

Comparison of Labor Costs between Florida and Mexican Strawberry Industries

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Introduction

Florida is the largest winter strawberry producing state in the U.S. In 2015, the Florida strawberry industry planted 11,000 acres of strawberries and produced 240 million lbs strawberries (USDA-NASS, 2016). The farm gate value of the industry was \$291 million in 2015, and the total economic contribution of the industry was estimated at over \$700 million in 2015 (Hodges, 2017). In recent years, the industry has faced growing competition from Mexico. Fresh strawberry imports from Mexico grew dramatically in the past decade. Total imports of fresh strawberries from Mexico increased fourfold during the period of 2004-2014 from 93 million lbs to 355 million lbs, and the total U.S. imports reached a record 365 million lbs in 2016 (USDA, 2016), almost exclusively from Mexico (99.7%). Most of the Mexican strawberries are produced in Central Mexico and imported in wintertime, when Florida strawberries are on the market. As a result, large imports from Mexico have posed great challenges for the Florida strawberry industry (Suh, Guan, Khachatryan, 2017).

Mexican's competitive advantage in labor cost is a fundamental driving force that led to the surging export (Biswas, Guan, and Wu, 2017). Strawberry is a labor-intensive crop and major tasks such as planting and harvesting require a significant amount of labor. Labor is the largest cost item in Florida strawberry production budget; on average, it accounts for 40% of the total production costs (Guan, Wu, and Whidden, 2017). The purpose of this study is to compare labor costs in Florida and Mexican strawberry production.

Surveys in Florida and Mexico

We conducted a strawberry industry labor survey in Florida for the 2014/2015 season and a growers survey in Central Mexico for the 2013/14 season to collect labor use and cost information. While our Florida growers survey focused exclusively on labor, including labor costs and productivity, the Central Mexican strawberry growers survey was a more comprehensive survey providing an overview of both production practices and costs in Central Mexican strawberry industry. One section of the survey was dedicated to labor with a focus on costs. Both surveys were completed by in-person interviews. Although labor information collected with these two surveys were for two different seasons (2013/2014 vs. 2014/2015), the cost comparison still serves as a reference to highlight the difference in labor costs.

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Wage Rates

In U.S. agriculture, general field work is usually paid by hour at a low wage rate. In Florida, general field workers were often paid the state minimum wage rate, which was \$8.05 per hour in 2015. But certain specialized work is paid a higher wage; for example, machine operators or tractor drivers were paid \$12 per hour (BLS, 2015). Strawberry pickers are usually paid a piece rate, and the rate varies within the season depending on the time of harvest. At the beginning of the strawberry harvest season (November), the fruit yield is lower and a high piece rate has to be paid to meet the minimum wage requirement. On average, pickers were paid \$2.5 per flat of strawberries (a flat holds 8 lbs of fruit) early in the season. Some growers paid as high as \$3 per flat. Throughout the season, as fruit yield increases, the time to harvest one flat of strawberries significantly decreases; the piece rate gradually decreases to \$1.75 per flat of strawberries. Workers in the Mexican strawberry industry are generally paid a lower wage rate. The daily wage rates were 140-150 pesos (\$10.1-\$10.8) in 2014 for tasks such as bedding, spraying and runner cutting, and 170 pesos (\$11.5) for planting transplants. Mexican piece rates for strawberry pickers varied depending on market destinations of strawberries. Pickers of fresh strawberries for export markets were paid 15 pesos (\$1.02) per box (4 kg or 8.82 lbs), while pickers of strawberries for processing facilities were paid 12 pesos (\$0.81) per barrel (8 kg or 17.6 lbs), respectively.

Cost Comparison

Job tasks requiring intensive seasonal labor input for strawberry production include bedding, planting, runner cutting, spraying, and harvesting. We compare labor costs of these tasks for Florida and Central Mexico growers (Table 1). Bedding is a series of operations prior to planting and involves disking, shaping, rolling the beds, applying pre-plant fertilizer, burying irrigation lines, and laying plastic mulch. The labor cost for bedding was about \$177 per acre in Florida for the 2014/15 season, while the cost was \$94 per acre in Central Mexico for the 2013/14 season.

The next step in strawberry production is planting, or plant establishment. Workers gather the plants in buckets or sacks, and place the strawberry plants inside the punched holes. Planting 18,000 – 20,000 transplants per acre costs \$351 in Florida. Although transplant population could reach 30,000 per acre in Central Mexico, the labor cost in planting was only \$86 per acre.

Table 1. Labor costs (\$/acre) of major tasks in strawberry production

Items	Florida(2014/15)		Mexico(2013/14)	
	\$/acre	\$/flat	\$/acre	\$/flat ^a
Bedding	177	0.06	94	0.03
Planting	351	0.12	86	0.03
Cutting, hoeing and weeding	943	0.31	423	0.14
Spraying	61	0.02	409	0.14
Harvesting	6,900	2.3	2,830	0.93
Total	8,432	2.81	3,842	1.27

- a. The unit cost is for strawberries for the export market. The 2014 exchange rate of 13.84 pesos/dollar is used.

In midseason, strawberries produce runners whose roots remain attached to the mother plants. These runners need to be cut periodically during the growing season so that the plants have more nutrients for berry production. Usually, three cuttings are needed in Florida. Sometimes growers need to hoe weeds or pull the weeds by hand. On average, these tasks take 117.1 man-hours, costing a total of \$943/acre in Florida. Mexican strawberries have a longer production season lasting from September to June, thus requiring more runner cuttings. Because no reliable survey data are available for this cost item in Mexico, we assume that Mexican strawberries need five runner cuttings and take 150 percent of the amount of Florida cutting time for each cutting due to the longer season and higher transplant density. As a result, Mexican growers would spend an average of \$423 per acre on runner cutting and weeding tasks.

Spraying is an operation in which machine operators drive tractors and spray pesticides to control diseases, insects, and weeds. Florida growers apply chemicals regularly to control disease with an average frequency of 22 applications over the season, resulting in a labor cost of \$61 per acre. Spraying labor cost in Mexico was estimated at \$409 per acre as the task is mostly done manually under high tunnels.

Harvesting is the most labor-intensive operation and constitutes the largest share of total labor expenditures. Florida pickers could pick an average of 11 flats per hour at the peak season, while at the beginning of the season (November) they could pick only about 3 flats per hour. Weighting the piece rates over time (by monthly yield) and across growers (by acreage), we obtained a season-average piece rate of \$2.30 per flat for Florida pickers. Assuming an average yield of 3,000 flats per acre, the typical yield level in a normal year, the labor expenditures for harvesting would be \$6,900. The Agrifood and Fisheries Information Service of Mexico reported that average Central Mexican strawberry yield was 4,963 flats per acre during 2013-2015. Assuming that 30% of strawberries were picked for the export market while others were sold to processing facilities and domestic fresh strawberry markets, the total labor cost for harvesting for fresh export in Central Mexico was estimated at 39,177 pesos per acre, which was \$2,830 per acre at the 2014 average exchange rate.

Altogether, the total of labor costs for producing strawberries in Florida was \$8,432 per acre while the cost was 53,173 pesos (\$3,842) per acre in Central Mexico (Table 1). To make a fair comparison, we calculated labor costs per flat of strawberries sold to the U.S. market. The labor cost was \$2.81 per flat for Florida strawberries. For Mexican exported strawberries, we need to divide non-harvest labor costs between fresh exported strawberries and non-export strawberries (fresh local plus processing). The survey data show that fresh export strawberries in Central Mexico accounted for about 50% of total production value, though they only accounted for 30% of production volume. We use this as the weight and allocate 50 percent of the non-harvest labor cost to fresh export strawberries. Based on the number of flats of fresh strawberries (1489 flats per acre) exported to the U.S., the per-flat labor cost for strawberries exported to the

U.S. was 18.27 pesos (\$1.27), which is approximately 45% of the labor cost for Florida strawberries.

Concluding Remarks

Our survey results show that labor costs significantly more in Florida strawberry industry than in Central Mexican strawberry industry, although Central Mexican strawberries require more manual work because of its longer picking season. The labor costs for tasks listed in Table 1 were \$8,432 per acre in Florida while they were 53,173 pesos (\$3,842) per acre in Central Mexico. The average labor cost was \$2.81 for Florida strawberries while it was 18.27 pesos (\$1.27) per flat for Mexican strawberries sold to the U.S. market, which is 45% of the Florida cost.

There are two points that should be noted. First, these cost estimates are only for the tasks covered in Table 1, which are major tasks in strawberry production but are not an exhaustive list. Other tasks excluded from our comparison include crew and general management and post-harvest activities. If these activities were included, the difference would be even larger. Guan, Wu, and Whidden (2017) showed that labor costs for crew and general farm management were \$2,224 per acre for Florida strawberries in the 2012/2013 season. After adjusting for the wage growth of 5.3% (OECD, 2016), this component would be \$2,342 per acre for 2014/2015. The total labor cost for 2014/2015 would be \$10,774 per acre (based on a yield 3,000 flats/acre). Extrapolating the Mexican labor cost in Table 1 (\$3,842) by the same proportion to account for the crew and general farm management would result in a total labor cost of \$4,895 per acre for the 2013/2014 season. Note that the extrapolation rate used most likely represents the upper bound because the wage difference in Mexico between managers and workers is likely to be less than that in the U.S. Further adjusting the labor cost to the 2014/2015 season with a 2.4% wage growth (OECD, 2016) to make it comparable to the Florida data results in a total labor cost of \$5,012 per acre for Mexican strawberries. Compared to the Florida cost estimate, labor cost for Mexican strawberries was at least \$5,762/acre cheaper than that of Florida strawberries.

Second, the exchange rate used in this study was 13.84 pesos per dollar. With the devaluation of the peso against the dollar, it becomes even cheaper to produce in Mexico. The current exchange rate is around 18 pesos per dollar. This would bring the \$5,012/acre down to \$3,853/acre. Then the gap between Florida and Mexican labor costs increases to \$6,921 per acre.

In sum, there is a large cost difference in labor between Florida and Mexican strawberry production. This difference is not likely to narrow down in the foreseeable future without a major technological breakthrough, such as mechanization of strawberry harvesting. Given the wage differences and the dwindling migrant labor supply, it is imperative for the U.S. (and Florida) industry to develop labor-saving technologies (Guan et al., 2015) and production systems.

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