UNIVERSITY OF FLORIDA
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Institute of Food and Agricultural Sciences

Comparative Costs of Growing Citrus in Florida and Sao Paulo (Brazil) for the 2000-01 Season[1]

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Introduction

The states of Florida and Sao Paulo (Brazil) combined account for approximately 85 percent of the world's production of orange juice. Sao Paulo produces 45 percent of the total world production of orange juice and Florida produces about 40 percent. A 2000-01 comparison of the orange industry in Florida and Sao Paulo is shown in Table 1. Sao Paulo has over twice the number of acres and trees planted to oranges than does Florida. Total orange production in Sao Paulo is about 60 percent more than in Florida. However, about 95 percent of the orange production in Florida is utilized for processed orange products as compared to 75 percent in Sao Paulo.

Brazilian Currency Devaluation and Its Impact on the Cost of Processed Oranges

Prior to 1999, Brazil's currency (Real) and the U.S. dollar exchanged close to a one-for-one rate; however, some of the cost advantages due to the devaluation may be eroded. In January/February 1999, the Real was allowed to float on the international markets, resulting in a major devaluation in the Real to the U.S. dollar. Changes in the value of the Brazilian Real to the U.S. dollar are shown in Table 2.

The impact of the Brazilian currency devaluation was reported in 2000 by Muraro, et al. A summary of the effects of the devaluation (in Reals) on specific inputs for the 1998-99 season were as follows:

- Labor Costs: Since workers were paid at relatively the same wage rate before and after the devaluation, labor costs in U.S. dollar equivalents declined.
- Fertilizer prices increased about 75 percent (in Reals).
- Chemical and Herbicide prices increased about 30 percent and 40 percent, respectively (in Reals).
- Machinery costs: The combined impact of fuel/gasoline/diesel prices, equipment/parts prices, and labor used in manufacturing processes resulted in an increase in machinery operating costs of about 35 percent (in Reals).

1. This is EDIS document FE364, a publication of the Department of Food and Resource Economics, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. Published February 2003. Please visit the EDIS website at http://edis.ifas.ufl.edu
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Since part, or all, of the inputs are manufactured into commercial products in Brazil, the net effect of the Real devaluation (in U.S. dollars) was to lower Brazilian production costs relative to U.S. production. A comparison of the effects that the Brazilian Real devaluation had on the delivered-in costs for Sao Paulo processed oranges is shown in Table 3. In 1996-97, when the Real exchange rate was one-for-one, estimated delivered-in costs were $0.5213 per pound solids. In 2000-01, when the exchange rate to the dollar was 2.55 Reals per one U.S. dollar, estimated delivered-in costs were $0.4259 per pound solids (an 18 percent decrease compared to the 1996-97 season). Note that these costs do not include the Fundecitrus (a regulatory and research organization) grower assessment.

Cultural/Production Costs for Processed Oranges

For the 2000-01 season, comparative production/cultural costs are presented as a cost per acre and per pound solids in Table 4. The cost comparisons are for Florida processed oranges in the southwest citrus production region and for processed oranges in the state of Sao Paulo. Cultural costs refer to labor, fertilizer and chemicals, machinery operating costs, and contracted services. Other costs are machinery depreciation and financial/interest costs. Unlike in Florida, Sao Paulo citrus growers seldom reset, or replant, diseased or lost trees on a yearly basis. Therefore, an annual charge to replant the grove after 15 years is included as other costs for Sao Paulo. The average yield for oranges grown in southwest Florida was estimated at 457 boxes per acre (6.5 pound solids per box). In Sao Paulo, the average yield for oranges was estimated at 257 boxes per acre (6.0 pound solids per box).

Labor costs for Florida and Sao Paulo were estimated to be $204.88 per acre and $43.95 per acre, respectively. Chemical and fertilizer costs were $308.39 per acre for Florida and $170.91 per acre for Sao Paulo. Machinery costs were $121.51 per acre for Florida and $44.83 per acre for Sao Paulo. Florida's costs include $86.90 per acre for contract services such as hedging, topping, and tree replacement. Total production costs for 2000-01 were $721.8 per acre for Florida and $259.69 per acre for Sao Paulo. Cost per pound solids was $0.2429 per pound solids for Florida and $0.1684 per pound solids for Sao Paulo.

Machinery depreciation and financial/interest costs were $134.58 per acre for Florida and $45.21 per acre for Sao Paulo. The annual charge for replanting a citrus grove in Sao Paulo after 15 years was estimated at $49.22 per acre per year. Total 2000-01 specified costs were $856.26 per acre for Florida and $354.12 per acre for Sao Paulo. Total cost per pound solids was $0.2883 per pound solids for Florida and $0.2296 per pound solids for Sao Palo.

Harvesting Costs

Average harvesting costs for Florida and Sao Paulo are shown in Table 5. Picking and roadsiding costs for 2000-01 averaged $1.60 per box for Florida and $0.384 per box for Sao Paulo. Hauling, or transporting, oranges to a juice processing plant averaged $0.503 per box for Florida and $0.150 per box for Sao Paulo. The $0.150 per box hauling cost in Sao Paulo is a standard flat charge throughout the state. Most oranges are grown within a 35-mile radius of processing plants in Sao Paulo, thereby reducing the cost of hauling. In southwest Florida, most oranges are hauled over 75 miles to a processing plant. The total 2000-01 harvesting costs were $2.103 per box for Florida and $0.534 per box for Sao Paulo. Total harvesting cost per pound solids was $0.3236 per pound solids for Florida and $0.0890 per pound solids for Sao Paulo.

Delivered-In Costs for Oranges Produced in Florida and Sao Paulo

A comparative summary of all costs associated with delivering oranges to processors in Florida and Sao Paulo are shown in Table 6. The costs are presented on a cost-per-pound-solids basis. Both grower costs and harvesting costs comprise the delivered-in costs to a juice processing facility. In addition to production costs, total costs include interest on average capital investment and, for Florida, land taxes and regulatory costs. Total 2000-01 grower costs were $0.4344 per pound solids for Florida and $0.3369 pound solids for Sao Paulo.

Added to grower costs are harvesting and grower assessment costs. Grower assessment for Florida refers to the per-box assessment paid to the Florida Department of Citrus (FDOC). In Sao Paulo, the grower assessment is the per-box charge paid to Fundecitrus (a regulatory and research organization funded by citrus growers and juice processors). When total grower costs are added to harvesting and grower assessments, the total delivered-in cost was $0.7849 per pound solids for Florida and $0.4467 per pound solids for Sao Paulo.

FOB Costs of Bulk FCOJ Delivered to Florida Juice Processors

A comparison of the freight on board (FOB) cost of bulk FCOJ delivered to a Florida juice processing facility is shown in Table 7. FOB costs are presented on a cost-per-pound-solids basis There are four categories for FOB costs: delivered-in cost to processor, bulk processing cost, domestic costs, and foreign costs. The 2000-01 delivered-in cost per pound solids was estimated at $0.7849 per pound solids for Florida and $0.4467 per pound solids for Sao Paulo. Bulk processing cost for FCOJ was estimated to be $.2034 per pound solids for Florida and $0.1691 per pound solids for Sao Paulo. The two remaining cost items apply to FCOJ produced in Sao Paulo. Domestic costs were $0.0292 per pound solids and refer to the cost of transportation to the Port of Santos and storage, and harbor charges at the port. Foreign costs include the U.S. tariff, FDOC equalization tax, ocean freight and insurance, USDA inspection, transportation from a Florida port, and miscellaneous other costs. Total foreign costs were $0.4190 per pound solids. Total 2000-01 FOB costs for bulk FCOJ at a Florida processing facility was $0.9882 per pound solids for Florida and $1.0640 per pound solids for Sao Paulo.

Concluding Remarks and Observations

Despite the apparent advantage in cost of production, the Sao Paulo citrus industry faces a number of challenges that will impact the cost of production. Leprosis is a disease that is transmitted by mites that cause twig and limb "die back", which if not controlled, can kill citrus trees. Control of this disease requires at least two sprayings annually and sometimes pruning the diseased areas of a tree.

Citrus Variegated Chlorosis (CVC) is a disease that is vector transmitted and is primarily a problem in young trees. However, it can render any productive trees uneconomic due to the production of small, poorly developed fruit (young trees with multiple foliage flushes are the most susceptible). Control of CVC includes planting disease-free trees, pruning infected limbs, and spraying to control the insect vector.

A new disease called "Sudden Death Disease" is primarily located in the northern region of Sao Paulo state. This disease causes a quick decline in citrus trees similar to the citrus tristeza virus (CTV). Currently, the cause of this new disease is unknown. Sweet orange varieties budded onto Rangpur lime rootstock appear to be the most susceptible. Approximately 85 percent of all orange trees in Brazil are budded onto Rangpur lime rootstock.

Although citrus canker in Sao Paulo appears to be under control, the economic loss from the eradication of this disease is costly to citrus growers. Sao Paulo citrus growers receive no compensation for trees eradicated/destroyed that were infested or exposed to citrus canker.

In response to the challenges to control disease problems, Sao Paulo has implemented a new law that will require all citrus trees planted after January 1, 2003, to come from shaded or greenhouse nurseries. This will result in increased costs of producing nursery trees. Along with the increased costs of nursery trees, grove care costs of Sao Paulo growers will also likely increase when dealing with Leprosis, CVC, and the new Sudden Death Disease.

Florida will continue to face a tight labor market as the supply of migrant labor from Mexico shrinks. Low-skilled laborers from Mexico are being drawn away from agriculture into the non-agricultural sector. Harvest labor contractors are now looking towards Guatemala and other Central American countries to find individuals willing to harvest citrus. Cost increases for pesticide registration will likely increase Florida's citrus production costs.

Sao Paulo citrus producers have a lower cost structure compared to Florida. The main advantage is labor costs, which is most apparent in harvesting costs. This advantage has widened with the recent devaluation of the Brazilian currency (Real) and the lack of inflation in Brazil. If continued devaluation of the Real occurs, resulting in a higher annual inflation rate, some of the cost advantages due to the devaluation may be eroded.

Florida producers could benefit if labor requirements were reduced and replaced by effective alternatives. The potential impact of mechanical harvesting is large, but it will not eliminate the cost advantage realized by Sao Paulo (Brazil).

References

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Table 1. Comparison of Florida and Sao Paulo orange industries, 2000-01.

	Florida[a]	Sao Paulo[b]
Bearing Acres	602,136	1,380,730
Non-Bearing Acres	63,393	105,201
Total Acres	665,529	1,486,940
Bearing Trees (1,000)	78,721	162,000
Non-Bearing Trees (1,000)	8,479	15,000
Total Trees (1,000)	87,200	177,000
Total Production (1,000 boxes)	223,300	355,000
Total Processed Production (1,000 boxes)	213,677	270,000
Processed Utilization (%)	95.7%	76.1%

[a] Source: Florida Agricultural Statistical Service.
[b] Source: Foreign Agricultural Service, USDA.

Table 2. Value of Brazilian currency (Real) to U.S. dollar.

	$Real to $US	% Change Since 1996-97
1996-1997	1.040	N/A
1997-1998	1.117	7.4
1998-1999	1.461	40.5
1999-2000	1.837	76.6
2000-2001	2.011	93.4
2001-2002 (Estimated)	2.551	145.3
As of September 10, 2002	3.105	N/A

Source: International Monetary Funds -- International Financial Statistics.

Table 3. Delivered-in costs for processed organes in Sao Paulo, 1996-97, 1998-99, 2000-01.

	Before Devaluation	After Devaluation	
	1996-97	1998-99	2000-01
	$/pound solids	*$/pound solids*	*$/pound solids*
Total Production and Other Costs	0.2843	0.2485	0.2296
Capital Investment Costs	0.2843	0.1093	0.1073
Total Grower Costs	0.3902	0.3578	0.3369
Total Harvesting Costs	0.1311	0.0915	0.0890
Total Delivered-In Costs*	0.5213	0.4493	0.4259

* Does not include Fundecitrus grower assessment.
Source: Ronald P. Muraro and Thomas H. Spreen (UF/IFAS).

Table 4. Comparative production costs for processed oranges in Florida and Sao Paulo, 2000-01.

	Southwest Florida		Sao Paulo	
	$/acre	*$/pound solids*	*$/acre*	*$/pound solids*
Labor (wages, salaries, and social taxes)	204.88	0.0690	43.95	0.0285
Chemicals and Fertilizer	308.39	0.1038	170.91	0.1108
Machinery Operating Costs	121.51	0.0409	44.83	0.0291
Contract Costs (tree replacement and pruning)	86.90	0.0293	N/A	N/A
Total Production Costs	721.68	0.2429	259.69	0.1684
Other Costs (machinery depreciation and finance charges)	134.58	0.0454	45.21	0.0293
Annual Charge to Replant Grove after 15 Years (Florida reset cost)	N/A	N/A	49.22	0.0319
Total Specified Costs	856.26	0.2883	354.12	0.2296
Yields	457 boxes/acre	6.5 ps/box	257 boxes/acre	6.0 ps/box

Source: Ronald P. Muraro and Thomas H. Spreen (UF/IFAS) from discussion with Marcos Pozzan (Montecitrus and other Sao Paulo citrus industry growers and representatives).

Table 5. Comparative harvesting costs for processed oranges in Florida and Sao Paulo, 2000-01.

	Southwest Florida		Sao Paulo	
	$/box	*$/pound solids*	*$/box*	*$/pound solids*
Picking Oranges and Roadsiding	1.600	0.2462	0.384	0.0640
Transporting Oranges to Processing Plant	0.503	0.0774	0.150	0.0250
Total Harvesting Costs	2.103	0.3236	0.534	0.0890

Source: Ronald P. Muraro and Thomas H. Spreen (UF/IFAS) from discussion with Marcos Pozzan (Montecitrus and other Sao Paulo citrus industry growers and representatives.

Table 6. Comparative delivered-in costs for processed oranges in Florida and Sao Paulo, 2000-01.

	Southwest Florida	Sao Paulo
	$/pound solids	*$/pound solids*
Total Production and Other Costs	0.2883	0.2296
Florida Grower Taxes and Regulatory Fees	0.0284	N/A
Capital Investment Costs	0.1177	0.1073
Total Grower Costs	0.4344	0.3369
Total Harvesting Costs	0.3236	0.0890
Department of Citrus Advertisement Assessment	0.0269	N/A
Fundecitrus and Other Assessments	N/A	0.0208
Total Delivered-In Costs	0.7849	0.4467

Source: Ronald P. Muraro and Thomas H. Spreen (UF/IFAS).

Table 7. Estimated FOB costs of bulk FCOJ delivered to Florida processors for Florida and Sao Paulo, 2000-01.

	Southwest Florida	**Sao Paulo**
	$/pound solids	*$/pound solids*
Delivered-In Cost	0.7849	0.4467
Bulk Processing Cost*	0.2034	0.1691
Domestic Costs	N/A	0.0292
Foreign Costs		
US FCOJ Tariff	N/A	0.2890
FDOC Equalization Tax	N/A	0.0299
Ocean Freight and Insurance	N/A	0.0716
USDA Inspection/Other Costs	N/A	0.0285
Total Foreign Costs	0.0000	0.4190
Total FOB Costs	0.9883	1.0640

* Estimated.
Source: Ronald P. Muraro and Thomas H. Spreen (UF/IFAS).