Estimates of the Replacement Costs of Commercial and Backyard Avocado Trees in South Florida[1]

Edward A. Evans and Jonathan H. Crane[2]

Introduction

The Florida avocado industry is the state's second-largest fruit industry (behind citrus) and is worth $12 to $14 million a year at the farm gate (USDA/NASS 2008) and $30 million at the wholesale level (Brooks, personal communication). The commercial avocado industry in Florida consists of approximately 7,500 acres (60 percent of the total tropical fruit crop acreage), about 951 growers (USDA/NASS 2008; USDA/NASS 2009; Crane, Balerdi, and Maguire 2007), and 35 registered avocado handlers and shippers (Brooks, personal communication). Of these 7,500 acres, over 98 percent are located in southwest Miami-Dade County. In addition to commercial production, many homeowners in South Florida have backyard avocado trees. These trees form an important part of the urban canopy and contribute economic, aesthetic, and environmental benefits, adding as much as 10 percent to residential property values. They provide shade and wildlife habitat, and improve air quality. As pointed out by McAliney (1993), a single mature tree can absorb carbon dioxide at a rate of 48 pounds per year, and release enough oxygen back into the atmosphere to support two human beings. It is estimated that there are more than 250,000 backyard avocado trees scattered across Miami-Dade County (Pybas, personal communication).

In light of the recent discovery of the redbay-laurel wilt disease complex, which can destroy both commercial and backyard avocado trees (Mayfield et al. 2008), the purpose of this article is to estimate how much it would cost to replace all commercial and residential backyard avocado trees in Miami-Dade, Broward, Palm Beach, and Lee Counties.

Methodology

Although there are several approaches to estimating the replacement cost, the approach adopted in this article is based on compensatory value (Nowak et al. 2002); that is, the value owners should be compensated for the loss of mature avocado trees, based on the principle that avocado trees can be viewed as structural assets. The compensatory value of the trees is calculated using the internet tool *Tree Value Analysis* (Evans et al. 2006). Calculations are based on the present value of the net costs of replacing lost trees and nurturing replacement trees to the production equivalent of lost trees. Net costs include: (1) the cost of replacing trees (stump removal, land preparation, purchasing and planting new trees); (2) new tree cultivation costs (fertilizer, pruning, weeding) during a replacement period of seven years; and (3) lost revenue from non-bearing trees. Stream of net costs for bringing replacement trees up to the production equivalent of lost trees are discounted to determine the present value of a tree.

Using the tool and inserting a $0.25 per pound farm gate price, the 2007/08 average grower's price (USDA/NASS 2009), a $150 per tree stump removal cost (Evans 2006),

1. This document is FE825, one of a series of the Food and Resource Economics Department, UF/IFAS Extension. Original publication date December 2009. Reviewed April 2019. Visit the EDIS website at https://edis.ifas.ufl.edu for the currently supported version of this publication.

2. Edward A. Evans, assistant professor, Food and Resource Economics Department; and Jonathan H. Crane, professor, Horticultural Sciences Department, UF/IFAS Tropical Research and Education Center, Homestead, FL.

and a five percent discount rate, we estimate the value of a mature tree to be around $330. This value was used for both commercial and non-commercial avocado trees and does not include any provisions for sentimental values attached to a homeowner's tree, or the fact that inputs used by the homeowner, including fertilizer and water, could be far more expensive than those used by commercial producers. In the case of commercial orchards, an average of 87 trees per acre was used to estimate the total number of trees in a county (Balerdi, personal communication)

To estimate the total number of backyard trees in Broward, Palm Beach, and Lee Counties, it was assumed that the ratio of backyard trees to population that exists in Miami-Dade County would be the same in these counties. This ratio was then applied to population estimates of these counties as contained in the 2008 United States Census.

Results

The table below summarizes the results of the cost analysis. The figures indicate that the total cost to replace all avocado trees in the four counties is $422.8 million. The cost to replace only the commercial trees is estimated at $216.1 million, while the cost for residential backyard trees is $206.7 million. As expected, Miami-Dade County had the highest total replacement cost of $294.9 million, followed by Broward County at $60.5 million.

Conclusions

Avocado trees contribute several market (food source, income, and employment) and nonmarket (open space retention, canopy cover, carbon sequestration, and wildlife habitats) benefits. The importance of canopy cover is recognized by the counties as evidenced by the Adopt-A-Tree Program, which has distributed about 13,822 avocado trees to date. Redbay laurel wilt disease complex has spread to South Florida, where the cost to replace avocado trees destroyed by this disease in Miami-Dade, Broward, Palm Beach, and Lee Counties would be about $423 million. As our analysis shows, it is imperative to prevent the spread of this disease in Florida.

References

Brooks, P. 2009. Personal communications, Miami, FL.

Crane, J.H., C.F. Balerdi, and I. Maguire. 2007. *Avocado Growing in the Florida Home Landscape*. CIR1034. Gainesville: University of Florida Institute of Food and Agricultural Sciences. https://edis.ifas.ufl.edu/publication/MG213

Evans, E., C. Balerdi, J. Crane, and S. Nalampang. 2006. *Determining the Value of an Orchard Tree*. FE676. Gainesville: University of Florida Institute of Food and Agricultural Sciences. https://doi.org/10.32473/edis-fe676-2006

Mayfield, A., J. Crane, and J. Smith. 2006. *Laurel Wilt: A Threat to Redbay, Avocado, and Related Trees in Urban and Rural Landscapes*. HS1137. Gainesville: University of Florida Institute of Food and Agricultural Sciences. https://edis.ifas.ufl.edu/HS391

McAliney, M. 1993. *Arguments for Land Conservation: Documentation and Information Sources for Land Resources Protection*. Sacramento, CA: Trust for Public Land.

Nowak, D., D. Crane, and J. Dwyer. 2002. "Compensatory value of urban trees in the United States." *Journal of Arboriculture* 28(4): 194–199.

Pybas, D. 2009. Personal communications, Miami, FL.

U.S. Census. 2008. United States Census Bureau, Washington, D.C. https://data.census.gov/cedsci/

USDA/NASS. 2008. *Non-Citrus Fruits and Nuts: 2008 Preliminary Summary, Fr Nt 1-3 (09)a*. United States Department of Agriculture, National Agricultural Statistic Service, Washington, D.C. (May 22). https://downloads.usda.library.cornell.edu/usda-esmis/files/zs25x846c/6w924f29j/np193c693/NoncFruiNu-01-23-2009_revision.pdf

USDA/NASS. 2009. *Census of Agriculture, Florida – State and County Data, Volume 1: Graphic Area Series, Part 9*. United States Department of Agriculture, National Agricultural Statistics Service, Washington, D.C. (April). https://agcensus.library.cornell.edu/wp-content/uploads/2007-Florida-flv1.pdf

Table 1. Replacement cost based on value of avocado trees.*

	Unit	Miami-Dade County	Broward County	Palm Beach County	Lee County	Total
Value of commercial trees	Dollars	330	330	330	330	
Value of backyard trees	Dollars	330	330	330	330	
Number of trees per acre	Number	87	87	87	87	
Number of acres (commercial)	Number	7,400	10	30	90	**7,530**
Number of commercial trees	Number	643,800	870	2,610	7,830	**655,110**
Number of backyard trees	Number	250,000	182,554	131,898	61,830	**626,282**
Number of households	Number	2,398,245	1,751,234	1,265,293	593,136	**6,007,908**
Urban avocado tree density	Percent	10.4	10.4	10.4	10.4	**10.4**
Total replacement (commercial trees)	Dollars	212,454,000	287,100	861,300	2,583,900	**216,186,300**
Total replacement (backyard trees)	Dollars	82,500,000	60,242,721	43,526,275	20,403,970	**206,672,967**
Total	Dollars	**294,954,000**	**60,529,821**	**44,387,575**	**22,987,870**	**422,859,267**

* Based on the value of a tree (i.e., the amount of money the tree owner should be compensated for tree loss) as a structural asset. Farm gate price estimated at 25 cents per pound. Tree value analysis is located at https://agecon.centers.ufl.edu/TreeCostAvocado.htm