

**California's Farm Labor Market:
The Case of Raisin Grapes**
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Summary

Raisin grapes are a commodity in which rising labor costs, uncertainty about the future availability of hand harvesters, and increasing competition from lower-cost production in Turkey are encouraging labor-saving mechanization. Grape varieties that mature earlier, allowing the canes on which bunches of grapes grow to be cut so that the grapes to dry into raisins while still on the vine, the dried on the vine or DOV method of production, facilitate the use of wine grape harvesters that use rotating fingers to knock the raisins from the vines and convey them to continuous paper trays for further drying or, if they are sufficiently dry, into bins for storage. DOV methods of production, which shift peak labor demands from September harvesting to winter pruning, were used for half of CA raisin crop in 2008.

Introduction

Raisins, mentioned in the Bible in the era of King David about 1,000 BC, are dried grapes. Green grapes normally have 22 to 26 percent sugar; drying reduces the amount of water so that raisins have 60 percent sugar by weight. The US was the largest producer of raisins until 2005, when Turkey's production surpassed that of the US. Turkey and the US combine to produce about 80 percent of the world's raisins.

Almost all US raisins are produced in California's San Joaquin Valley, where commercial raisin production began in the 1870s with the arrival of immigrants from present-day Armenia and Turkey. In 1909, CA produced 280,000 tons of green grapes that were dried into raisins (4 to 4.5 pounds of green grapes dry into a pound of raisins). In recent years, about two million tons of green raisin-type grapes have been harvested, and 70 percent have been dried into raisins. About 95 percent of California raisins are from the roughly 225,000 acres of

Thompson seedless grapes¹ that dry into the dark brown color associated with raisins, but some are crushed to make wine, juice or sweetener, making it difficult to determine the exact acreage of Thompson seedless grapes devoted to raisins.² Americans consume 1.5 to two pounds of raisins a year.

About 65 percent of CA's raisin grapes are in Fresno county, followed by 16 percent in Madera county and eight percent each in Tulare and Kern counties.³ Newly planted grapes require four years to reach commercial yields, but it takes six to seven years after planting to achieve yields of 8-12 tons of green grapes or 2-3 tons of raisins per acre.

There are about 3,500 CA raisin growers with an average 50 acres each; many raisin growers are retired or depend mostly on off farm income (ERS, 2003). Raisin production has been rising, from an average 200,000 tons a year in the 1970s, 300,000 tons a year in the 1980s and 1990s, and 400,000 tons a year between 2000 and 2003; raisin production peaked at 484,000 tons in 2000.

A Federal Market Order has regulated the flow of raisins to the market since 1949. A Raisin Advisory Committee that includes producers and handlers determines how much of the crop will be marketed immediately as "free tonnage" and how much will be placed in the "reserve pool" and sold at concessionary prices to foreign buyers or the school lunch program. The price received by growers is the weighted average of the free and reserve prices, so that a grower price of \$1,310 a ton, as was negotiated by the Raisin Bargaining Association for 2008-10, means about \$800 a ton to growers on all their raisins if 60 percent of the raisin crop is free tonnage. The RAC receives federal Market Access Program funds to promote the sale of US raisins abroad.

Raisin farmers in recent years have had gross revenues of about \$350 million a year from 425,000 tons of raisins, an average of about \$800 a ton. However, raisin prices have fluctuated over the past three decades from \$200 to \$1,250 a ton. Especially between 2000 and 2002, there was a surplus of raisins due to high

¹ The Thompson seedless grape was developed by Scottish immigrant William Thompson.

² In 2008, CA had 225,000 acres of raisin-type grapes, including 221,000 bearing acres (98 percent); 92 percent were Thompson seedless. NASS reported that 25,000 acres of mostly raisin-type grapes were removed after the 2008 harvest. California in 2008 had 526,000 acres of wine grapes, 92 percent bearing, and 93,000 acres of table grapes, 89 percent bearing
www.nass.usda.gov/Statistics_by_State/California/Publications/Fruits_and_Nuts/200903grpac.pdf

³ Data from CA Grape Acreage Reports,
www.nass.usda.gov/Statistics_by_State/California/Publications/Fruits_and_Nuts/index_gab.asp

production and foreign competition, and only 56 percent of raisins were allotted to free tonnage.⁴ Prices dropped from \$1,220 a ton in 1999 to \$569 a ton in 2000, and fell further to \$377 a ton in 2002, largely because of reduced purchases of Thompson seedless grapes by wineries.

In response to the low prices, a raisin diversion program was implemented to encourage raisin growers to remove vineyards or prune their vines to reduce production. Raisin prices have since rebounded, to at least \$1,310 a ton for free tonnage between 2008 and 2010.⁵ If 40 percent of raisins are placed in reserve, growers would effectively receive about \$800 a ton.

The US exported about 120,000 tons of raisins a year in the late 1990s, with three-fourths sent to the EU. Turkey is the world's leading exporter of raisins, accounting for a third of global exports, followed by the US and Iran, about a sixth of global exports each, and Greece and Chile, each accounting for about a twelfth of global raisin exports. Chile is the leading supplier to the US of imported raisins.

Hand Labor

During the 1990's, the raisin industry estimated that 40,000 to 50,000 workers were required for the typical six-week harvest. Due to declining acreage, increased mechanization, and perhaps more realistic reporting, industry leaders have reduced estimated harvest employment to 20,000 to 30,000 workers.⁶ Workers wielding a curved knife reach under the vines to cut bunches of green grapes, drop them in a plastic tub or pan, and dump the 20-pound tubs onto paper trays lying between the rows. The green grapes dry into raisins in the 100-degree plus heat.

After one week, the trays with partially dried grapes are turned or rolled to ensure uniform drying. After another week or two, the rolled up trays are picked up and taken to a facility where they are shaken off the paper trays unto a conveyor belt, where stems and debris are removed before the raisins are taken to a handler/packer for storage and sale.⁷

⁴ Fewer raisins were crushed for wine since the 1990s than in earlier years.

⁵ The Raisin Bargaining Association, which represents a third of raisin growers, announced a minimum price of \$1,310 a ton for raisins produced in 2008, 2009 and 2010 in April 2008.

⁶ ["Raisin Growers Hope Labor Lasts Through Harvest," Ag Alert, California Farm Bureau Federation, September 5, 2007.](#)

⁷ CA had 22 raisin packers in 2003, including three cooperatives, one of which is Sun-Maid.

Raisins are vulnerable to rain damage during the 2 to 3 weeks they are drying, and there is always a labor shortage in the race between sugar and rain. Grapes are literally sugar balls, with twice as much sugar as sugar cane or sugar beets. Every August, farmers measure the rising sugar level of their grapes and, when they contain 22 or 23 percent sugar, most turn to contractors for harvesters. Farmers are required to have their raisins drying on the ground by a certain date, typically about September 20, to collect payments under their crop insurance policies in the event of rain. The longer farmers wait to begin the harvest, the more workers are needed. If the harvest begins 20 days before the "rain date," twice as many workers are needed than if the harvest begins 40 days before the rain date.

With most harvesters brought to farms by labor contractors, a farmer may complain of a labor shortage if he requests two 40-worker crews and gets two 25-worker crews, increasing the risk of rain damage to the drying grapes. Farm organizations regularly report shortages of 10 to 20 percent, meaning they would like 4,000 to 8,000 additional workers.⁸

Harvesters are paid piece rate wages of about a cent a pound or 25 cents for each 20-pound tray; the state's minimum wage is \$8 an hour, so a worker must harvest at least 32 trays an hour.⁹ In 1991, when the state minimum wage was \$4.25 an hour, the piece rate was \$0.16 a tray, so a worker would have had to harvest at least 26 trays an hour.¹⁰ The productivity standard rose because the minimum wage rose 88 percent between 1991 and 2008, while the piece rate rose 56 percent.¹¹

Growers harvesting 10 tons of green grapes or 20,000 pounds an acre generate 1,000-20 pound trays, and harvesting them costs \$250 in wages to workers plus \$100 or 40 percent in overhead payments to contractors. If growers receive a net \$800 a ton for 2.5 tons of raisins per acre, labor costs of \$350 an acre are 18 percent of the \$2,000 gross revenue per acre. Growers incur additional costs for

⁸ Manuel Cunha Jr. of the Nisei Farmers League asserted that raisin growers were "short" 20 percent of the workers needed for the harvest in 2005, reporting 50 calls a day asking for harvest workers. Dennis Pollock, "Labor shortage sours citrus harvest," Fresno Bee, November 24, 2005.

⁹ Harvest cost estimates are from University of California Cooperative Extension, "Sample Costs to Establish a Vineyard and Produce Grapes for Raisins, 2006."

¹⁰ A 1991 survey reported that the average piece rate was \$0.16 a tray, about the same rate that had been paid for the previous decade (Alvarado, et al). In 1994, EDD found that the prevailing wage was \$0.17 a tray, and rose to \$0.19 a tray by 1997.

¹¹ Farmers typically use farm labor contractors (FLCs) to obtain and supervise harvest labor. Payroll and FLC charges average 8-10 cents a tray, making grower costs 33-35 cents a tray.

turning the trays, picking them up, and putting the raisins into bins for delivery to a packer. U.C. Cooperative Extension estimated the cash costs of growing and harvesting raisins using the conventional tray-dried method to be \$2,150 per acre in 2006, suggesting little profitability.

Most workers pick 30 to 40 trays an hour, earning \$8 to \$10 an hour or \$100 for a 10-hour day. Most raisin pickers do not receive fringe benefits beyond those required by law, viz, social security, unemployment insurance, and workers compensation. A 1991 survey of raisin harvesters reported that over 99 percent were born abroad, 92 percent were male, and a third were unauthorized (Alvarado et al, 1993); by the mid-1990s, it was estimated that two thirds of raisin harvesters were unauthorized (Mason, et al 1997). The median age of raisin harvesters in these surveys was 28, and they had an average five years education in Mexico.

Mechanization

There is an labor-saving alternative to scanning the skies for rain clouds and complaining of labor shortages. Some grape varieties reach optimal sugar levels earlier, at the beginning rather than the end of August. Workers or a machine can cut the canes holding bunches of green grapes so they begin to dry into raisins while still on the vine, the so-called dried-on-the vine (DOV) method of harvesting. Another machine (a modified wine grape harvester) with rotating fingers knocks the raisins from the vine and places them on a continuous paper tray in the vineyard for further drying or, if they have completely dried, conveys the raisins to a bin traveling alongside the harvester.

About 35 percent of the raisins harvested in 2008 used the “continuous tray” system; another 15 percent used the DOV method in which all the drying of raisins into grapes was done on the vine. The continuous-tray system is far more popular because it can be used in established vineyards with little or no modification to the trellises on which grape vines grow. According to UC cost studies, traditional tray-dried (hand) harvesting costs were \$494 an acre in 2006,¹² while continuous tray mechanical harvesting costs were \$282 an acre in 2008 (UC Cooperative Extension, 2008). The cost savings of continuous tray harvesting are somewhat offset by higher amortized (or rental) equipment costs of \$259 an acre for the equipment needed for the continuous tray method versus \$33 an acre for much less equipment needed for hand-harvesting. Farmers who say they save about

¹² This includes \$270 for hand picking, \$34 for rolling trays, \$112 for hauling and boxing, \$34 for shaking, \$20 for hauling to the processor, and \$24 for assessments (U.C. Cooperative Extension, 2006, op cit.).

“...half the cost of labor” with the continuous tray system are apparently not including increased equipment costs in their calculations.¹³

Sun-Maid Growers developed and patented a DOV raisin-production system that uses a specially-designed trellis to divide the vine canopy into fruiting and renewal zones. For \$2,000 an acre, this system can be implemented in existing vineyards, facilitating DOV harvesting. The fruiting zone, which later becomes the drying zone, is oriented toward the south side in rows that are planted from east to west to speed the drying of green grapes into raisins. There are cane severing machines, leaf removers, and mechanical harvesters available.

In newly planted vineyards, harvest labor requirements can be reduced even more. Madera-area grower Lee Simpson developed a high-density raisin-grape vineyard, with almost 1,100 vines an acre (twice the usual number) trained to grow on overhead trellises with fruiting and renewal zones in alternating rows. The canes with bunches of grapes are cut by hand in July-August, and the raisins dry on the vine in six weeks before being knocked mechanically into bins. Rain does not damage these drying raisins because it runs off, and yields are much higher, over five tons of raisins an acre.

Innovators such as Simpson represents one end of the spectrum, while growers in their 60s and 70s with 30 to 40 acres of raisins represent the other. Many of these older growers are reluctant to make the investments needed to retrofit their vineyards for mechanization and buy or lease harvesting machines that can cost \$150,000 to \$200,000 each. Countries such as Turkey can produce raisins with hand labor cheaper than California growers, \$600 a ton or less versus at least \$800 a ton in California. Faced with uncertainty about the future demand for their raisins, many smaller farmers are reluctant to incur the fixed costs associated with mechanization.

Conclusions

The US raisin industry is mechanizing because the industry is globalizing, preventing US raisin prices from rising as much as they otherwise would. As a commodity that is dried and storable, raisins are easier to mechanize than most fresh fruits and vegetables, since bruises and blemishes from machine handling are less of a worry.

The major factors encouraging mechanization in the CA raisin industry are higher wages and labor uncertainty at a time of increased global competition. To remain competitive, CA producers must reduce their production costs, which is most easily achieved by reducing labor costs and increasing yields in DOV

¹³ [Lisa Lieberman, “Labor Changes Boost Mechanization,” Capital Press, October 7, 2005.](#)

systems. Major obstacles to mechanization include the structure of the industry, large numbers of relatively small producers, and the availability of labor.

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