Florida Strawberry Production Cost and Trend

Zhengfei Guan,[1] Feng Wu, Alicia Whidden
University of Florida

Introduction

Florida is the second largest strawberry producing state, and the strawberry industry has a farm gate value of approximately $300 million (USDA-NASS, 2015) and a much higher total economic contribution to the state economy. In recent years, the industry has been facing various challenges. One of the challenges is the quickly rising production costs. Besides increases in materials costs such as fertilizer and pesticides, strawberry production is costing more in payroll, averaging $8,000 to $10,000 per acre. As the Mexican agricultural labor supply is tightening due to improved economic opportunities at home and increased border control, growers are facing severe labor shortage and will have to pay more to attract domestic labor or use the H-2A foreign guest workers to do the field work. Besides these market factors, government regulation and compliance requirements have also increased production costs.

Cost of production is a key factor of competitive advantage in market competition. Rising costs have been eroding the competitiveness of Florida strawberries and squeezing growers' profit margins over the years. Combined with rising imports of strawberries from Mexico (Suh, Guan, Khachatryan, 2017), these trends have posed serious challenges to the industry. To identify appropriate course of action, it is important for growers and policy makers to understand how production costs have changed over time and the underlying factors. We collected cost information over a 5-year period, analyzed the cost structure of Florida strawberries, and examined the trend of changing costs along with the factors underlying the trend.

Methods

The cost information was collected from sampled growers, which were selected from stratified samples from large, medium and small operations. Data collected include size of operation, yield, production, costs of materials, fumigant, pesticides, fertilizers, fuels, compliance costs, labor use and costs, overhead costs, etc. Growers were requested to provide cost estimates for each item for three seasons over 2008-2013: 2008/09, 2010/11, and 2012/13. Meanwhile, growers were also asked to forecast cost changes for 3 years after this period. Sampled growers were interviewed, and the cost items were explained to growers during the interview so that they could provide more accurate information.

Cost Estimates and Changes

Table 1 presents the cost estimates on a per-acre basis for producing strawberries in Florida. Columns 1-3 show the expenses associated with the three seasons, while column 4 summarizes

[1] Contact author: guanz@ufl.edu; 813-419-6590.

cost changes over the duration the sample period. The total production costs per acre in 2008/09, 2010/11, and 2012/13 were $22,847, $25,495, and $29,069, respectively. Note that the cost items in the table represent major costs of production, but the list is not exhaustive. In particular, we did not include asset depreciation as growers had difficulty providing accurate estimates. The cost budget studied includes three main categories -- pre-harvest variable costs, harvest and marketing costs, and overhead costs. The yield bases for cost budgeting are 2,900, 3,000, and 3,300 flats per acre in the three seasons, which are representative yields from the samples collected.

Table 1. Estimated costs of strawberry production in Florida

$/acre	2008/09	2010/11	2012/13	Change*
Cultural:				
Fumigant	490	628	740	250
Drip Tape	220	163	219	-1
Plastic Mulch	400	358	386	-14
Transplants	2,072	2,430	2,610	538
Fertilizer	500	602	687	187
Pesticides	845	949	1,061	216
Fuel	400	546	628	228
Waste Disposal	68	68	110	42
Total Cultural Costs:	4,995	5,744	6,441	1,446
Labor:				
Planting	155	225	287	132
Cutting runner &hand weeding	406	500	500	94
Spraying	192	350	210	18
Clean-up labor	143	181	265	122
Total Pre-harvest operating costs:	5,891	7,000	7,703	1,812
Harvest and Marketing:				
Picking	5,800	6,300	7,788	1,988
Picking supervisors	580	600	743	163
Packing box & Clamshell	5,003	5,265	6,105	1,102
Cooling	1,798	2,010	2,096	298
Food Safety	7	24	31	24
Total Operating Costs:	19,079	21,199	24,466	5,387
Overhead:				
Land Rent	500	700	1,000	500
Asset repairs/maintenance cost	345	331	307	-38
Property Taxes	163	135	107	-56
Unemployment taxes	100	101	154	54
Other taxes and charges	890	1,040	1,050	160
Property Insurance	193	211	195	1
Other insurance	203	162	163	-40
Supplies	111	94	145	34
Management	1,263	1,522	1,481	218

Total Production Costs($/acre):	22,847	25,495	29,069	6,222

Note: Costs in 2008/09 are estimated based on yield of 2,900 flats per acre; those in 2010/11 and 2012/13 are based on 3,000 flats and 3,300 flats, respectively.
* Change represents difference between the 2012/13 and 2008/09 seasons.

Pre-harvest variable costs include costs of cultural materials and labor use prior to harvest. The costs amount to $7,703 in 2012/13, representing 26.5% of the total production cost. The major cost components among the pre-harvest variable costs are transplants (9.0%), labor (4.3%), pesticides (3.6%), fumigant (2.5%), fertilizer (2.4%), and fuel (2.2%). These costs have increased by $1,812 per acre or 24% in the five-year period.

Transplant costs increased by $538, or 26% over the study period. The total transplant costs were $2,072 in 2008/09 and increased to $2,610 in 2012/13. Florida growers plant fresh bare-root transplants in late September or early October, which were delivered from nurseries located in Canada, California or North Carolina.

Fumigation costs have been on a steady rise and increased from $490 per acre in 2008/09 to $740 in 2012/13, representing an increase 51%. The ban of methyl bromide has led to the use of alternative fumigant products, which often provide poor or inconsistent pest control (e.g., Olson and Santos, 2012). To achieve a near equivalent level of effectiveness as methyl bromide, growers used several alternative fumigants in combination or in sequence. As a result, the fumigation costs have grown quickly.

Pesticide costs increased because of increased pest pressure due to methyl bromide phase-out. Alternative fumigants are not as broad-spectrum and effective as methyl bromide in the control of fungi and bacteria, nematodes, insects, and weeds, which requires the use of pesticides more frequently to reduce pest pressure to acceptable levels. The cost has increased $216 per acre, or 25.6%, in the five-year period.

Fuel and *Fertilizer* costs increased by $187 and $228 over the time period, representing an increase of 37.4% and 57%. This is not surprising given that from 2008 to 2012, gas and fertilizer price indexes increased 1.5 and 1.22 times, respectively.

Labor use before harvest is not as intensive as for harvest, but there are many operational tasks requiring hand labor, which include planting, runner cutting, hoeing, hand weeding, spraying, and field cleanup, etc. The total operational labor cost was $1,262 in 2012/13, an increase of $366, or 40.8%, from five years before. The main driving force is the increasing wage, which will be discussed next.

The total pre-harvest operating costs increased from $5,891 to $7,730 per acre. The costs increased by $1,812 per acre, or 30.8%.

Harvest and marketing costs were estimated at $16,763, representing 57.7% of the total cost. The main contributors to the harvest and marketing costs are the costs associated with picking, and packing & cooling, which accounted for 29.3% and 28.2%, respectively, in 2012/13. It is worth noting that the cost associated with food safety (compliance and 3rd party audit) was

low, which is expected to increase significantly under the Federal Food Safety Modernization Act (FSMA).

Strawberry harvesting is a highly labor-intensive operation, involving supervisors and pickers. Pickers are usually paid piece rate, and supervisors hourly. Supervisors could also get paid based on quantities harvested. Florida growers rely on immigrant workers, particularly Mexican workers, to pick strawberries. In response to the increased wage rate in rural Mexico due to rising productivity, Florida growers have had to pay higher wages to attract Mexican workers. On the other hand, tougher immigration laws passed in neighboring states may have decreased the flow of workers to Florida and pushed up wage rates. The piece rate for pickers increased from $2.1 to $2.36 per flat in the study period. Higher yields also caused increases in harvesting costs. The combined increase of wage and yield led to a 34% increase in harvesting costs, reaching $8,531 per acre in 2012/13.

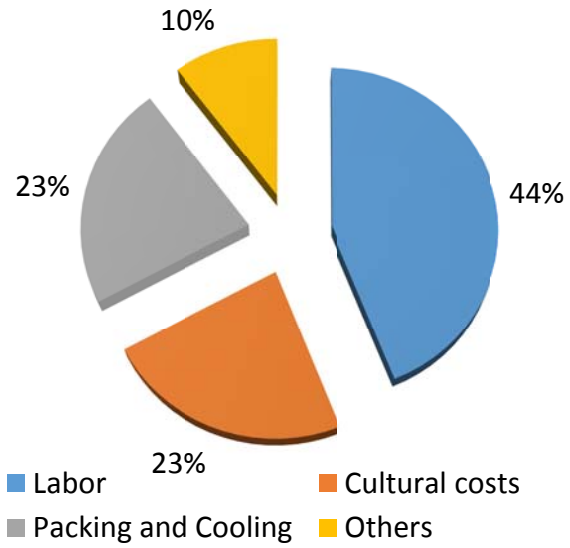
Packing and cooling costs changed primarily due to the higher yields. The price of packing boxes & clamshells has been relatively steady, increasing slightly from $1.73 to $1.85 over the period. Similarly, the unit cost of cooling did not change much, with an average of $0.64 per flat over the three seasons. This amount accounted for discount deals between coolers and some growers. Higher yields resulted in a greater need for packing and cooling; the total cost amounted to $8,201 per acre, which increased by $1,400 per acre, or 20.6%, from 2008/09.

Overhead costs are those associated with general operation of the farm, consisting of land rent, asset repairs and maintenance, management, and other overhead charges (e.g., property tax, insurance, supplies, etc.) and were estimated at $4,603 in 2012/13, accounting for 16% of the total cost. Two categories showing remarkable growth in recent years were land rent and management cost. Land rental has doubled since 2008/09 and amounted to $1,000 per acre. In addition, the increase in wage also drove up management cost by 17.3% from 2008/09 to $1,481/acre in 2012/13.

Trend of Cost Changes

Strawberry growers forecasted that cost categories will increase in the next three years, ranging from 2% to 30%. The categories that are likely to increase by more than 10% include fumigants, pesticides, and labor. This is consistent with our expectation. First, finding cost-effective fumigant alternatives will be a long term challenge. Effective post methyl bromide pest management will likely require the adoption of more integrated pest management approaches, including cover crops, pre- and post-emergence herbicides, new technologies for fumigant application, and new mulches. This integrated effort will increase pest management costs. Second, labor shortages are a serious challenge to the industry. Growers have found it increasingly difficult to find workers for their field work. As the border control has heightened and the immigration reform has been stalled, strawberry growers have to resort to the more expensive and cumbersome H-2A program to address the existing labor shortfall, which will continue to escalate labor costs.

Figure 1. Contributions to cost escalation



Conclusions

The estimated total production cost for strawberries in Florida was $29,069 per acre in 2012/13, or about $8.81 per flat assuming a yield of 3,300 flat per acre. The total cost was $22,847 per acre or $7.88 per flat five years ago. The total cost increased by $6,222 per acre, or 27.2%. Pre-harvest operating costs increased 30.8% over the study period. Over the same period, the farm gate prices declined due to rapid increases in imports. The rising costs and falling prices have significantly reduced growers' profit margins.

The cost item that has increased most significantly since 2008/09 was labor. Temporary labor needed for the operations from planting to harvest costs $9,793 per acre, while the year-round labor costs $1,481 per acre. The combined cost ($11,274 per acre) accounted for approximately 40% of the total cost. Over the five-year period studied, labor cost increased by $2,735 per acre or 32%, of which 11 percentage points were due to increased picking cost because of the yield difference, and the remaining 21 percentage points were caused by non-yield factors. Overall, labor contributed to 44% of the $6,222 total cost increase (Figure 1). Labor shortages and rising labor costs, if not addressed, will continue to impact Florida growers and the market share of Florida strawberries. Growers may be forced to cut down the acreage and some may even find their business's survival at risk (Suh, Guan and Khachatryan, 2017). Therefore, it is imperative for growers and policy makers to find viable labor solutions for the industry. Due to labor shortages, more growers are turning to the H-2A guest worker program. However, there have been various complaints about the program and the need of reform has been under heated discussion. Viable, cost-effective labor solutions could also help improve the

competitive position of other labor-intensive commodities such as tomato and pepper that have similar challenges with what the strawberry industry is facing (Wu, Guan, and Suh, 2017).

References:

Olson, S.M., and B.M. Santos (eds.). 2009. Vegetable production handbook for Florida. Vance Publishing Corporation, Lenexa, KS.

USDA, 2015. Quick Stats. U. S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), Washington, D.C.

Wu, F., Z. Guan, and D.H. Suh. 2017. The Effects of Tomato Suspension Agreements on Market Price Dynamics and Farm Revenue. *Applied Economic Perspectives and Policy*. Forthcoming.

Suh, D.H., Z. Guan, and H. Khachatryan. 2017. The Impact of Mexican Competition on the U.S. Strawberry Industry. *International Food and Agribusiness Management Review* 20: 591-604.