

# Sample Avocado Production Costs and Profitability Analysis for Florida<sup>1</sup>

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## Introduction

As an important tree fruit crop to the agricultural economy of Florida, the avocado industry is second only to citrus (NASS/USDA 2008). Annual farm gate sales are worth about \$24.4 million. At the wholesale end of the market, the Florida avocado industry is worth upwards of \$35 million per year (P. Brooks, personal communication, 2014). Approximately 80 percent of the crop is sold outside of the state; hence, the industry brings in a substantial amount of “new dollars” to the state, resulting in an overall economic impact of close to \$100 million per annum (A. Hodges, personal communication, 2014). The industry consists of about 7,000 acres (NASS/USDA 2013), representing about 60 percent of the total tropical fruit crop acreage. There are about 500 registered growers and about 30 registered avocado handlers and shippers (A. Flinn, personal communication, 2014). Over 98 percent of the avocados are grown in Miami-Dade County. Orchard size ranges from 0.1 to over 500 acres, with 93 percent of the farms less than 15 acres (NASS/USDA 2009).

Although avocado varieties produced in South Florida look similar due to their “green skin” and are easily distinguishable from the “purplish-black skin” varieties grown in California, they differ somewhat and fall into one of three main types: West Indian, Guatemalan, and Mexican. These three avocado types collectively comprise some 60 major and minor commercial varieties that mature at different

times during the season in various weights and sizes. As a consequence, yields per acre vary among producers, depending on the production techniques and varieties grown. There is also a tendency of *alternate-year bearing*, implying high yields one year and lower yields the next (although, recently, the pattern is less obvious). In recent years, there has been an upward trend with respect to average yields. This is due in part to trees being replanted with higher-yielding varieties and closer planting density. This practice started after the devastation to the industry caused by Hurricane Andrew in 1992 and has intensified within recent years.

This article provides an estimate of the costs and returns associated with avocado production in Miami-Dade County and a brief analysis of the profitability of the industry. Our sample budget is based on a five-year average marketable yield of 16,500 pounds, or 300 bushels (1 bushel = 55 pounds), per acre, and on estimates of the field run price. This price represents the average price the growers receive from the packing house for the total quantity marketed (delivered to the packing house), assuming a pack-out rate of about 80 percent. The budget does not make any provision for establishment costs. If the grove were recently established, an additional charge (amortization) should be included in the fixed costs (FE956). Although the assumptions made in computing the costs reflect the practices of the avocado growers in the area, the information provided here is intended only as a guide to facilitate estimating the

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financial requirements of maintaining avocado groves. Data used in the analysis were obtained from interviews with growers and Extension specialists.

## Cost of Production

Table 1 illustrates a sample budget, indicating a total *pre-harvest cost* of \$2,741 per acre, or \$0.17 per pound of avocados produced (on the tree). Of the total pre-harvest cost, operating costs totaled \$1,596 and fixed costs were estimated at \$1,145 per acre. The main operating costs were fungicide, fertilizer, and mow, with shares of 25.5 percent, 22.1 percent, and 15.9 percent, respectively. This is not surprising, given that fungicide is now the main cost item due to the threat of Laurel Wilt Disease, a deadly fungus that was discovered in the commercial avocado production area in 2012. Several growers have been applying fungicide as a spot treatment or in a prophylactic manner (P. Brooks, personal communications, 2014). Included under fixed costs were land rent, insurance, taxes, and overhead expenses (investment repairs and cost recovery for owned machinery). Although the majority of farmers own the land, an opportunity cost for the land was included equal to the existing land rental rate (\$500 per acre). This reflects the standard practice of valuing the contribution of the land.

When *harvesting and marketing* costs are added to production costs, the total per-acre cost increases to \$3,797. This translates into a cost of \$0.23 per pound to produce, harvest, and market avocados (\$0.064 per pound is added to the \$0.17 per pound cost of production to cover harvesting and marketing costs). The only contributor to the harvesting and marketing costs is the cost associated with picking and hauling. Because the fruit is easily bruised and scratched, avocados are hand-picked with the aid of self-propelled, hydraulically-powered equipment for positioning the worker in areas of the tree not easily reached from the ground. This makes harvesting a highly labor-intensive operation and relatively expensive. Federal Marketing Order 915, in existence since 1954, regulates production practices and harvesting procedures, such as those governing the size and quality of the fruit, as well as packing and shipping containers, and shipping dates. The Order is aimed at increasing grower returns by promoting orderly marketing conditions while at the same time ensuring consumer satisfaction. Harvested avocados are placed in bins and transported to packing houses.

Figure 1 illustrates the proportion of costs by category. Harvest and marketing costs account for approximately 28 percent of the total cost of producing and marketing the crop. The cultural cost (e.g., pruning, fertilization, and

pest control) is about 40 percent; fixed or overhead cost accounts for 30 percent; and, interest on capital is 2 percent.

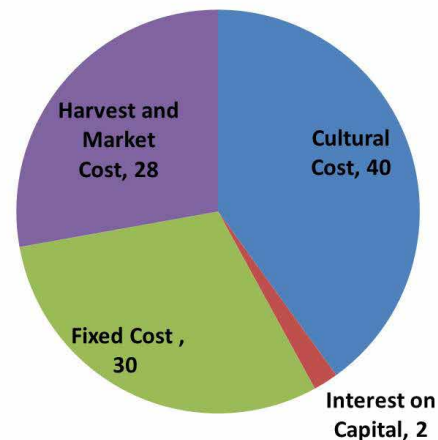


Figure 1. Proportion of costs

## Returns and Profitability Analysis

Avocado yield varies from less than 11,000 pounds per acre in a poorly managed orchard to more than 20,000 pounds per acre in a well-managed orchard. Yield also varies by variety. For this study, we used an average yield of about 16,500 pounds (300 bushels) per acre for a reasonably well-managed orchard. Assuming a planting density of 100 trees per acre, this implies a yield of about 165 pounds (3 bushels) per tree. As mentioned earlier, we assumed a Field Run Price (grower's price) of \$0.31 per pound, resulting in gross revenue of \$5,122 per acre. Subtracting the total cost of production and marketing (\$3,797) from the revenue (\$5,122) gives a net return to the grower of about \$1,325 per acre, or around \$0.08 per pound of marketable fruit (Table 1). This represents a return of 34.9 percent on the total cost of producing and marketing avocados. Given that most Florida avocado growers (93%) produce on farms less than 15 acres and 72 percent of growers produce avocados on farms less than 5 acres, total net return for the majority of growers is less than \$19,870 per annum. It should be pointed out that many of the growers who own their land tend to ignore the fixed costs and instead focus on the gross margin as their profit (i.e., the difference between total revenue and operating and marketing costs). Following such an approach implies a return of about \$0.15 per pound ( $\$0.31 - \$0.10 - \$0.06 = \$0.15$ ), or \$2,470 per acre. While such a return appears more favorable, it still may be insufficient for a 10-acre family farm. It can be assumed that some growers remain in the industry for land speculation and have other sources of income.

## Sensitivity Analysis

Table 2 presents a sensitivity analysis of net returns to a grower on a per-acre basis, while Table 3 presents a similar analysis conducted on the basis of gross margin (gross profit). In the best-case scenario where both price and yield are assumed to increase by 10 percent, net return per acre would increase from \$1,325 to \$2,068. In the worst-case scenario where both price and yield decline by 10 percent, net return per acre would decrease from \$1,325 to \$467 per acre. Other combinations of changes of prices and yields and their impact on net return per acre are shown in Table 2 as well. However, it should be noted that at the industry level, a sizeable increase in production usually results in a decreased in the price received by the growers. In general, it can be assumed that a 10-percent increase in output by the industry (aggregate) is likely to result in a 4.3 percent price reduction, other factors remaining constant. In addition, promotion of the health benefits associated with the consumption of avocados is increasing the demand for avocados and could serve to lessen the price impact resulting from increased supply of avocados. The information presented in Table 3 can be interpreted in a similar manner to that presented in Table 2, noting that this is with respect to gross profit which ignores the fixed cost estimates.

## Concluding Remarks

Our estimate of total annual production cost (including harvesting) for avocados in South Florida is \$3,797 per acre, or about \$12.66 per bushel. With a gross revenue of \$5,122 per acre (\$17.07 per bushel), this implies a net return to the grower of about \$1.325 per acre, or \$4.42 per bushel. Since most growers sell their crop to packing houses, they are somewhat restricted in their ability to influence the price they receive; however, they can adopt practices that will increase their pack-out rates and, consequently, the profitability of their operations. The recent threat from the discovery of the Red Ambrosia Beetle and Laurel Wilt Disease within the major avocado production areas is already having a negative impact on the cost of production. The continued spread of this deadly disease is of grave concern since any major addition to production costs associated with the management of this pest and disease could easily cause many of these operations to become unprofitable.

## References

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Table 1. Sample budget for avocado production

<b>Item</b>	<b>Quantity</b>	<b>Value per Acre</b>	<b>Value per Pound</b>
	(pound)	(\$/acre/year)	(\$/pound)
<b>REVENUE</b>			
Marketable yield (pounds/acre)	16,500		
Field run price			0.31
Total revenue		5,122	
<b>OPERATING COSTS</b>			
Fertilizer		352	
Fungicide		407	
Herbicide		136	
Insecticide		125	
Pruning		150	
Irrigation		96	
Mow, vine, miscellaneous		254	
Interest on operating capital 5%		76	
Total operating cost		1,596	0.10
<b>FIXED COSTS</b>			
Cash overhead			
Insurance		100	
Taxes		100	
Non-cash overhead			
Land rent		500	
Other overhead		445	
Total fixed cost		1,145	0.07
<b>TOTAL PRE-HARVEST COST</b>		<b>2,741</b>	<b>0.17</b>
<b>HARVEST &amp; MARKETING COSTS</b>			
Pick and Haul — \$0.064/pound		1,056	0.06
Total harvest and market cost		1,056	0.06
<b>TOTAL COST</b>		<b>3,797</b>	<b>0.23</b>
<b>GROSS MARGIN</b>		<b>2,470</b>	<b>0.15</b>
<b>ESTIMATED NET RETURNS</b>		<b>1,325</b>	<b>0.08</b>

Table 2. Sensitivity analysis, net returns per acre

Yield (pounds/acre)		Wholesale Price (dollars/pound)				
		0.28 (-10%)	0.29 (-5%)	0.31 (base)	0.33 (+5%)	0.34 (+10%)
14,850	(-10%)	467	615	918	1,209	1,358
15,675	(-5%)	645	802	1,115	1,429	1,585
16,500	(base)	823	988	1,325	1,648	1,813
17,325	(+5%)	1,001	1,174	1,521	1,867	2,041
18,150	(+10%)	1,179	1,361	1,724	2,087	2,068

Table 3. Sensitivity analysis, gross margin per acre

Yield (pounds/acre)		Wholesale Price (dollars/pound)				
		0.28 (-10%)	0.29 (-5%)	0.31 (base)	0.33 (+5%)	0.34 (+10%)
14,850	(-10%)	1,512	1,760	2,057	2,354	2,503
15,675	(-5%)	1,790	1,947	2,260	2,574	2,730
16,500	(base)	1,968	2,133	2,470	2,793	2,958
17,325	(+5%)	2,146	2,319	2,666	3,012	3,186
18,150	(+10%)	2,324	2,506	2,869	3,232	3,413