs of production studies are available at: http://coststudies.ucdavis.edu/current/commodity/strawberries/.

University of California put total costs of production at $44,000 an acre, with labor about $14,000. Harvesting accounted for 83 percent of labor costs.

7 The California Supreme Court developed a six-factor test to distinguish employees from independent contractors, that is, who controls the work, what is the opportunity for profit or loss, what investment does the individual make in equipment, what skills are required, how permanent is the relationship, and is the service integral to the employer's business. In share-farming, the California Supreme Court said that harvesters are employees even if they sign contracts saying they are independent contractors because growers retain control over the production and sale of the crop. S. G. Borello & Sons, Inc. v. Department of Industrial Relations (1989). Available at: http://law.justia.com/cases/california/supreme-court/3d/48/341.html.

California produces over 90 percent of U.S. strawberries.
Photo Credit: UC Davis ARE

Figure 4.3. Average Unemployment Insurance (UI)-Covered Agricultural Employment, U.S. and CA, 2009–2018



Source: U.S. Department of Labor, Bureau of Labor Statistics, QCEW. Available at: www.bls.gov/cew

Workers take full flats to checkers to receive credit, get an empty flat, and resume picking. Many larger growers put conveyor belts in the field on which pickers can place trays of berries to reduce the amount of time spent walking to receive credit for their work—increasing worker productivity. There are experiments underway to use machines to harvest strawberries.

The strawberry industry illustrates the immigration and farm labor conundrum. The industry responded to rising consumer demand by expanding production and supplying berries year-round. Workers settled in areas that offered berry jobs for up to eight months a year and, with two earners, many berry-picking families have annual incomes of $15,000 to $25,000 a year. However, berry picking remains a one or two decade-long job rather than a lifetime career for most pickers, and the children of strawberry workers educated in the U.S. generally shun their parents' jobs, explaining why the arrival of newcomers from poorer countries eager to work is of keen interest to farmers.

Farm Worker Employment

Farm worker employment involves several concepts. First is average employment, the number of workers employed each month, summed, and divided by 12 months.[8] Average U.S. farm employment, as measured by employer reports when paying unemployment insurance (UI) taxes, was over 1.2 million in 2015. Some states do not require smaller farmers to pay UI taxes on farm worker wages, so UI covers an estimated 86 percent of U.S. hired farm workers, making average total employment 1.4 million.[9]

California requires all employers to participate in UI, and its average agricultural employment was 423.000 in 2018, a third of average U.S. agricultural employment. Over the past decade, average farm worker employment increased in both the U.S. and California (Figure 4.3).

There are more farm workers than average employment because of seasonality that generates peaks and troughs. UI-covered farm worker employment across the U.S. ranged from a high of 1.4 million in July 2018 to a low of 1.1 million in January, for a peak-trough ratio of 1.3. California had a peak 475,500 in August 2018 and 344,900 in January 2018, for a ratio of 1.4. The peak-trough ratio increases as the geographic unit decreases. At the county level, the peak-trough ratio may be two to one, and on an individual farm as high as 100 to one, as when 200 workers are hired for harvesting but only two during the winter.

8 Average employment data are from the Quarterly Census of Employment and Wages (www.bls.gov/cew), and include workers on the payroll for the period that includes the 12th of the month.

9 Federal law requires farm employers to provide UI coverage to wage and salary farm workers if they paid $20,000 or more in wages in a calendar quarter or employed at least ten farm workers on each of 20 days in 20 different weeks during the current or preceding calendar year.

Table 4.2. California Farm Workers and Earnings, 2014

NAICS Code	NAICS Title	Primary Workers	CA Earnings ($ Millions)	Avg. Earnings per Worker ($)	Only Job	Percent Share[1]
11	Agriculture	691,615	11,430	16,527	499,440	72
1111	Oilseed and Grain Farming	4,587	116	25,363	3,144	69
1112	Vegetable and Melon Farming	44,878	1,068	23,789	30,760	69
1113	Fruit and Tree Nut Farming	153,999	2,710	17,600	102,805	67
1114	Greenhouse & Nursery Production	34,715	884	25,452	26,530	76
1119	Other Crop Farming	19,052	446	23,414	14,244	75
1121	Cattle Ranching and Farming	25,224	737	29,223	19,817	79
1122	Hog and Pig Farming	132	4	26,804	109	83
1123	Poultry and Egg Production	2,851	83	29,143	2,123	74
1124	Sheep and Goat Farming	543	12	21,759	465	86
1125	Animal Aquaculture	441	13	30,104	324	73
1129	Other Animal Production	3,069	77	25,144	2,308	75
1151	Support Activities for Crop Production	391,711	4,982	12,719	288,435	74
1152	Support Activities for Animal Production	3,156	81	25,765	2,585	82
1153	Support Activities for Forestry	2,589	76	29,217	2,012	78
Nonfarm[2]		137,711	4,548	33,025	--	--
All Workers with at Least One Ag Job		829,326	15,978	19,266	--	--

Source: Employment Development Department, special data tabulations

Notes: The North American Industry Classification System or NAICS classifies business establishments according to type of economic activity. NAICS 11 is Agriculture, Forestry, Fishing and Hunting.

[1] Share of primary farm workers who were only employed in this NAICS category.

[2] Nonfarm are workers with at least one farm and one nonfarm job, and their highest earning job was a nonfarm job.

Jobs versus Workers

Average employment and peak-trough ratios are measures of jobs, not the number of unique workers who fill them. There are more farms than full-time equivalent farmers,[10] and more farm workers than full-time equivalent jobs for hired workers.

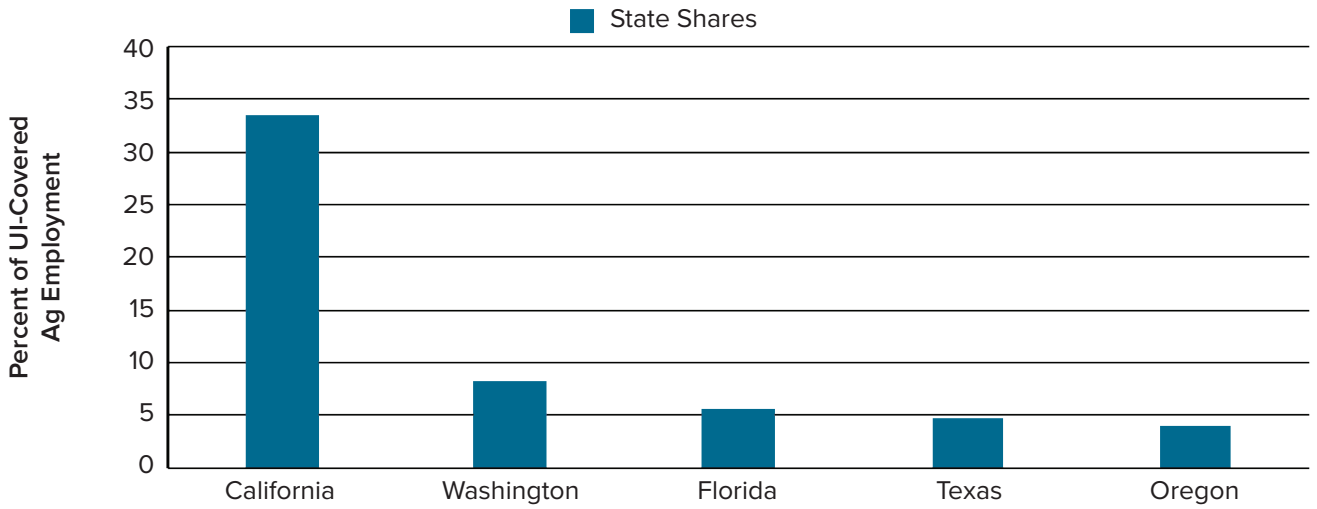
The question of how many more workers than jobs is hard to answer. During the 1980s, when the Current Population Survey (CPS) included questions in December asking whether anyone in the household worked for wages on a farm during the year, it found 2.6 million unique farm workers when average farm employment was 1.3 million, suggesting two unique workers per job. These workers were grouped at the ends of the days-of-farm work spectrum. One-third did fewer than 25 days of farm work during the year, while 20 percent worked year-round.[11]

There are no national data on the number of individuals who work for wages on farms sometime during the year. California extracted the social security numbers (SSNs) of all workers reported by farmers sometime during the year, allowing a comparison between unique farm workers and

10 There are 2.2 million U.S. farms but only 750,000 full-time equivalent farmers. Many farmers work off the farm full- or part-time.

11 For an example of the 1980s CPS reports, see https://naldc.nal.usda.gov/download/CAT89917698/PDF

Figure 4.4. State Shares of UI-Covered Agricultural Employment, 2017



Source: U.S. Department of Labor, Bureau of Labor Statistics, QCEW. Available at: www.bls.gov/cew

average employment. In 2014, when average agricultural employment was 411,000, some 829,000 unique SSNs were reported by California farm employers, suggesting the same two workers for each average job as in the 1980s.

The 829,000 farm workers in California earned a total of $16 billion, including $11.4 billion or over 70 percent from agricultural employers (NAICS code 11).[12] Average earnings for all workers with at least one farm employer were over $19,000 in 2014, while average earnings for primary farm workers, those who had their maximum earnings in agriculture, were $16,500.

One sector stands out as employing the most primary farm workers, crop support employers (NAICS 1151), many of whom are farm labor contractors. Almost 392,000 or 57 percent of primary farm workers were employed by crop support employers, followed by 22 percent who were employed by fruit and nut farming establishments (NAICS 1113). Crop support workers had the lowest average earnings, $12,700, explaining why the overall average earnings of primary farm workers were only $16,500 even though all commodities except crop support and fruit and nut farming had higher average earnings (Table 4.2).

12 The North American Industry Classification System or NAICS classifies business establishments according to type of economic activity. NAICS 11 is Agriculture, Forestry, Fishing, and Hunting.

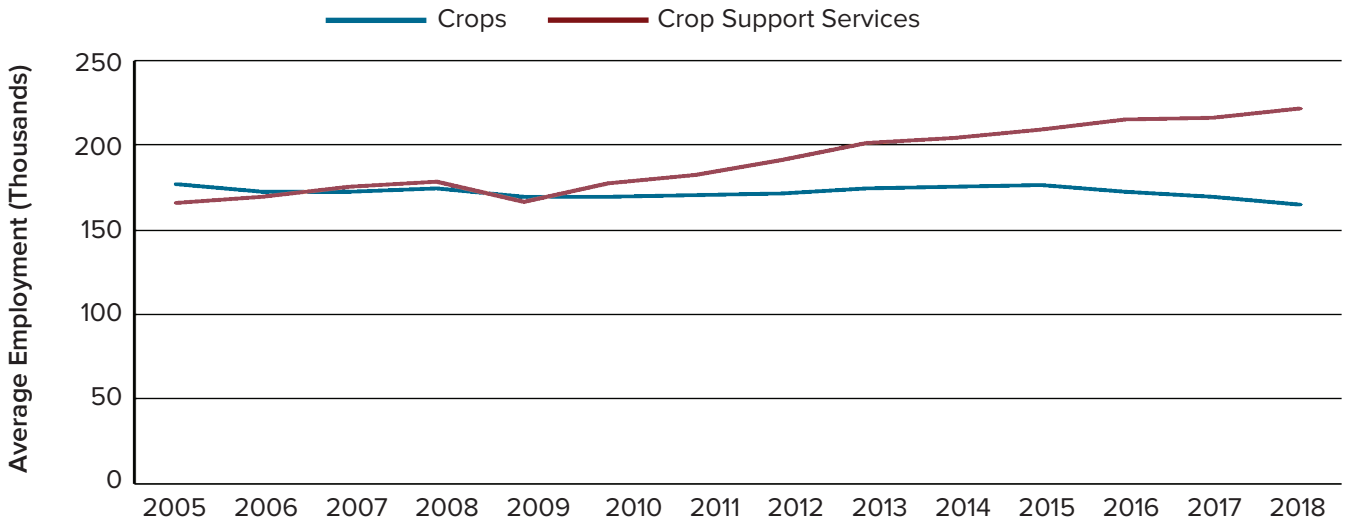
Concentration by State and Commodity

Average employment, peak-trough ratios, and unique farm workers are three ways to study who works for wages on U.S. farms. There are other windows into farm work, including which states and commodities have the most farm workers.

Figure 4.4 shows that five states accounted for 55 percent of average agricultural employment covered by unemployment insurance in 2017, including 33 percent in California.

The Census of Agriculture, which collected data from farm employers on their expenses for hired farm labor in 2017, including workers hired directly and expenses for contract labor, shows a similar concentration of farm labor in a few states. Nine states accounted for 57 percent of direct hire and contract farm labor expenses in 2017. California had $10.8 billion in direct hire and contract farm labor expenses in 2017, followed by Washington, $2.4 billion; Texas, $2 billion; Florida, $1.8 billion; and Oregon, $1.2 billion. Wisconsin, North Carolina, and Michigan each had about $1.1 billion in farm labor expenses, and Iowa had $1 billion. In California, Washington, Florida, and Oregon, crop direct hire and contract farm labor expenses were over 80 percent of farm labor expenses, while in Texas, Wisconsin, and Iowa, over half of farm labor expenses were for direct hire and contract labor on livestock farms.

Figure 4.5. California Average Crop and Crop Support Employment, 2005–2018



Source: U.S. Department of Labor, Bureau of Labor Statistics, QCEW. Available at: www.bls.gov/cew

Within California, five counties accounted for 43 percent of the state's direct hire and contract farm labor expenses. Fresno had $1.2 billion in total farm labor expenses; Monterey, $1.1 billion; Kern, $867 million; Tulare, $852 million; and Santa Barbara, $595 million.

Farm worker employment is concentrated by commodity. U.S. crop employment averaged 550,000 in 2018, including almost 184,000 in fruits and nuts, 93,000 in vegetables and melons, and 155,000 in greenhouse and nursery production, so that 80 percent of average crop employment was in FVH crops.[13]

The UI data do not specify the commodity in which the average 325,000 workers brought to farms by crop support services, mostly farm labor contractors, worked. This makes it very hard to determine exactly which commodities employed the most farm workers in a state like California, where Figure 4.5 shows that over half of average employment on crop farms is with crop support services.

Farm worker employment is complicated because the seasonal nature of production upends normal assumptions about average employment and unique workers, as when 100 jobs means 110 workers, indicating 10 percent turnover. Turnover is much higher in agriculture, an industry that has long relied on a reserve of workers who had few other job options so that they would be available when they were needed but do not have to be paid when there is no work. In the words of economist Varden Fuller, agriculture relies on "poverty at home and misery abroad" to ensure that a supply of seasonal workers is "on tap."[14]

The U.S. Department of Labor's National Agricultural Worker Survey (NAWS) finds that farm workers are mostly Mexican-born men.[15] The NAWS, launched in 1989 to detect farm-labor shortages due to immigration reforms, found that the foreign-born share of U.S. crop workers was 55 percent in 1989–90, peaked at 83 percent in 1999–2000, and is now 70 percent. About 30 percent of U.S. crop workers were born in the United States.

13 By commodity, average employment was 40,000 in apples, 32,000 in strawberries, 30,000 in grapes, 22,000 in other berries such as blueberries, and 20,000 in nuts.

14 See https://bit.ly/3pYluO5.

15 NAWS data are available at: https://www.dol.gov/agencies/eta/national-agricultural-workers-survey/research/data-tables.

Hired Farm Workers

1990, 2000, and Today

Many crop worker characteristics have V- or inverted V-shapes, with peaks or troughs around 2000. The share of unauthorized workers was less than 10 percent in 1990 due to legalizations in 1987–88, peaked at almost 60 percent in 2000, and is now less than 50 percent.

This inverted V-shape of unauthorized farm workers reflects changing patterns of Mexico-U.S. migration. Newcomers are persons in the U.S. less than a year before being interviewed, and they are almost always unauthorized. The newcomer share of crop workers was less than 5 percent in 1990, peaked at 25 percent in 2000, and is less than 5 percent today.

Most crop workers are not migrants, persons who cross borders to work for wages. There is no single federal definition of a migrant farm worker. The NAWS, which considers a worker to be a migrant if he moved at least 75 miles from his usual home for a farm job, finds a declining share of migrants—about 15 percent in both the U.S. and California.

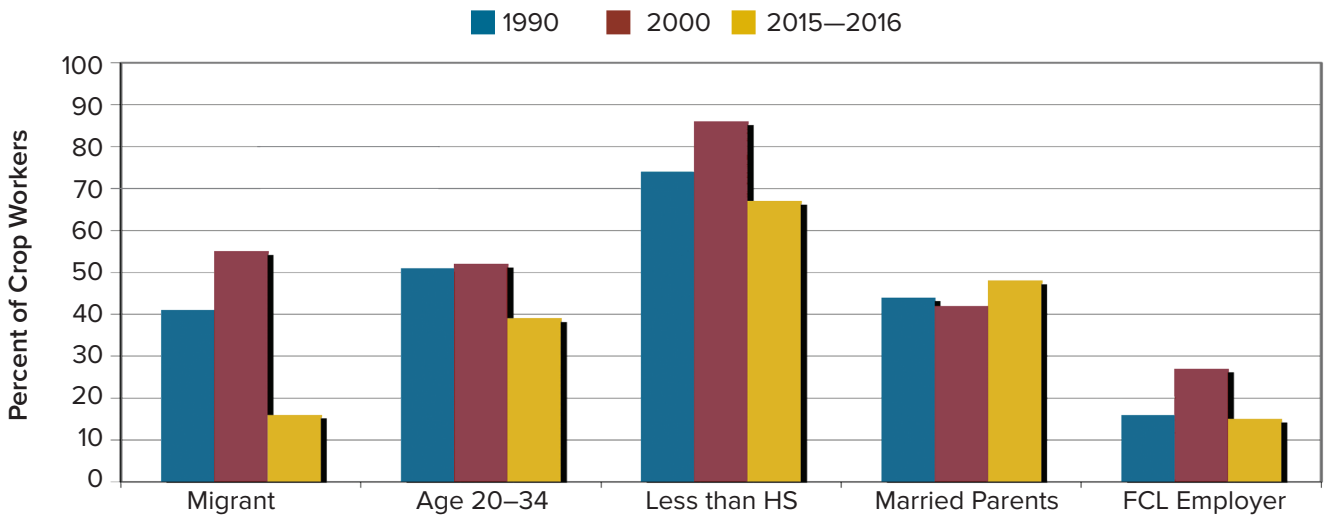
Of those who migrate to do crop work, a quarter follow the crops by having at least two farm jobs 75 miles apart, while three-fourths shuttle between homes in Mexico and jobs in the U.S. This means that fewer than 5 percent of U.S. crop workers are follow-the-crop migrants who move with the ripening crops from Florida up the Eastern Seaboard or who move from Texas to Michigan.

With fewer young newcomers arriving, the crop workforce is aging. The average age of crop workers is 39, compared with a median of 42 for all U.S. workers.[16] In 1990 and 2000, over half of U.S. crop workers were in the 20 to 34 age group. Today, the share of workers in this age group is below 40 percent (Figure 4.6).

Average years of schooling for U.S. crop workers were eight in 1990, seven in 2000, and nine today. California crop workers are less educated, with an average seven years of schooling. The share of U.S. workers who speak English well fell from a quarter in 1990 to less than 20 percent in 2000, and is now a third. In California, the share of workers speaking English well has always been less than 15 percent.

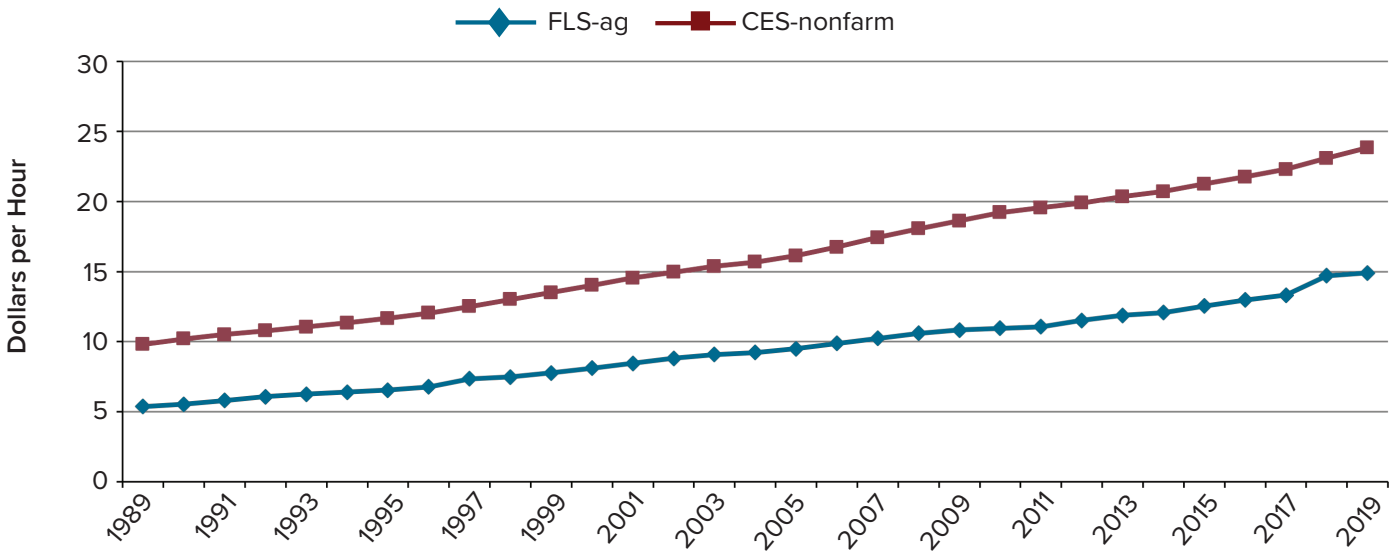
16 One-seventh of crop workers are 55 or older, compared with about 20 percent of all U.S. workers. See http://bit.ly/2MK5oJK.

Figure 4.6. U.S. Crop Worker Characteristics, 1990, 2000, 2015–2016 (Share of Workers)



Source: National Agricultural Workers Survey. Available at: https://www.dol.gov/agencies/eta/national-agricultural-workers-survey/research/data-tables

Figure 4.7. Hourly Earnings of U.S. Farm and Production Workers, 1989–2019



Sources: Farm Labor Survey. Available at: https://usda.library.cornell.edu/concern/publications/x920fw89s?locale=en
Current Employment Statistics. Available at: https://www.bls.gov/ces/

Almost 60 percent of U.S. and California crop workers are married parents; only a quarter are single with no children. Median family income has risen to the $20,000 to $25,000 range for U.S. and California crop workers over the past two decades; many families have two earners. A rising share of U.S. and California crop worker families, about half, receive some type of means-tested assistance such as Medicaid or SNAP (Food Stamps), a sharp jump from less than a quarter in 1990 and 2000. Rising benefit usage reflects low-income and "mixed-status" farm worker families that have unauthorized parents and U.S.-citizen children eligible for health and other benefits.[17]

Employers and Earnings

Workers can be hired directly by farm operators or brought to farms by nonfarm entities such as custom harvesters and farm labor contractors. Type-of-employer data follow a V-shaped trajectory, starting high, dipping in 2000, and rebounding since. About 86 percent of U.S. crop workers were hired directly by farmers in 1990, 73 percent in 2000, and 85 percent today; the California direct-hire shares were 73, 55, and 66 percent, respectively; that is, the California direct-hire share has not yet returned to 1990 levels[18] (Figure 4.5).

When newcomers were pouring into the U.S. in the 1990s, the average years of U.S. farm work experience fell from ten years in 1990 to eight years in 2000. However, the slowdown in Mexico-U.S. migration after the 2008–09 recession contributed to rising farm work experience, which is now 14 years across the U.S. In California, the average farm work experience fell from 11 to 9 years, and is now 16 years. U.S. and California crop workers have been employed an average of seven years by their current farm employer.

Crop workers across the U.S. reported that they earned an average $5.25 an hour in the early 1990s, when the federal minimum wage was $4.25. They earned $6.50 an hour in 2000, when the federal minimum wage was $5.15, and $10 an hour today, when the federal minimum wage is $7.25. In California, workers reported average earnings of $5.55 in

17 In 2016, California made all unauthorized poor children eligible for Medicaid, called Medi-Cal in California. Since a third of NAWS workers are interviewed in California, the share of farm worker families receiving some type of assistance is likely to rise.

18 The UI data find that 55 percent of average employment on California farms is comprised of workers brought to farms by crop support services, suggesting that the NAWS sample in California includes a higher share of directly hired workers.

the early 1990s, when the state's minimum wage was $4.25, $6.55 in 2000, when the state's minimum wage was $5.75, and $11.83 in 2015–16, when the state's minimum wage was $9 an hour. The NAWS finds that the California wage premium of earlier years has disappeared.

Farm employers also report the average hourly earnings of their non-supervisory employees; U.S. farm workers earned an average of almost $15 in 2019, almost triple their 1989 nominal wage (Figure 4.7). The earnings of U.S. nonfarm workers, which were $24 an hour in 2019, rose from almost $10 an hour in 1989. The ratio of average farm to nonfarm earnings rose from 55 percent in 1989 to 63 percent in 2019, narrowing the farm-nonfarm wage gap. Farm employers report higher earnings to USDA than workers report to the NAWS.[19]

U.S. crop workers averaged over 190 days in 35 weeks of farm work in 2015–16, suggesting 5.4 days of work a week. California crop workers had even more days of farm work, an average 205 days in 36 weeks in recent years, or an average 5.7 days a week. The share of U.S. crop workers with at least one nonfarm job was over 30 percent in 1990, 15 percent in 2000, and 25 percent today. The California shares are 16, 6, and 17 percent, respectively; that is, California crop workers are less likely to have nonfarm jobs.

About 80 percent of U.S. crop workers interviewed in the NAWS are employed in FVH commodities, as are 90 percent of California crop workers. However, the interviewed U.S. workers have switched from mostly vegetable workers in 1990 to mostly fruit workers today; California has always had a much higher share of fruit workers.

The share of U.S. crop workers in harvesting jobs has been falling, from 40 percent in 1990 to 30 percent in 2000, to less than a quarter today. For California, the harvesting share fell from almost half to 30 percent to 25 percent in the same time frame. The most common job today is semi-skilled, such as equipment operator: a third of U.S. workers, and 37 percent of California workers, had such jobs when interviewed.

Most crop workers plan to continue to do farm work for at least five more years. In 1990, two-thirds of U.S. workers said they would continue to do farm work as long as they could; in 2000 this dipped to 56 percent, and today over 75 percent of workers plan to continue to do farm work indefinitely. The California shares are 75 percent, 65 percent, and 80 percent, respectively. A declining share, about a third of U.S. workers and a quarter of California workers, say they could find a nonfarm job within a month.

The NAWS portrays a Mexican-born crop workforce that has settled in the U.S., formed or united families, and found employment with one fruit or vegetable farmer during the year. By working about 200 days or 1,600 hours a year at $10 an hour, long-season and full-year farm workers can earn $15,000 to $20,000 a year.

Working on farms is much like working in any other job. Most workers live away from the farm where they work, drive or carpool to work, and return to nonfarm homes when they finish work. Many farm workers would like to keep working in agriculture, but their capacity to do so may depend on the pace of the introduction of back-saving mechanical aids.

19 NAWS question D12 asks the hourly wage of workers who are paid hourly, and D13–D18 ask about piece-rate wages, including how many hours per day piece-rate workers were employed.

Farm Labor Markets

Work is the exchange of effort for reward, and labor markets perform 3-R functions: recruitment or matching workers with jobs, remuneration or paying wages and benefits to motivate workers to work, and retention to keep experienced and productive workers. Each of these 3 Rs operates differently in agriculture.

Recruitment

Recruitment normally involves developing job descriptions that lay out the minimum qualifications required to fill a job, advertising for candidates, and screening and interviewing applicants to find the best worker. Some farmers use formal procedures to hire skilled and professional workers, but most hiring of farm workers is informal.

Since most farm workers do not speak English, and most farmers do not speak Spanish, the key job matcher is a bilingual intermediary, a directly hired crew boss or a farm labor contractor who recruits a crew of workers by asking current workers to refer qualified friends and relatives. Some growers place signs along roads advertising for workers or pickers, assuming that workers drive around looking for work.

There are sometimes job vacancies posted in employment service offices or advertised in newspapers, but many advertised farm jobs reflect farmers who are seeking certification to hire guest workers; farmers must advertise for U.S. workers to be certified to hire guest workers. Fewer than 5 percent of farm job vacancy postings result in the employment of U.S. workers to fill jobs.

The key work unit in agriculture is the crew, which ranges from 10 to 60 depending on the commodity and task. A hoeing and weeding crew may consist of 10 or 20 workers accompanied by a working supervisor who sets the pace of work, while a fruit harvesting crew may include 40 to 60 workers, a quality checker to record each worker's production, and a non-working crew boss.

Supervisors and crew bosses, many of whom climbed the job ladder from hoeing or harvesting to foreman, are expected to maintain their crews at full-strength and monitor the pace and quality of work. The often close relationships between supervisors and crews, which may include the foreman's relatives and workers from the same Mexican community, minimizes complaints. Instead of voicing disagreement, farm workers often move on to another crew when there are disputes or they perceive that bosses are favoring particular workers, since they can do the same work for similar wages with another employer. Most farm workers have access to cell phones, making it easy to learn about wages and earnings on nearby farms.

Very few farm labor supervisors have formal training in managing workers, an omission that attracts little attention as long as supervisors ensure that farm work gets done. Union contracts impose restrictions on supervisors by allowing workers to file grievances, and labor compliance systems imposed by produce buyers restrict the freedom of supervisors. For example, the Fair Food Program (FFP) of the Coalition of Immokalee Workers calls for firing supervisors who commit or tolerate sexual harassment in tomato-picking crews in Florida, while the Equitable Food Initiative (EFI) in California creates teams of supervisors and workers on the strawberry and vegetable farms it has certified to monitor recruitment and supervision.[20]

There are public and private efforts to train farm supervisors and improve the quality of recruitment, including California requirements that labor contractors receive eight hours of training each year on protective labor laws and regulations. The California Farm Labor Contractor Association provides training for supervisors employed by farmers and contractors, teaching them about their responsibilities under federal and state labor laws. The University of Florida operates a Farm Labor Supervisor Training Program that issues certificates to supervisors who volunteer to complete training on labor, health, and safety laws. Many farm managers take little interest in why workers quit, turning recruitment over to supervisors and not questioning how they treat workers.

20 For details on the FFP and EFI, see Martin, 2016.

Remuneration

Remuneration or motivation to perform the job is encouraged by the wage or reward system. Most farm and nonfarm jobs pay hourly wages or monthly salaries, and managers monitor the speed and quality of the work performed to ensure "an honest day's work for an honest wage." The labor market is unusual because of this continuous bargaining between employers and employees, with some workers being fired for poor performance and others quitting for other options.

The share of farm jobs paid hourly wages has been rising, reflecting a more homogenous workforce (mostly Mexican-born men) with similar productivity, new ways to monitor the pace of work, as when conveyor belts move in front of harvest workers and the employer controls the speed of the machine. Laws and court decisions require farm employers to keep detailed records of hours and units of work accomplished for workers paid on an incentive or piece-rate basis.

When workers harvest fruit in trees, making them difficult to monitor, many employers pay incentive or piece-rate wages, such as $20 to pick a 1,000-pound bin of apples, to give workers an incentive to work fast without close monitoring. Piece rates have other advantages as well, such as keeping the cost of getting work done predictable without screening workers, since slower workers earn less. As child labor laws tightened and minimum wage laws were applied to farm work, the workforce became more uniformly young, Mexican-born men, allowing farmers to pay hourly wages and expect workers to pick at similar rates. Court decisions have also encouraged a switch from piece to hourly wages.[21]

Piece-rate wage systems create an iron triangle between three elements of farm jobs: the government-set minimum hourly wage, the employer-set piece rate, and the productivity standard or the units of work per hour or day that a worker must accomplish to earn at least the minimum wage. A worker's earnings are the higher of the minimum hourly wage or his or her piece-rate earnings.

Piece rates are set so that the average worker earns more than the minimum wage to give him or her an incentive to work fast. However, employers do not have to retain workers who cannot earn at least the minimum hourly wage at the employer-set piece rate, so the combination of the minimum wage and the piece rate creates a minimum productivity standard. For example, if the piece rate is $20 to pick a bin of apples and the minimum wage is $10 an hour, workers must pick at least four bins in an 8-hour day to earn the $80 minimum wage. Employers may fire workers who are not able to earn the minimum wage.

The iron triangle between minimum wages, piece rates, and productivity standards is important because of the aging crop workforce. Minimum wages are rising in many states, such as to $15 an hour in California by 2022. If piece rates do not rise, workers must work faster to earn the minimum wage. For example, if the minimum wage is $15 an hour and the piece rate stays at $20 a bin, workers must pick six rather than four bins to earn the higher minimum wage of $120 in an eight-hour day.

If the piece rate does not rise with the minimum wage, the composition of the labor force may change to include only those who can pick fast enough to earn the higher minimum wage at the old piece rate. Piece rates should rise with minimum wages so that workers do not have to do more work to earn the higher wage. However, there is no database of piece-rate wages and productivity standards.

The basic federal labor law—the Fair Labor Standards Act—that sets minimum wages, child labor rules, and overtime requirements, has different provisions for agriculture. Youth 16 and older may work in any farm job anytime, and those 12 and older may work in non-hazardous farm jobs outside of school hours with the consent of their parents. Farm workers employed on farms that used fewer than 500 man-days of labor in any quarter of the preceding year are exempt from the federal minimum wage, and all farm workers are exempt from federal overtime pay requirements.[22]

21 Two 2013 California appellate court decisions, Gonzalez v. Downtown LA Motors and Bluford v. Safeway Stores, encouraged the switch. Gonzalez held that workers who are paid piece-rate wages must be paid at least the minimum wage when not doing piece-rate work, while Bluford held that piece-rate employees must be paid for rest periods required by law. Most piece-rate workers earn more than the minimum wage, so before these decisions, many employers did not pay piece-rate workers for waiting and rest time. See https://migration.ucdavis.edu/rmn/more.php?id=1939.

22 See https://www.dol.gov/whd/ag/ag_flsa.htm.

Some growers place roadside signs looking for workers.
Photo Credit: *The Rural Blog*, http://irjci.blogspot.com/2011_11_13_archive.html

California and some other states adopted tighter standards, requiring that all farm workers receive at least the state's minimum wage and that farm workers employed more than 10 hours a day and 60 hours a week receive overtime pay of 1.5 times their usual wage. In 2016, California enacted legislation requiring overtime pay for farm workers after eight hours a day or 40 per week, treating farm workers the same as nonfarm workers.[23]

Retention

Most workers are employed less than a full year on a farm, which creates a retention issue of how to keep them during the season and induce them to return next season. Farmers often stress that farm work requires skills, emphasizing that workers must learn how to distinguish ripe and unripe produce and work quickly, so that two or more seasons may be required to be fully proficient.

Experienced workers may be more productive, but most farmers do remarkably little to retain them and to maintain contact with them during the off-season. One model employer, the Coastal Growers Association, gave letters to employees as they were laid off at the end of the season thanking them for their work, and sent them letters at Christmas advising them when seasonal work was likely to begin in the spring. Such written communications with employees are rare.

Crew bosses who hire workers also tell them when they are no longer needed. Even though many farms have payroll systems that would make it easy to identify the most productive workers, few acknowledge such workers in any public way at the end of the season, leaving even productive workers unsure if they will be recalled.

The usual attitude to labor supply and retention is similar to that toward water. Commercial fruit and vegetable farms in California rely on irrigation, and farmers in the past worked collectively to maximize supplies of available water rather than investing stretching water supplies on their particular farms. That is, they urged the construction of more dams and canals rather than investing in drip irrigation systems that provide water to each plant or vine. More expensive water has encouraged a shift from the collective to individual strategies to use less water, and drip irrigation is now common.

There may be a similar evolution toward the retention of experienced workers as wages rise. With fewer newcomers, many farmers are introducing bonus systems to retain workers for the season, and some are offering bonuses to experienced workers who return next season. Reliance on guest workers reduces uncertainty, as most arrive on the date specified by the employer and depart at the end of the season. Most first-time guest workers have no experience doing the work they are expected to perform in the U.S., but by returning year-after-year, their productivity rises.

23 See https://migration.ucdavis.edu/rmn/more.php?id=1995.

Unions

Farm worker unions were once described as "much ado about nothing."[24] Hired farm workers often receive low wages and find work only seasonally, but they have been hard to organize into unions for three major reasons: exits, contractors, and dispersion.

The most able farm workers who could be effective local union leaders are typically the first to leave for better nonfarm jobs, so that unions must constantly organize and educate the new workers who join the farm workforce to maintain their ranks. Second, farm worker unions have found it hard to raise wages and benefits for the workers they represent because the contractors who bring workers to farms make it hard to determine the reason for low wages; is it the Mexican-born contractor or the white employer with whom most workers cannot communicate? Third, farm workers are dispersed across many farms, making it costly to organize and serve farm workers.

There were major efforts to organize farm workers in the past, but there are no links between past and present farm labor unions. The first California farm worker unions had radical leaders who wanted to replace the employer-employee system with cooperatives (Industrial Workers of the World or Wobblies), or were Communists (Cannery and Agricultural Workers Industrial Union) who wanted to eliminate capitalist employers. In this clash of extremes between radical unions and conservative growers, there was often violence, and farm employers were able to rally local law enforcement against "outsider" union leaders, who were often arrested and jailed.

The AFL-CIO tried to organize farm workers in the 1950s, but this effort failed because English-speaking organizers signed up workers in a top-down fashion via contractors. Unions relied on strikes that could boomerang and help growers by only partially stopping production and increasing grower prices, and many unions were anti-immigrant and anti-minority. Cesar Chavez and the United Farm Workers were successful in the 1960s for reasons that included charismatic leadership and a nonviolence philosophy that won the support of churches and other unions, tight labor markets due to the demise of the Bracero program in 1964, and boycotts that won widespread consumer support during the Civil Rights movement.

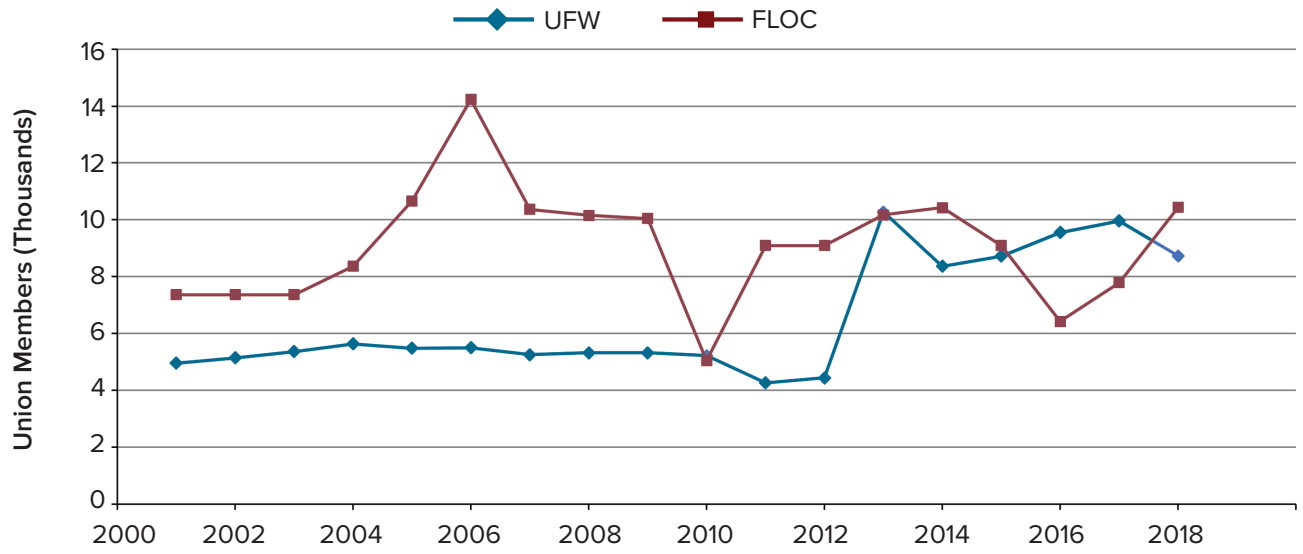
The UFW won a 40 percent wage increase for table grape workers in 1966, raising the usual wage from $1.25 to $1.75 an hour at a time when the California minimum wage was $1.65. Farm workers were not covered by labor laws that required government agencies to hold elections to determine whether workers wanted to be represented by unions, so the UFW sent letters to grape growers, asking them to sign contracts or negotiate. They refused, prompting the 1968–1970 grape boycott, one of the most successful union boycotts, as over 12 percent of American adults avoided grapes. By 1970, the UFW had contracts with most grape growers.

The UFW next turned to lettuce, bringing it into conflict with the Teamsters who represented the nonfarm workers who packed and transported lettuce and other vegetables. Instead of dealing with the UFW, many growers signed contracts with the Teamsters, which was lawful as labor relations laws excluded farm workers. The UFW soldiered on and in March 1973, claimed 67,000 members and contracts with 180 farms. However, many of the grape farmers who signed contracts with the UFW switched to the Teamsters as their contracts expired, so that the UFW ended 1973 with 12 contracts and the Teamsters with over 300.

The UFW battled the Teamsters and growers in agricultural areas, leading to thousands of arrests and convincing most Californians that a farm labor law was necessary to resolve farm labor conflicts. The UFW supported Democrat Jerry Brown, who became governor in 1975 and made the enactment of the Agricultural Labor Relations Act (ALRA) his top priority. Outgoing Governor Ronald Reagan supported a farm labor law that would have banned harvest time strikes and boycotts, but the ALRA allowed both, and extended more rights to farm workers than are available under the federal National Labor Relations Act to nonfarm workers.

24 Jamieson, Stuart. 1945. "Labor Unionism in American Agriculture." Washington. Bureau of Labor Statistics. Bulletin 836. Available at: https://fraser.stlouisfed.org/docs/publications/bls/bls_0836_1945.pdf.

Figure 4.8. United Farm Workers and Farm Labor Organizing Committee Members, 2001–2018



Source: U.S. Department of Labor LM-2 reports. Available at: www.unionreports.gov

The paradox of the ALRA is that, after an initial flurry of state-supervised elections and perhaps 200 contracts, the number of unionized farm workers and contracts has trended downward. There have been many books and articles on the failure of Cesar Chavez and the UFW to transform the farm labor market, which they ascribe to four major factors. First, many blame Chavez, a charismatic leader who preferred idealism to administering contracts and was unwilling to tolerate dissent, as evidenced by the fact that the UFW has no locals to train farm workers as leaders.

Second, the Agricultural Labor Relations Board (ALRB), courts, and growers are blamed for frustrating the desires of workers to form and join unions; the UFW often enlists its supporters in the Legislature to disagree loudly with particular ALRB decisions.

Third, the structure of agriculture changed to make organizing more difficult. The UFW's first contracts were with conglomerates that also had farming operations, making them vulnerable to boycotts of their nonfarm products. Many conglomerates sold their farming operations in the 1980s, and the independent growers who replaced them often obtained farm workers via contractors.

Fourth, illegal immigration surged in the late 1970s and 1980s, and again after immigration reforms in 1986. New workers streaming into the U.S. sometimes assumed that Cesar Chavez was the Mexican boxer[25] rather than the UFW leader. With more workers than jobs, it proved hard for unions to win wage increases.

There are two major farm worker unions today, the UFW in California and the Farm Labor Organizing Committee (FLOC) in Ohio and North Carolina. The UFW reported 5,000 members to the Department of Labor (DOL) for most of the past decade, but jumped to 10,000 in 2013 before dipping to 9,000 in 2014 and 2015 (Figure 4.8). FLOC's membership rose from about 7,500 to a peak of over 14,000 in 2006, and was 9,100 in 2015. Many FLOC members are guest workers brought into the U.S. by the North Carolina Growers Association.

Even though FLOC has the same number of members as the UFW, the UFW has receipts and disbursements much higher than FLOC (Table 4.3). One reason is that almost all FLOC receipts are the dues and fees paid by members, while some UFW receipts are from contributions and other businesses. The UFW, which requires 3 percent dues on the earnings of members, reported $4 million in member dues and fees in 2018, while the FLOC, which charges 2 percent, reported $600,000 in dues and fees. The UFW in 2018 reported 7,500 members and 370 agency payers,

25 Julio César Chávez, a six-time world champion boxer in the 1980s, is considered the greatest Mexican fighter of all time.

Table 4.3. UFW and FLOC Receipts and Disbursements, Dollars, 2001–2018

Year	UFW Receipts	UFW Disbursements	FLOC Receipts	FLOC Disbursements
		U.S. Dollars		
2001	6,629,050	7,160,500	254,232	204,549
2002	6,881,772	7,431,927	164,803	153,351
2003	6,716,966	6,608,412	187,094	157,989
2004	6,668,763	7,247,636	272,465	216,599
2005	6,710,469	6,774,191	490,343	445,295
2006	6,373,269	6,624,551	781,726	646,770
2007	6,196,231	6,073,440	514,507	681,084
2008	6,446,247	5,683,478	337,509	418,998
2009	6,446,247	5,683,478	613,712	514,974
2010	6,932,943	7,170,861	523,059	532,640
2011	7,221,571	6,620,104	439,451	442,573
2012	7,470,884	8,709,953	499,283	520,294
2013	7,119,904	7,396,471	528,081	588,295
2014	6,956,943	6,857,503	600,556	486,812
2015	7,191,804	7,270,396	509,136	461,029
2016	7,844,003	7,491,906	546,581	431,584
2017	8,535,023	8,399,684	785,973	624,120
2018	8,203,082	8,210,166	607,843	623,415

Source: U.S. Department of Labor LM-2 reports. Available at: www.unionreports.gov

while FLOC reported 10,400 members. Other unions also represent farm workers. The Chino, CA-based Christian Labor Association's Local 16 had 50 dairy worker members in 2015, down from over 300 in 2000. San Jose-based UFCW Local 5 reported 29,000 members in 2015, including 1,000 farm workers, while Salinas-based Teamsters Local 890 reported 5,400 members in 2015, including 500 farm workers.[26]

The Coalition of Immokalee Workers is a workers' organization, not a union, that negotiates agreements with the buyers of Florida tomatoes and other commodities. These agreements require the growers who produce these commodities to abide by the terms of a Fair Food Program that lays out worker rights, including making the grower responsible for compliance with all labor laws. Buyers such as McDonald's pay a "penny-a-pound" premium for the Florida tomatoes they buy, and growers pass this premium on to their workers. The Equitable Food Initiative (EFI) is an NGO that certifies farms as in compliance with its standards, including compliance with labor laws as well as food safety and environmental sustainability. The EFI operates in conjunction with the UFW, which says that unions cannot rely only on "collective bargaining to improve the lives of farm workers."[27]

Three major scenarios could unfold in farm labor over the next decade: status quo, immigration enforcement only, and an immigration reform that includes legalization for unauthorized workers, requires farmers to check the legal status of new hires, and makes it easier for farmers to hire guest workers. While consumer demand and trade affect the volume of FVH production, immigration is likely to determine how they are grown and harvested.

26 UFCW Local 5 has another 1,800 members in nonfarm fresh produce packing plants, and Teamsters Local 890 has another 200 drivers who haul produce from the fields to plants and are considered nonfarm workers.

27 See https://migration.ucdavis.edu/rmn/more.php?id=1978.

What's Next?

Status Quo

The status quo would see FVH agriculture continuing to expand in ways that create enough new jobs to offset those lost to mechanization and imports, so that average farm worker employment remains stable. The dynamic factors in the status quo scenario are the aging of the current farm work force and the absence of new farm workers except via guest worker programs.

Agriculture is akin to a canary in a coal mine in adjusting to fewer newcomers from abroad. After two decades of large-scale unauthorized Mexico-U.S. migration, farm employers became accustomed to workers appearing when they were needed. In California, many farmers turned to labor contractors to bring workers to their farms, and competition between contractors kept wages near the minimum and meant that there were few work-related benefits beyond those such as social security and workers compensation insurance required by law.

In response to fewer newcomers from Mexico, farm employers are pursuing four strategies: satisfy, stretch, substitute, and supplement. The first strategy is to satisfy current workers to retain them longer. This strategy seems to be working, as the NAWS finds an aging crop workforce employed by one farm employer for an average seven years. However, there may be physical limits to how long farm workers can continue to lift and carry heavy bags of fruits and vegetables in 100-degree heat as their average age approaches 40. A familiar aphorism says that it is hard to find a farmer under 40 because of the capital required to farm and hard to find a farm worker over 40 because of the physical demands of farm work.

Most farmers believe that the supply of labor inside U.S. borders is fixed or inelastic, so that higher wages will not attract or retain more farm workers. Instead, some are improving the training of first-level supervisors to reduce favoritism and harassment. Others are offering benefits and bonuses, such as low-cost health care to employees and their families or bonuses for staying until the end of the season.[28]

The second strategy is to stretch the current workforce with mechanical aids that increase productivity and make farm work easier. Most fruits and vegetables are over 90 percent water, and hand harvesters spend much of their time carrying harvested produce down ladders to bins or to the end of rows to receive credit for their work. Smaller trees mean fewer ladders and faster picking, and hydraulic platforms reduce the need to fill 50- to 60-pound bags of apples and oranges from ladders. Slow-moving conveyor belts that travel ahead of workers harvesting berries, broccoli, and other vegetables reduce the need to carry harvested produce, making workers more productive and harvesting jobs more appealing to older workers and women.

Under the 1942–64 Bracero program, most fruits and vegetables were picked into 50- or 60-pound field boxes, lifted onto trucks, and taken to packing sheds for nonfarm workers to prepare for marketing. Fewer workers and higher wages in the 1960s led to bulk bins that hold 1,000 pounds of apples or oranges and forklifts to move the bins. Conveyor belts for harvested produce and packing for market in the fields means higher productivity for workers and less handling of produce.

More can be done to raise the productivity of hand-harvesters. Trees and plants have been designed for maximum yields, not maximum worker productivity. Dwarf trees, talk-stalk broccoli that requires less bending to cut, and table-top production of strawberries, as in some European countries, could stretch a smaller farm workforce by increasing worker productivity. The time between development of new plants and their widespread diffusion is measured in decades. However, scheduled increases in minimum wages in major farming states have accelerated efforts to add worker productivity to the usual yield and eye-appeal characteristics desired in fruits and vegetables.

28 Bonuses of 5–10 percent to earnings for workers who stay through the season can be cheaper than raising wages to enhance retention, since they can be ended when not needed, while it is difficult to reduce wages.

The third strategy is substitution, or replacing workers with machines. Labor-saving mechanization is the story of agriculture, as the U.S. went from 95 percent of U.S. residents in agriculture in 1790 to less than 2 percent today. The production of the big-five crops—corn, soybeans, wheat, cotton, and rice—has been mechanized. There have been enormous labor-saving changes in livestock production as well, including robotic milking systems. Most nuts are harvested mechanically, with machines shaking them from trees and sweeping them into rows for collection.

Fresh fruits and vegetables have defied mechanization for several reasons. Many are fragile, and human hands are far gentler than mechanical fingers to harvest grapes or peaches. Machines that shake apples or pears from trees damage a higher share of the fruit than hand-harvesters, meaning a smaller share goes to market. Finally, machines are fixed costs and workers are variable costs—farmers must pay for a $200,000 harvesting machine whether there are apples to pick or not, while they do not pay wages to workers if storms or disease destroy the apple crop.

Raisin grapes provide an example of the difficulties of mechanizing a harvest even when technology is available. For most of the past half-century, some 50,000 workers harvested raisin grapes around Fresno each August and September, cutting bunches of green grapes and laying 25 pounds on paper trays to dry into raisins in the sun, earning about $0.25 a tray or a penny a pound.

Grapes are sugar balls, with 20 to 25 percent sugar, and harvesting raisins is a race between sugar and rain. Allowing grapes to stay on the vine increases sugar levels but raises the risk that September rains will damage the drying raisins. The longer growers wait until they begin to harvest, the more workers will be needed to pick the grapes so that they can dry into raisins before suffering rain damage.

There are new grape varieties that reach optimal sugar levels earlier in August, and allow the canes holding bunches of green grapes to be cut and the grapes dried partially or fully into raisins while they are on the vine. Harvesting machines use rotating fingers to knock the partially dried raisins onto a continuous paper tray in the vineyard until they dry into raisins or harvest fully dried-on-the-vine (DOV) raisins.

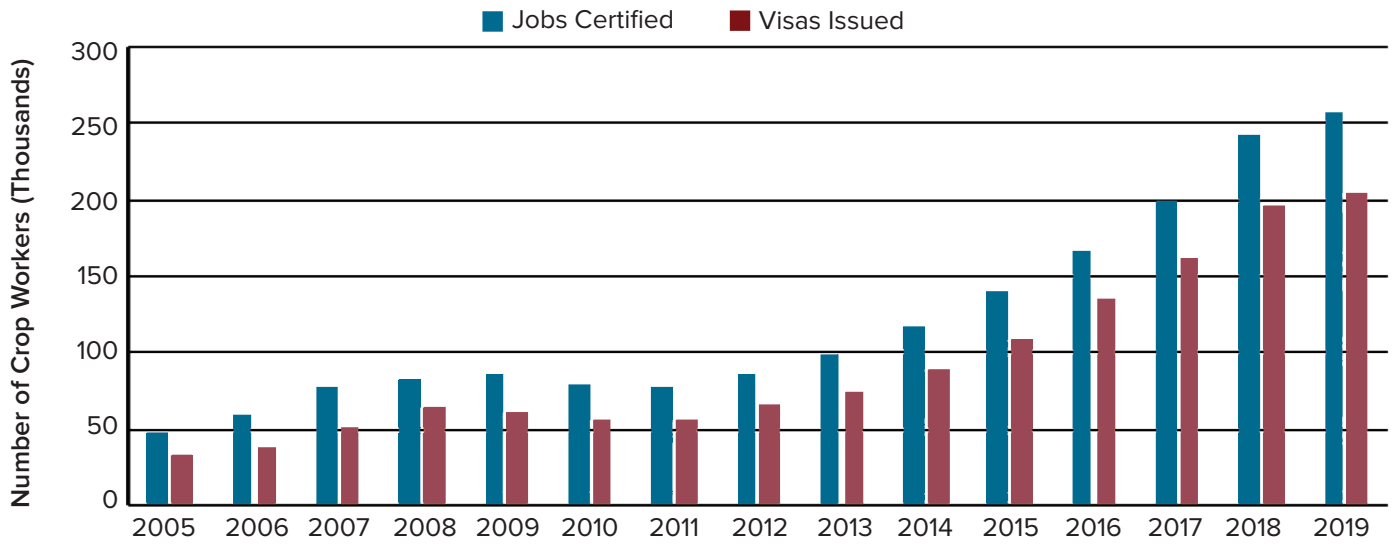
The harvesting of one-third of California raisin grapes uses some type of DOV mechanization, and the question is: why not more? Most raisin growers are over 60, have fully paid for their 20-to 40-acre vineyards, and are reluctant to make up-front investments to retrofit vineyards for DOV mechanization when China, Iran, and Turkey can produce raisins cheaper. Switching to DOV methods locks in costs, while hand-harvesting maximizes flexibility. Depending on the relative prices of wine and raisin grapes, farmers can wait until shortly before harvest to decide whether their Thompson Seedless grapes will be sold to wine makers or harvested mechanically or hand-harvested for raisins.

The fourth adjustment is to supplement current workers with guest workers. The H-2A program was created in 1952 to provide foreign workers for U.S. farmers and was used primarily by sugar cane growers in Florida and apple growers along the East Coast until the mid-1990s. North Carolina tobacco farmers became the largest users after ex-government officials created an association that, for a fee, recruits guest workers in Mexico, brings them to North Carolina, and deploys them to farmers. Turn-key and loyal H-2A guest workers proved very attractive to farmers, especially as the workers gained experience by returning year after year.

Receiving government certification to employ H-2A guest workers requires employers to satisfy three major criteria. First, farmers must try to recruit U.S. workers and provide reasons why U.S. workers who applied for jobs were not hired. Farmers convinced that most U.S. workers will not remain for the entire season often try to discourage U.S. workers from applying. For example, U.S. workers applying for jobs with the North Carolina association must be willing to accept a farm job anywhere in the state rather than near their homes, and some U.S. workers say they are deliberately assigned jobs far away from home to discourage them.

Second, farmers must provide free housing to H-2A guest workers and out-of-area U.S. workers. Housing is a special concern in California, where most labor-intensive agriculture is in metro counties that often have shortages of affordable housing and restrictions on building more. Third, the law requires that H-2A guest workers should not "adversely affect" U.S. workers. The government enforces this no-adverse-effect requirement by setting a

Figure 4.9. H-2A Jobs Certified and H-2A Visas Issued, 2005–2019



Sources: U.S. Department of Labor. Available at: https://www.dol.gov/agencies/eta/foreign-labor/programs/h-2a
U.S. State Department. Available at: https://travel.state.gov/content/travel/en/legal/visa-law0/visa-statistics.html

super-minimum wage called the Adverse Effect Wage Rate (AEWR), which is $14.77 an hour in California in 2020, when the state's minimum wage is $13 an hour.

The H-2A program is expanding. Some 258,000 farm jobs were certified by DOL to be filled with H-2A workers in FY19, a tripling over the past decade. The top five H-2A states, FL, GA, WA, CA, and NC, accounted for half of the jobs certified to be filled with H-2A workers and doubled over the past decade to over 140,000 farm jobs certified by DOL to be filled by guest workers in FY15 on about 7,500 U.S. farms (Figure 4.9). The largest 300 farm employers with H-2A workers each requested certification to fill 100 or more jobs, and accounted for almost half of all certifications. H-2A workers are in the U.S. for an average six months, so the 205,000 H-2A workers in FY19 contributed the equivalent of 100,000 full time workers, about 11 percent of the 900,000 full-time equivalent jobs in U.S. crop agriculture. At its peak in the mid-1950s, Braceros were an average of 20 percent of U.S. farm workers. If H-2A workers fill the equivalent of 180,000 U.S. crop jobs, they would be 20 percent of U.S. crop employment.

Many of the largest employers of H-2A workers are associations and farm labor contractors that recruit workers in Mexico and move them from farm to farm. The North Carolina Growers Association is the largest association, bringing over 10,000 Mexican workers into the state to work on tobacco and vegetable farms. The Washington Farm Labor Association (WAFLA) is second, bringing almost 10,000 Mexican guest workers to the state that leads in fresh apple and cherry production. Many of the other large requesters of H-2A workers are labor contractors, including Fresh Harvest in California and Rodrigo Gutierrez-Tapia in Florida. Contractors must submit documentation to DOL of their arrangements to provide workers to farmers, but FLC-farmer contracts are not made public.

Some H-2A workers fill more than one job, so that there are more certified jobs than visas issued to H-2A workers. In recent years, for every 130 farm jobs certified, DOS issued 100 H-2A visas. H-2A admissions data published by the U.S. Department of Homeland Security are not useful because they record each entry, so that an H-2A worker living in Mexico and working in the Yuma, Arizona area creates an admission each day he enters the U.S., so that one worker entering daily for 60 days becomes 60 admissions.

Enforcement Only

Almost half of U.S. crop workers are unauthorized. An enforcement-only strategy of building a wall on the Mexico-U.S. border, requiring employers to verify the legal

status of new hires, and aggressively trying to remove unauthorized foreigners from the U.S. would squeeze a farm workforce that is growing primarily via H-2A guest workers.

A combination of tougher border enforcement and better conditions in Mexico reduced the inflow of unauthorized Mexicans joining the farm workforce to a trickle, and it is not clear how much more a border surge or wall would prevent the entry of unauthorized newcomers. However, requiring all employers to use E-Verify, the internet database that verifies the legal status of all newly hired workers, could make it harder for farm employers to hire and rehire unauthorized workers.

Audits of the I-9 forms that newly hired workers and their employers complete illustrate the potential of more enforcement to disrupt the hiring of unauthorized farm workers. In June 2015, Broetje Orchards, a 6,000-acre apple and cherry grower in Eastern Washington, agreed to pay a $2.25 million fine for employing 950 unauthorized workers in 2014. Broetje is considered a model farm employer in the relatively remote area where its orchards are located, providing housing for many of its 2,000-plus workers.[29] The Department of Homeland Security (DHS) said that it wants to hold Broetje "accountable but not cripple its ability to provide jobs to lawful workers."

Many employers terminate unauthorized workers after I-9 audits and hire workers via the H-2A guest worker program. Gebbers Farms, a 5,000-acre apple and cherry operation north of Wenatchee, Washington, fired 550 workers after a 2009 audit. A year later, Gebbers was certified to hire 1,200 H-2A guest workers. School enrollment and population did not go down as predicted, suggesting that many of those who lost their jobs at Gebbers found other jobs in the area. Grocery store owner Esteban Camacho said: "Everything is back to normal. I think most of the people who stayed here wound up working somewhere else. There are a lot of the same people around."[30]

The third prong of an enforcement-only approach is to make it difficult for unauthorized foreigners to live in a particular place. Alabama (HB 56), Arizona (SB 1070), Georgia (HB 87), and South Carolina (HB 4400) enacted laws beginning in 2010 that required all employers to use E-Verify to check new hires and to have state and local police determine the legal status of persons they encounter. These laws were challenged as promoting racial profiling, and some provisions did not go into effect.

Unauthorized foreigners were expected to leave enforcement-only states and leave crops unpicked. For example, Georgia farmers led the opposition to HB 87, and complained of labor shortages when it was enacted. However, they continued to plant blueberries, a very labor-intensive crop whose acreage rose 40 percent from 12,000 in 2011 when HB 87 was enacted to over 17,000 by 2016.

Legalization

The U.S. has dealt with unauthorized farm workers before. In the early 1980s, as farm labor unions were weakening in California and farm wages were falling, the share of unauthorized workers was about 20 percent. Migrant advocates complained that unauthorized status made workers vulnerable, and growers said they preferred to hire legal workers, leading to the farm labor compromise included in the Immigration Reform and Control Act of 1986. IRCA's Special Agricultural Worker (SAW) program allowed unauthorized foreigners who did at least 90 days of farm work in 1985–86 to become legal immigrants, and the H-2A guest worker program was modified to make it easier for farmers to hire foreign guest workers.

IRCA did not work out as anticipated for several reasons. First, the SAW program's easy application requirements legalized far too many unauthorized foreigners. Once a worker presented a letter from a farm employer saying he had done 90 days of farm work in 1985–86, the burden of proof shifted to the government to show that the applicant was lying. In part because the government lacked investigators with expertise to detect false claims, over 1.2 million unauthorized foreigners became immigrants under the

29 Broetje opened a $6.7 million, 48-unit complex near Prescott in 2013. Each 1,400-square-foot unit can house up to eight people, with rent set at up to 23 percent of gross wages. Available at: https://migration.ucdavis.edu/rmn/more.php?id=1766.

30 See https://migration.ucdavis.edu/rmn/more.php?id=1550_0_4_0.

SAW program—perhaps the largest immigration fraud ever perpetrated on the U.S. government.[31]

Second, illegal immigration increased rather than decreased. There was relatively little border or interior enforcement after the enactment of IRCA, and Mexicans found it easy to cross the border illegally and obtain false documents to present to employers. With IRCA's general and SAW legalization programs granting immigrant status to 2.7 million unauthorized foreigners, 85 percent Mexicans, Mexican-born workers spread throughout the U.S. from bases in California and the Southwest. Farm, construction, and meatpacking employers asked these pioneering migrants to recruit friends and relatives, and both legal and unauthorized Mexican workers were soon a familiar presence in most states.

Third, the H-2A program shrank rather than expanded, as farmers found it easier to hire unauthorized workers, to whom they did not have to provide housing and pay a special minimum wage, than to hire H-2A guest workers. As the Florida sugarcane harvest mechanized in the early 1990s, the number of H-2A guest workers dropped below 15,000, and most were employed to pick apples in New England and herd sheep in the western states.

Farmers knew that half of their workers were unauthorized by the mid-1990s, a higher share than before IRCA was enacted, and tried to get Congress to enact an easy guest worker alternative to the H-2A program. Congress considered several proposals, but President Clinton threatened to veto any new guest worker program for agriculture and none was enacted. Instead, the election in 2000 of Presidents Fox in Mexico and Bush in the U.S. spurred farm employers and worker advocates to negotiate the Agricultural Job Opportunities, Benefits and Security Act (AgJOBS), an IRCA-like effort to legalize unauthorized farm workers and make it easier to hire guest workers.

AgJOBS differs from IRCA in two important respects. First, instead of the IRCA legalization that moved workers directly from unauthorized to immigrant status, AgJOBS would have given unauthorized farm workers a temporary legal status that could be converted to immigrant status only if the temporary legal worker continued to do farm work for three to five years, an effort to slow exits from farm work. Second, AgJOBS would have given farm employers what they want in a guest worker program, viz, an end to the requirement to try to recruit U.S. workers, an option to pay a $1 to $2 an hour housing allowance instead of providing housing, and a reduction in the AEWR to offset the cost of the housing allowance.

AgJOBS was not enacted, but in November 2014, President Obama issued an executive order to create the Deferred Action for Parents of Americans and Lawful Permanent Residents (DAPA) program. DAPA would have provided 4 million unauthorized parents with legal U.S. children temporary work permits, including up to 500,000 farm workers. However, Texas and 25 other states sued to block DAPA's implementation, arguing that DAPA was an unconstitutional overreach of executive power. Federal courts agreed, and the U.S. Supreme Court on a 4–4 vote in June 2016, allowed lower court injunctions blocking the implementation of DAPA to remain in effect.

Immigration provided one of the sharpest contrasts between Republicans and Democrats in the 2016 elections. Donald Trump called for a wall on the Mexico-U.S. border and the removal of "illegal aliens" from the U.S., while Hillary Clinton promised comprehensive immigration reform with a path to U.S. citizenship for unauthorized foreigners. The Republican platform opposed "any form of amnesty for those who, by breaking the law, have disadvantaged those who have obeyed it," while the Democrats asserted that "DAPA is squarely within the President's authority" and should be expanded.

Many farm and nonfarm employers expected Trump to make it easier to recruit and employ guest workers under the H-2A and H-2B programs, since Trump's businesses use these programs to obtain farm and nonfarm workers. However, there have been no major changes to the H-2A and H-2B programs as of Fall 2020. The H-2A program continued to grow as growers found the housing they must provide to H-2A workers, and employers requested two or three times more than the 66,000 H-2B visas available each year. Despite record unemployment rates, H-2A workers were deemed essential and allowed to enter the U.S. despite otherwise closed borders in Spring 2020.

31 Roberto Suro, "Migrants' False Claims: Fraud on a Huge Scale," *New York Times*, November 12, 1989. Available at: https://nyti.ms/38BKGVr.. Almost 300,000 applicants for SAW status were rejected, that is, they did not become immigrants.

Conclusion

The farm labor market is changing as fewer new workers arrive to replace those who age out of farm work or find nonfarm jobs. Amidst uncertainty over the future direction of U.S. immigration policy, farmers are pursuing 4-S strategies to: satisfy current workers, stretch them by increasing their productivity with mechanical aids, substitute machines for workers where possible, and supplement current workers with H-2A guest workers.

In this time of farm labor change, there are four recommendations for government action: better data, support for mechanical aid and mechanization research, a focus on worker-to-farmer mobility, and a strategy for FVH agriculture in a globalizing world. There are also perennial recommendations such as improved enforcement of labor, safety, tax, and other laws to protect farm workers, and more efficient spending of the over $1 billion the federal government devotes to improving the education, health, housing, and training of farm workers.

Data

Farm workers are often seen through hazy windows. The various data sources are like windows into a room whose size and shape is not completely known. Some of the windows are large and clear, while others are small and scratched.

The NAWS provides the clearest window on who farm workers are, but covers only non-H-2A crop workers. With H-2A guest workers now filling 10 percent of long-season crop jobs, the NAWS window is shrinking. The NAWS portrays directly hired workers employed in non-harvesting jobs in fruit and vegetable agriculture who are settled and aging, but provides less information on harvest workers brought to farms by farm labor contractors. Expanding the NAWS to include H-2A and livestock workers, and redoubling efforts to interview harvest workers brought to farms by contractors, could improve the database for evidence-based policies.

More could be done with employer-reported administrative data. Much of the detail on earnings that is released each month along with the unemployment rate comes from employers who are paying their unemployment insurance taxes. Since farm employment is concentrated on large farms that must pay UI taxes, and major farming states such as California require all farmers to pay UI taxes, more could be done to study all workers employed on farms for wages, as was done to show that there were two unique workers for each full-time equivalent job in California.

Research

Federal and state governments spend over $4.5 billion a year on agricultural and food-related research, much of which is conducted at land-grant universities to raise yields and to make crops and livestock more resilient to diseases and pests. During the 1960s and 1970s, government funds were also used to develop machines to replace farm workers. A combination of rising illegal immigration that reduced employer interest in labor-saving mechanization and union-filed lawsuits charging that taxpayer monies were being used to develop machines to displace farm workers eliminated government support for mechanization research in the 1980s.[32]

Research is a long-term investment with an uncertain payoff. To develop crops that ripen uniformly so that they can be picked by machine, or trees that are shorter and vegetables that are taller to make picking easier, may require a decade or more. With newcomers pouring into the U.S. over the past two decades, there was little economic incentive to research crops that could be harvested mechanically or are easier to harvest by hand.

Incentives are changing to favor more agricultural research that considers the availability and cost of labor. The clearest signal comes from state laws that will raise the minimum wage to $15 an hour in less than a decade, so that employers can expect a 50 percent increase in the wages of hand workers. The immigration signals are less clear, and

32 In 2006, public-sector investment in farm machinery and engineering was less than $200 million, versus $1.5 billion spent on crops, $1.3 billion on animals, and almost $1 billion on environmental issues (Fuglie and Toole, 2014).

raise questions about how farmers should weigh trade-offs between investing in housing for guest workers versus investing in machines to replace hand workers.

The Future

Almost all farm workers are Hispanic, and almost all farmers are white, making agriculture the closest to a U.S. "apartheid industry." Both farmers and farm workers are aging, and there are fears about the source of the next generation of farmers and farm workers.

American folklore imagined hired hands on family farms marrying the farmer's daughter and moving up the job ladder from farm worker to farmer. Such mobility was more myth than reality, but if the U.S. is to avoid having an agriculture dominated by landowners who rely on hired managers and hired workers, more could be done to help workers make the transition to farmer. Many workers with the expertise to grow crops lack the capital needed to become farmers, opening the possibility of farmers financing the sale of their farms to trusted workers and changing the face of farming. Governments could support projects that minimize the risks involved in such worker-to-farmer transitions.

Thinking Strategically

China and India, with 40 percent of the world's people, are also the largest producers of many crops, including most fresh fruits and vegetables. However, the U.S. is the major exporter of farm commodities, selling twice as much to other countries as the No. 2 farm exporter, Brazil. The leading U.S. farm exports reflect comparative advantage, with soybeans, corn, and wheat leading the list, followed by meat-animals that is fed these U.S.-produced grains. Although the U.S. exports some fresh fruits and vegetables, primarily to Canada, none are among the top 25 U.S. farm exports.

The U.S. is likely to continue to produce most of the fresh fruits and vegetables consumed by Americans for reasons that range from high productivity to lower transportation costs. However, the production of some very labor-intensive commodities may shift toward lower-wage countries. Almost all bananas, most fresh asparagus, and many winter fresh fruits are imported, raising the question posed by Mexican President Carlos Salinas in urging the approval of NAFTA, "Does the U.S. prefer Mexican tomatoes or Mexican tomato pickers? Should the U.S. government continue to admit foreign workers so that labor-intensive commodities are produced in the U.S., or should the U.S. make it easier to import such commodities from abroad?"

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Appendix: Farm Wages and Prices

The U.S. Bureau of Labor Statistic's Consumer Expenditure Survey (www.bls.gov/cex) reported a total of 132 million U.S. "consumer units" or households in 2019. They had an average of 2.5 persons, 1.3 earners and 1.9 motor vehicles; 63 percent were homeowners and the average age of the reference person in the household was 51. Average consumer unit income before taxes was $82,850, and average annual expenditures were $63,000.

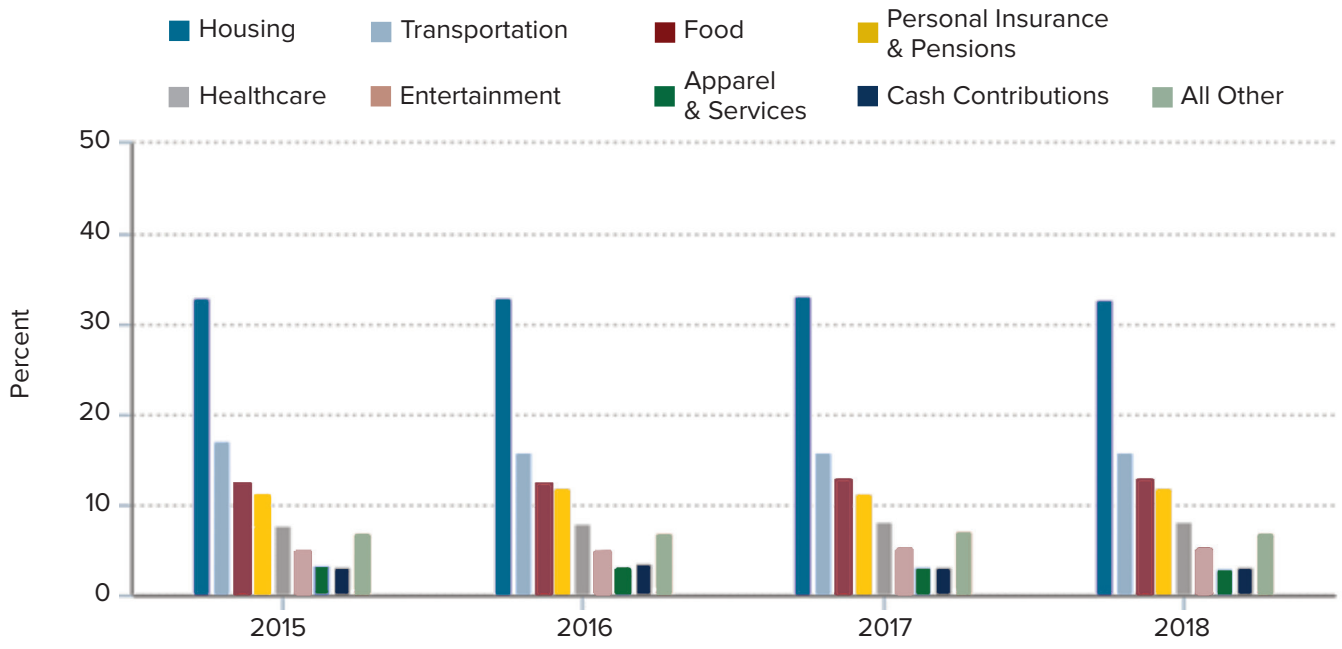
These expenditures included $8,200 a year for food, 13 percent of total expenditures. Food spending was divided between 56 percent or $4,600 a year—an average of $88 per week for food eaten at home, and 46 percent or $3,509 a year—an average of $67 a week for food bought away from home. The cost of food away from home largely reflects convenience, service, atmosphere and other factors, since the cost of food is a relatively small share of away-from-home food spending. The cost of food represents 35 percent of what is spent in cafeteria-style restaurants, 30 percent of spending on fast food, and 25 percent of spending in fine dining restaurants.

Figure 4.1A shows that other significant consumer-unit expenditures were $20,700 for housing, $10,700 for transportation, $5,200 for health care, $1,900 for apparel, and $3,000 for entertainment.

The largest food-at-home expenditures were for meat and poultry, an average of $980 in 2019. Expenditures on cereal and bakery products, $585, exceeded the $455 spent on dairy products. Expenditures on fresh fruits ($320) and fresh vegetables ($295) were $615 a year or $11.80 a week in 2019, and consumer units spent an additional $110 on processed fruits and $145 on processed vegetables. Consumer units spent almost as much on alcoholic beverages, $580 in 2019, as on fresh fruits and vegetables, $615.

Data on food spending by pre-tax income are available only for 2018; the 13 percent of consumer units with incomes of less than $15,000 spent 54 percent of their pre-tax incomes on food, while the 7 percent with incomes of $200,000 or more spent 5 percent of their income on food. Lower-income consumer units spent a higher share of their incomes on food at home.

Appendix Figure 4.1A. Percentage of Expenditure Shares by Selected Categories, 2015–2018



Source: U.S. Bureau of Labor Statistics. Available at: https://www.bls.gov/opub/reports/consumer-expenditures/2018/pdf/home.pdf

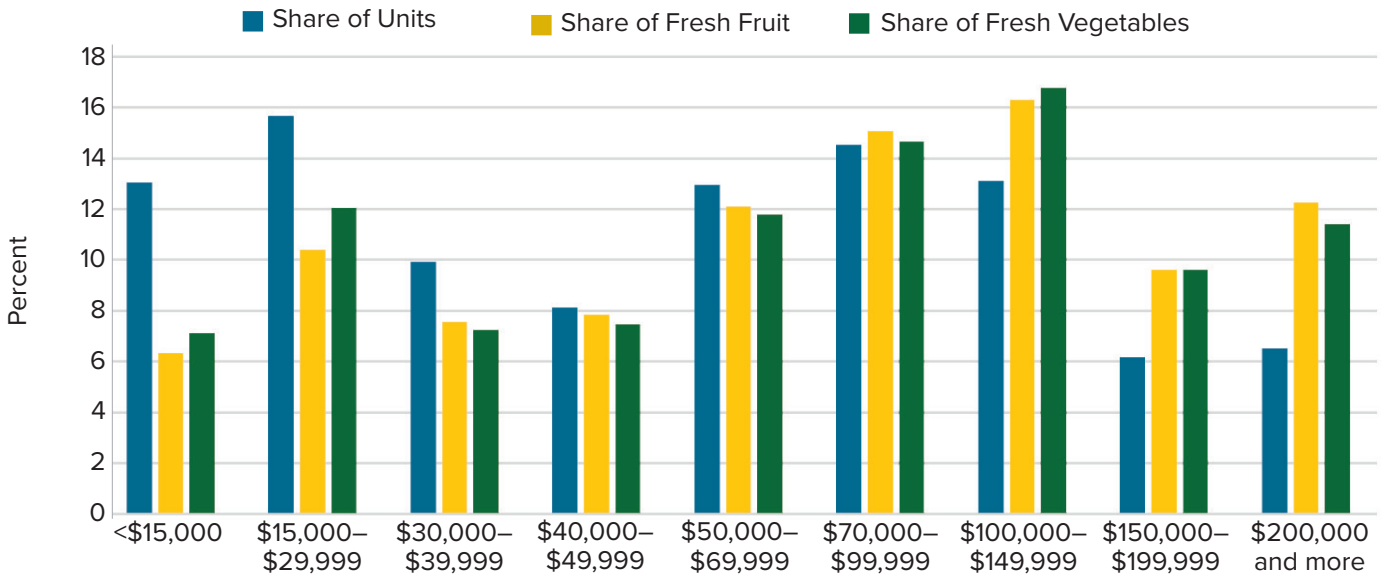
Appendix Table 4.1A. Consumer Unit Spending on Food and Fruits and Vegetables by Income, 2018

	All Consumer Units	<$15,000	$15,000 – $29,999	$30,000 – $39,999	$40,000 – $49,999	$50,000 – $69,999	$70,000 – $99,999	$100,000 – $149,999	$150,000 – $199,999	$200,000 and more
Number of Consumer Units	131,439	17,156	20,575	13,022	10,683	17,003	19,074	17,243	8,118	8,566
Share of Units (%)	100%	13%	16%	10%	8%	13%	15%	13%	6%	7%
Pre-tax Income ($)	78,635	7,604	22,316	34,729	44,763	59,313	83,370	120,778	171,314	320,317
Food ($)	7,923	4,130	4,628	6,077	6,286	7,168	8,753	10,854	13,195	16,392
Food Share (%)	10%	54%	21%	17%	14%	12%	10%	9%	8%	5%
Food at Home ($)	4,464	2,690	3,011	3,744	3,633	4,228	4,900	5,759	6,764	8,002
Food at Home Share (%)	56%	65%	65%	62%	58%	59%	56%	53%	51%	49%
Alcohol ($)	583	201	190	326	383	512	569	854	1,108	2,052
Fruits & Vegetables ($)	858	485	589	700	690	817	933	1,111	1,344	1,567
Fresh Fruits ($)	322	156	214	246	310	301	334	400	500	606
Fresh Vegetables($)	112	61	86	82	103	102	113	143	174	196
Spending on Fruit ($ millions)	42.3	2.7	4.4	3.2	3.3	5.1	6.4	6.9	4.1	5.2
Spending on Vegetables ($ millions)	14.7	1.0	1.8	1.1	1.1	1.7	2.2	2.5	1.4	1.7

Source: U.S. Bureau of Labor Statistics, Table 3. Available at: https://www.bls.gov/opub/reports/consumer-expenditures/2018/home.htm

Note: Spending on fruits and vegetables is for fresh produce.

Appendix Figure 4.2A. Share of Consumer Units and Share of Spending on Fresh Fruits and Vegetables by Pre-Tax Income, 2018



Source: U.S. Bureau of Labor Statistics. Available at: https://www.bls.gov/cex/2018/aggregate/income.pdf

Higher income units spent more on fruits and vegetables, about three times more for those with incomes of $200,000 or more compared with those earning less than $30,000. Spending on alcoholic beverages rose with income as well; those earning $200,000 or more were the only group to spend more on alcoholic beverages than on fruits and vegetables.

Half of spending on fruits and vegetables was on fresh fruits and fresh vegetables. The leading fresh fruits by expenditure were fresh apples, an average $44 spent per consumer unit in 2018; bananas, $44; oranges, $32; other fresh citrus, $5;, and other fresh fruits, $149. The leading fresh vegetables were potatoes, with $45 spent per consumer unit in 2018, followed by lettuce, $30; tomatoes, $48; and other fresh vegetables, $172.

Figure 4.2A shows that in 2018, the quarter of consumer units with incomes of $100,000 or more, accounted for 38 percent of total spending on fresh fruits and vegetables. By contrast, almost half of consumer units had incomes of less than $50,000 in 2018, and they accounted for a third of total spending on fresh fruits and vegetables.

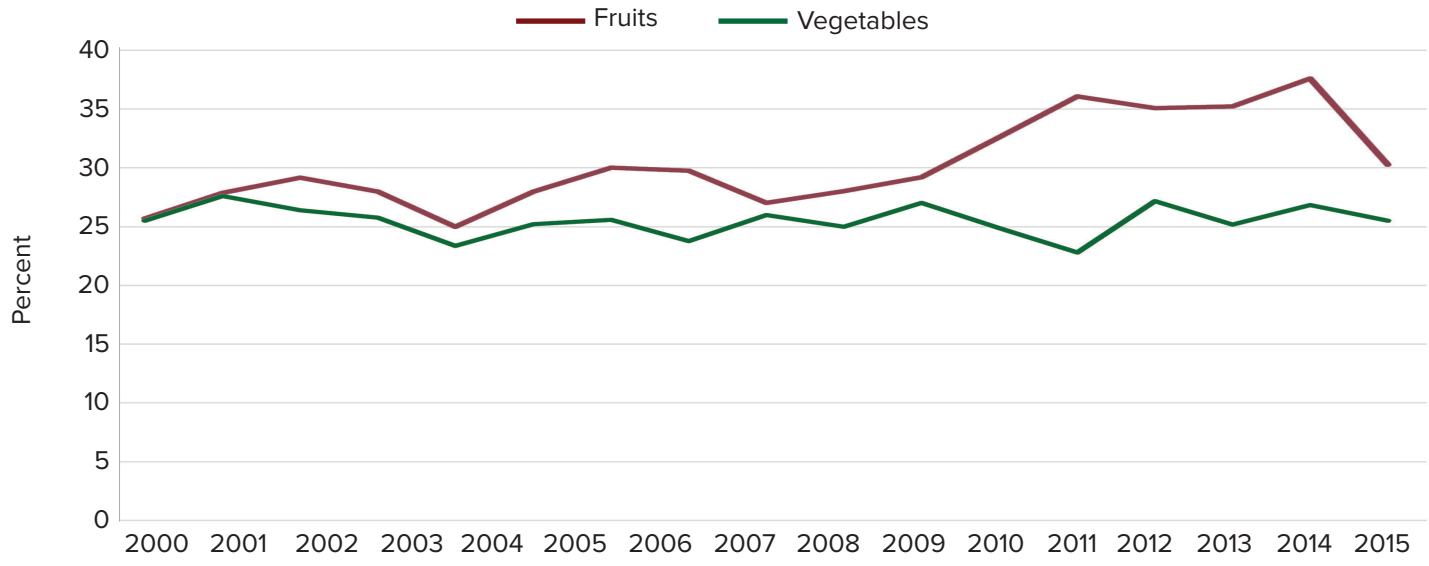
Farmers get less than 20 percent of the average retail food dollar, but slightly more for fresh fruits and vegetables.[33] Farmers received an average 38 percent of the average retail price of fresh fruits and 28 percent of the average retail price of fresh vegetables in 2015, the most recent data available. This means that average consumer expenditures on these items include $203 a year for farmers [(0.38 x 320 = $120) +(0.28 x 295 = $83)].

Farm labor costs are less than a third of farm revenue for fresh fruits and vegetables, so farm worker wages and benefits for fresh fruits and vegetables cost the average consumer unit $67 a year (0.33x $203 = $67). In fact, farm labor costs are less than $67 because over half of US fresh fruits, and a third of U.S. fresh vegetables, are imported.

Even though strawberries are picked directly into the containers in which they are sold, and iceberg lettuce is wrapped in the field, farmers and farm workers get a very small share of retail spending on fruits and vegetables. Consumers who pay $2 for a pound of strawberries are paying about 70 cents to the farmer and 30 cents to farm workers. For $2 worth of fresh field-grown tomatoes, farmers receive 50 cents and workers 15 cents.

33 See www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer/price-spreads-from-farm-to-consumer/#Fresh%20fruit.

Appendix Figure 4.3A. Farmers' Average Share of Retail Price of Fresh Fruit and Fresh Vegetables, 2000–2015



Source: USDA Economic Research Service. Available at:
https://www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer/price-spreads-from-farm-to-consumer/#Fresh%20fruit

About half of the workers employed on U.S. crop farms are unauthorized. These unauthorized crop workers are aging and settling, making them less mobile and flexible. Farmers are adjusting to fewer unauthorized newcomers by substituting machines for workers and supplementing the current workforce with legal H-2A guest workers.

What would happen to consumer expenditures on fresh fruits and vegetables if farm labor costs rose, perhaps due to the introduction of E-Verify, the internet-based system that allows employers to check the work authorization of newly hired workers?

The closest natural experiment occurred after the Bracero program ended in 1964. Mexican Braceros were guaranteed a minimum wage of $1.40 an hour at a time when U.S. farm workers were not covered by the minimum wage. Some table grape harvesters, who were paid $1.40 when they worked alongside Braceros in 1964, were offered $1.25 in 1965, prompting a strike. Cesar Chavez became the leader of the strike and won a 40 percent wage increase in the first UFW table grape contract in 1966, raising workers' wages to $1.75 an hour.

What would happen to consumer expenditures if there were a similar 40 percent wage increase today? The average hourly earnings of U.S. field and livestock workers was $14 an hour in 2019, so a 40 percent increase would raise them to $19.60 an hour.

For a typical household or consumer unit, a 40 percent increase in farm labor costs translates into a 4 percent increase in the retail price of fresh fruits and vegetables (0.30 farm share of retail prices x 0.33 farm labor share of farm revenue = 10 percent; if farm labor costs rise 40 percent, retail spending rises 0.4 x 10 = 4 percent). If average farm worker earnings rose by 40 percent, and the increase were passed on fully to consumers, average spending on fresh fruits and vegetables for a typical household would rise by less than $25 a year (4 percent x $615 = $24.60).

A 40 percent wage increase, on the other hand, would raise the average earnings of seasonal farm workers from $14,000 for 1,000 hours of work to $19,600, lifting the earnings of a farm worker household of four from half of the federal poverty line of $25,750 in 2019 to three-fourths of the poverty line.