ORGANIC FARMING RESEARCH FOUNDATION

P.O. Box 440
Santa Cruz, CA 95061

tel ~(831) 426-6606
fax ~ (831) 426-6670

email ~ research@ofrf.org
web ~ www.ofrf.org

Organic farming research project report submitted to the Organic Farming Research Foundation:

Project Title:

The Florida organic citrus sector: Results of a 2003-04 study

FINAL PROJECT REPORT

Principal investigator:
Kevin Athearn
Ph.D. Candidate
Dept. of Food and Resource Economics
University of Florida
P.O. Box 110240
Gainesville, FL 32611
352-392-1881
athearn@ufl.edu

Cooperating Investigator:
James Stearns, Assistant Professor, Dept. of Food and Resource Economics, University of Florida

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Introduction

1.1. Background

Florida accounted for 74% of U.S. domestic production of citrus in the 2002-03 season with 718,100 acres bearing citrus fruit (FASS). The total on-tree value of Florida citrus production in 2002-03 was $815.9 million. This figure is the lowest since 1985-86 (FASS). Declining acreage and production in recent years reflect worsening economic conditions for growers as U.S. per capita citrus consumption (especially of orange juice) declines, international competition increases, and on-tree citrus prices fall. Recent pest and disease outbreaks, competition with residential development for land and water resources and increasing scrutiny regarding the environmental impacts of citrus production add to the challenges Florida citrus growers face.

In contrast, organic agriculture has experienced rapid growth in recent years. Increasing at rates of about 20% annually since 1990 (Dimitri & Greene), organic retail sales were estimated at more than $9 billion in the U.S. and about $21 billion in all major world markets in 2001 (Greene & Kremen). Organic production in the U.S. has expanded to meet this growing demand. U.S. organic fruit and vegetable acreage rose by more than 30% between 1997 and 2001, while organic pasture and rangeland doubled (Greene & Kremen; Dimitri & Greene). Certified organic vegetable acreage exceeds 2% of total vegetable acreage in the U.S. (Greene & Kremen). Organic agriculture, though still small as a portion of total agricultural production, is a growing phenomenon that provides potential alternatives for many growers.

Consistent with this trend, an organic citrus sector has emerged in Florida. According to USDA-ERS data, certified organic citrus land in Florida increased from 2,296 acres in 1997 to 6,056 acres in 2001, while increasing from 6,099 to 9,741 acres in the entire U.S. Although organic citrus sales figures are not available, organic orange juice, packaged under brands such as Organic Valley, Horizon, and Uncle Matt's, as well as fresh organic citrus, are now widely available at retail outlets. In Europe, citrus fruit represents the largest category of organic fruit sales, and both Europe and Japan import organic citrus fruit and juice from the United States (Liu).

1.2. Research Needs and Questions

Despite the rapid growth of organic agriculture, information on organics in general and organic citrus in particular is scarce. A major complaint within the organic community is the lack of university research on organic agriculture. Organic growers face considerable difficulty obtaining useful information and assistance relating to organic production methods and solutions to problems that arise, especially pertaining to their specific crops and regions. According to the Third Biennial National Organic Farmers' Survey, "lack of information and experience regarding organic production" and an "inability to identify markets for organic products" were two of the top three problems most frequently mentioned as the greatest barrier to converting from conventional to organic production (Walz, p.9). The top two current constraints to organic production listed by organic farmers were (1) "uncooperative or uniformed extension agents," and (2) "the cost of organically allowable inputs" (Walz, p.9). Another major constraint identified by numerous organic growers is that "information on organic practices [is] unavailable or hard to find" (Walz, p.91). Some of the most important areas for further research, according to nationwide survey respondents, are whole farm planning, market analysis, and economic research (Walz, pp.22-23).

Likewise, the Scientific Congress on Organic Agricultural Research (SCOAR) suggests that economic research on production and markets is an important need for organic growers. In particular, SCOAR lists

among the existing research needs: "economic data on practices and markets" (SCOAR 2003b, p.E1), "profitability of different organic cropping systems," and "breakdown of supply, demand, prices, flows, economic impacts" (SCOAR 2003a, p.E2).

On November 29, 2001, Florida Certified Organic Growers and Consumers, Inc. (FOG) and the University of Florida, Institute of Food and Agricultural Sciences, sponsored an organic farming workshop at the Lake Alfred Citrus Research Center. The workshop, titled "Building Bridges Between Organic Farms and Land-Grant Institutions," was an attempt to bring organic growers, extension personnel, researchers and administrators together to develop a research agenda and guide the implementation and dissemination of research. At this meeting an Organic Citrus Advisory Committee (OCAC) of eleven individuals, including growers, industry members, researchers and extension personnel, was formed. Preliminary discussion of research needs took place. On January 16th, 2002, the OCAC held its first official meeting. At this meeting, the need for data on existing organic production and markets was identified as the top priority, among many research needs.

From the OFRF survey, SCOAR statements, and the OCAC meeting, it is clear that improved information on the economics of organic production and marketing is needed and would be beneficial to organic growers and others associated with the organic agricultural industry. This report helps meet these needs by providing economically relevant information on the organic citrus sector in Florida that could be beneficial to agricultural researchers, extension agents, policy makers, growers, and others in the organic citrus industry.

For this study, the authors identified several research questions. What are the current acreage, production volumes and primary market channels for organic citrus in Florida? What characteristics distinguish organic citrus growers and their farm enterprises? How is organic citrus grown? What are the main inputs used, and what are the production costs? How do various factors affect the profitability or economic viability of organic citrus production? What are the main incentives and disincentives for organic citrus production? What sources of information do organic citrus growers rely on, and what are their primary research needs?

A review of various databases and literature found only one previous survey of organic citrus growers in Florida. That survey of 14 out of 16 identified organic citrus growers covering 568 acres was conducted in 1993. The survey covered questions relating to grower characteristics, production practices, problems, and costs. Results of that study are reported in Swisher, Monaghan and Ferguson, and Swisher and Monaghan.

1.3. Research Objectives

This report updates and builds on the information provided by the ten-year-old survey results and includes interviews with organic citrus handlers (packers and processors) and exiting growers. The purpose of this project is to collect, analyze, and disseminate economically relevant information on the organic citrus sector in Florida. In particular, the research objectives are:

i. Identify existing acreage, production volumes, and market channels for organic citrus varieties;
ii. Characterize organic citrus growers and their farm enterprises;
iii. Obtain a description of typical grove care practices, estimate costs of organic citrus production, and create representative production budgets;
iv. Identify the primary incentives and disincentives for growers to adopt and maintain certified organic citrus production;
v. Document the main sources of information on which organic growers rely and their primary research needs.

These objectives are accomplished through interviews with Florida organic citrus growers, organic citrus handlers (packers, processors, and intermediaries), and exiting growers (growers who gave up their certified organic citrus operations in recent years). The project is intended to benefit the organic citrus industry, agricultural researchers, extension agents, policy makers, and the growers themselves. This research is important for understanding the economics of the organic citrus sector, anticipating and tracking market responses to changing circumstances, assisting growers with budgeting and farm planning, and guiding further research that would be relevant to growers.

1.4. Research Method

The research method is a census of currently certified organic citrus growers and handlers and a convenience sample of exiting and transitional growers. Exiting growers are previously certified organic citrus growers who gave up their certification within the last two years. Transitional growers have applied for organic certification, but are not yet fully certified. Data is collected through a combination of in-person and telephone interviews structured by a pre-tested questionnaire designed to accomplish the research objectives.

All fifty U.S. certifying agents accredited by the USDA were contacted between May 2003 and March 2004 for their public list of certified entities or to verify that they did not certify any organic citrus entities in Florida. Also, a list of organic growers registered with the Florida Department of Agriculture and Consumer Services (FDACS) was obtained. This list, compiled for the first time in the 2003-04 season, contains all registered organic growers shipping during the 2003-2004 season. Final verification of the FDACS list and statistics was made on March 25, 2004.

Thirty-nine organic citrus growers that were certified sometime between the 2001-02 and 2003-04 seasons or have initiated the transition to organic and will be fully certified by the 2004-05 season were identified through these sources.[1] Interviews were conducted with thirty-two of the thirty-nine growers (fourteen in-person interviews and eighteen telephone interviews) between July 2003 and March 2004. Four growers declined to be interviewed, and the remaining three could not be contacted. Growers were classified as current (fully certified in the 2003-04 season), transitional (will not be fully certified until the 2004-05 season), or exiting (previously certified during the 2001-02 or 2002-03 seasons, but no longer certified).

Of the thirty-nine organic citrus growers identified, thirty-one were current in the 2003-04 season, six were exiting, and two were transitional. The six exiting growers gave up their organic certification for citrus sometime between 2001 and 2003, and the two transitional growers will be fully certified for the 2004-05 season. The thirty-one current organic growers represent a census of the entire population of certified organic citrus growers in Florida as of the 2003-04 season. The exiting and transitional growers contacted in this study represent a convenience sample, since the authors do not believe that they identified the entire population of exiting and transitional growers.

At least two of the certified growers manage groves for additional grove owners (who were not contacted), either in a cooperative or other management arrangement. For the purposes of this report, a "grower" refers to one certified entity with organic citrus producing land. A certified entity that owns or leases groves and manages for other landowners (who themselves are not certified individually) counts as one grower only.

[1] One ten-acre experimental organic citrus grove owned by the University of Florida is not included.

In addition, sixteen organic packers, processors, or intermediate handlers were identified through lists provided by USDA accredited certifying agents as being active in the 2003-04 season. Fourteen of these were interviewed (12 telephone interviews and 2 in-person interviews).

2. Acreage, Production, and Marketing

2.1. Acreage

Information on acreage was obtained for all thirty-nine growers identified by this study. For those growers who could not be contacted, acreage figures were obtained from their certifying agent or FDACS.

Certified organic acreage has increased considerably since the 1993 survey that documented 568 acres. The USDA-ERS provides estimates for organic citrus acreage in Florida for 1997, 2000, and 2001, increasing from 2,296 to 6,056 acres. As of August 2003, organic citrus growers placing fruit into commercial channels are required to register with the Division of Fruit & Vegetables, License and Bond, according to Chapter 20-39.017 of the official rules affecting the Florida Citrus Industry (pursuant to Chapter 601, Florida Statutes). Thus, for the first time in the 2003-04 season, organic citrus growers are required to register with the Florida Department of Agriculture and Consumer Services (FDACS) and provide their organic acreage and production estimates. The total registered organic citrus acreage compiled by FDACS is 4,810 acres for the 2003-04 season. This survey provides acreage estimates for the 2002-03 and 2003-04 seasons based on interviews with growers and a prediction for 2004-05 acreage. Acreage estimates from the three different sources are presented in Table 1.

Table 1. Estimated Acreage for Certified Organic Citrus in Florida by Season

Season	USDA[1]	FDACS[2]	This Survey[3]
1997	2,296	--	--
2000	2,927	--	--
2001	6,056	--	--
2002-2003	--	--	4,150
2003-2004	--	4,810	4,720
2004-2005[4]	--	--	5,926

[1] Source: USDA-ERS; reported on a January to December basis.
[2] Source: FDACS; reported on an August to July basis.
[3] Reported on an August to July basis.
[4] Predicted acreage based on current acreage plus acreage in transition that is due to be fully certified by the 2004-2005 season. This estimate assumes no current growers give up their certification or reduce their certified acreage.

The acreage figures provided by the survey data should be treated as estimates. The survey estimate for 2003-04 corresponds closely with the FDACS acreage figure. The small discrepancy of 90 acres may result from a technical issue of when some transitional groves became fully certified. The 2004-2005 acreage is a prediction based on survey data of current (2003-04) acreage plus transitional acreage due to become fully certified next season. It is possible that not all transitional acreage was identified (suggesting that actual acreage could be higher than predicted). The prediction, however, does not account for growers that may give up organic citrus or reduce their acreage (suggesting that actual acreage could be lower than predicted).

It is not known why the USDA acreage estimate for 2001 (6,056 acres) is so much higher than other years. Either numerous groves became fully certified for the first time in 2001, but then exited a year later, or much of this acreage was not legitimate. Anecdotal evidence indicates that fraud has been a

problem in the Florida organic citrus sector. It is thought that the introduction of the national organic standard in 2002 and greater oversight by the DOC and FDACS starting in 2003 have eliminated or reduced the problem of fraud.

Table 2. Regional Distribution of Organic Citrus Acreage.

Region	**Estimated 2003-04 Organic Acreage**	**2002-03 Total Citrus Acreage[6]**	**Percent Organic**
North[1]	96	199	48%
Central[2]	1813	300,903	0.6%
Indian River[3]	2184	168,830	1.3%
Southwest[4]	620	90,858	0.7%
South[5]	3	388	0.8%
Other Counties	0	235,362	0%

[1] North region is Putnam County.
[2] Central region includes Polk, Highlands, Lake, Osceola, Hardee, Hillsborough, and Pasco counties.
[3] Indian River region includes Indian River, St. Lucie, Brevard, and Okeechobee counties.
[4] Southwest region includes DeSoto and Charlotte counties.
[5] South is Miami-Dade County.
[6] Source: FASS; represents total commercial citrus acreage (higher than bearing acreage).
Note: The location of four organic acres is unknown.

Organic citrus is still a relatively small portion of total citrus acreage in Florida. The 4,150 certified organic citrus acreage estimate represents 0.58% of total citrus bearing acreage (718,100 acres) in Florida in 2002-03.

The regional distribution of organic citrus acreage in 2003-04 based on survey results is provided in Table 2. The Indian River region accounts for the largest organic citrus acreage, followed closely by the Central region. The regional distribution of all citrus acreage (conventional and organic) in 2002-03 is provided in Table 2 for comparison. Using the 2003-04 organic citrus acreage estimates and the actual 2002-03 total citrus acreage reported in the Citrus Summary 2002-03 (FASS), the organic percentage is estimated for each region. The north region (Putnam county) has the highest percentage of organic citrus, with organic acreage accounting for almost one-half of total citrus acreage. The Indian River region is a distant second in organic percentage.

2.2. Yields and Production Volumes

Yield figures were only obtained from a few growers, and these figures varied widely. Yields are determined as much by economic factors as by agronomic constraints. Grower resources, input prices, market conditions, specific practices, individual knowledge and skills, as well as weather and soil type affect yields. Yields are reported in field boxes, which hold 1.6 bushels of fruit.

Table 3. 2003-04 Total Organic Production Estimates by Variety.

Variety	**Number of Field Boxes (1 3/5 bushels)**
Valencias	282,900
Hamlins	233,050
Red Grapefruit	142,500
White Grapefruit	46,500
Tangerines	44,800
Sunburst	27,240
Pineapple Oranges	25,000
Tangelos	21,000
Satsumas	5,900
Temples	1,220
Honey Bells	600
Other	3,020
Total	**833,730**

Source: FDACS.

For conventional red grapefruit, the average 2002-03 yield was 395 boxes per acre (FASS). Organic growers reported red grapefruit yields ranging from 27 boxes per acre (for a very low cost grower with sparsely planted trees) to 250 boxes per acre (for a medium cost grower) to 1000 boxes per acre (for a high cost grower). (See p. 15 for discussion of grower categories based on input costs.) Valencia yields were reported ranging from about 200 to 414 boxes per acre among organic growers, whereas the average conventional Valencia yield for 2002-03 was 299 boxes per acre (FASS). Organic tangerine yields of 100 boxes per acre and 298 boxes per acre were reported. The average conventional yield for tangerines in 2002-03 was 253 boxes per acre.

As part of the new organic citrus registration program, growers are required each season to provide estimates of their organic production for that season. The organic production estimates for the 2003-04 season are listed by variety in Table 3. Insufficient data were collected to estimate production volumes for other years.

Valencia and Hamlin oranges and red grapefruit are varieties with the largest organic production volumes in Florida. Red grapefruit and tangerines represent a higher portion of total organic citrus production than of total conventional citrus production (FASS; FDACS). Total estimated organic production for the 2003-04 season is 833,730 boxes.

2.3. Market Channels

Florida citrus is sold through a variety of market channels. Retail outlets include major supermarket chains, specialty supermarkets, natural food stores, and food cooperatives. Some fruit is sold directly to consumers through farmers markets, roadside stands, or Internet sales. Florida citrus is exported to Europe and Japan as well. Fresh eliminations or #2 grade fruit may be sold to processors for juicing, to retail stores with “fresh squeezed” juice machines, non-profit organizations or low-income outlets.

Organic citrus is more likely to be grown for fresh market outlets than conventional Florida citrus. Based on the responses of 23 growers, the authors estimate that 53% of Florida organic citrus acreage is intended for the fresh market, while 47% is intended for processing. This allocation is much different than the conventional allocation between fresh and processed. Roka (2001) estimated that only between 23% and 26% of conventional citrus in Florida is intended for the fresh market. The actual percentage of fruit that is sold fresh is significantly lower, after eliminations are subtracted.

Whereas 108 citrus packinghouses and 52 citrus processing plants were in operation in Florida in 2000 (Hodges et al. 2001), only eight certified organic packinghouses and five certified organic processing plants were identified in this study as active in 2003-04. These figures include one certified entity that has both a packinghouse and processing plant. In addition, four intermediate handlers (including brokers, distributors, and bottlers) are certified to handle organic citrus.

All five processors that were contacted do handle conventional citrus as well as organic. Of seven packers interviewed only two have conventional lines in addition to their organic lines. Three out of four intermediate handlers work with conventional as well as organic citrus.

Seven of the eight packers own or manage groves, and two processors own or manage groves. None of the intermediate handlers own or manage groves.

Two packers handle mostly their own fruit. One packer packs exclusively for one grower. Two other packers handle significant volumes from several different growers. No response was obtained from the remaining three packers on this issue. Four out of five processors obtain significant volumes from a variety of different growers.

Most organic growers sell their fruit to a packinghouse or processing plant. The packer or processor then arranges sales to wholesalers, retailers, or export outlets. A variety of different terms of sale are used. Among growers that do not own a packinghouse or processing plant, single year or multi-year on-tree contracts with packers or processors are common. On-tree contract prices are not necessarily tied to the packout rate. Some growers sell on the cash/spot market. Other less common sales arrangements for growers include wholesale price minus a fixed packing and marketing fee.

Packout rates vary considerably, not only with the quality of the fruit, but also with the requirements of different markets. Packout rates ranging from 30% to 90% were reported.
Most growers and packers indicated that eliminations go into organic juice. One grower reported that sometimes eliminations go into conventional juice. Some eliminations or #2 grade fruit is sold to stores with juice machines, non-profit organizations or low-income outlets. One grower reported receiving $2 per box for grapefruit eliminations.

Three growers reported receiving on-tree prices for grapefruit of $5 to $6 per field box. Two growers reported tangerine on-tree prices ranging from $8 to $10 per field box. For processed citrus, growers often receive a delivered-in price per pound solid, from which “pick & haul” costs, taxes and fees are subtracted. Four growers reported delivered-in prices ranging from $1.25 to $1.45 per pound solid for juice oranges.

The Rodale Institute collects and posts weekly wholesale prices for organic and conventional fruits and vegetables on their website, www.newfarm.org. A sample of five weekly average prices between October 2003 and April 2004 ranged from $33.00 to $19.50 for a 48-count carton of Ruby (red#23) grapefruit. The price premium ranged from 105% to 189% above the conventional price with an average premium of 157%. Prices are also posted for navel oranges and honey tangerines. The origin of the fruit is not reported.

Specific figures on organic citrus volumes to different markets could not be obtained. Interviews with growers, packers, and processors, however, suggest that most fresh organic citrus is shipped to supermarket chains, specialty supermarkets, and natural food stores in major urban centers on the East Coast and Midwest. Some fresh citrus is exported to Europe and Japan. A small percentage of organic citrus is sold locally or directly to consumers through farmers markets, roadside stands, food coops, and

Internet sales. Processed citrus is sold as organic orange juice or grapefruit juice through retailers nationwide. Some organic citrus juice is exported to Europe and Japan as well.

The small number of organic packers and processors and anecdotal evidence suggest that market channels for organic citrus are not perfectly competitive. Different market outlets have different volume and quality requirements, and support different price levels. Some channels may restrict entry or limit volumes in order to maintain a substantial price premium. Reports from Europe indicate that despite an organic price premium, substantial amounts of organic citrus are sold on the conventional market (Juliá and Server; Liu). Although none of the Florida organic citrus growers report selling fruit as conventional (except eliminations in some cases), some growers complain of difficulty finding suitable markets for their organic citrus and have let fruit drop on the ground. Others report that intermediate handlers try to control organic citrus markets and that large consolidated distribution channels reflecting retail purchasing structures can make it difficult for small growers to access major retail markets, including local supermarkets.

3. Grove and Grower Characteristics

Thirty-five growers were identified as having certified organic citrus acreage in the 2002-03 or 2003-04 seasons (27 of these had certified acreage in 2002-03 and 31 had certified acreage in 2003-04). Of these thirty-five growers, twenty-eight agreed to be interviewed. Four others were contacted by telephone, but declined to be interviewed. The remaining three could not be contacted. Organic citrus grove acreage was obtained for all thirty-five growers either directly from grower responses or from their certifying agent or FDACS. Results reported in this section are based on 2002-03 and 2003-04 certified growers only.

3.1. Farm Sizes

Organic grove sizes vary widely. Of 35 growers with certified organic citrus acreage in either the 2002-03 or 2003-04 seasons, organic grove sizes ranged from less than one acre to 1,165 acres. For the purposes of this study, one grower refers to one certified entity, which may encompass more than one land owner. The mean acreage owned or managed by one certified entity, whether contiguous or not, is 148 acres in this sample. The median acreage is 63 acres. That is, one-half of growers have organic citrus groves that are 63 acres or less. Fourteen of the 35 growers (40%) have groves of 25 acres or less.

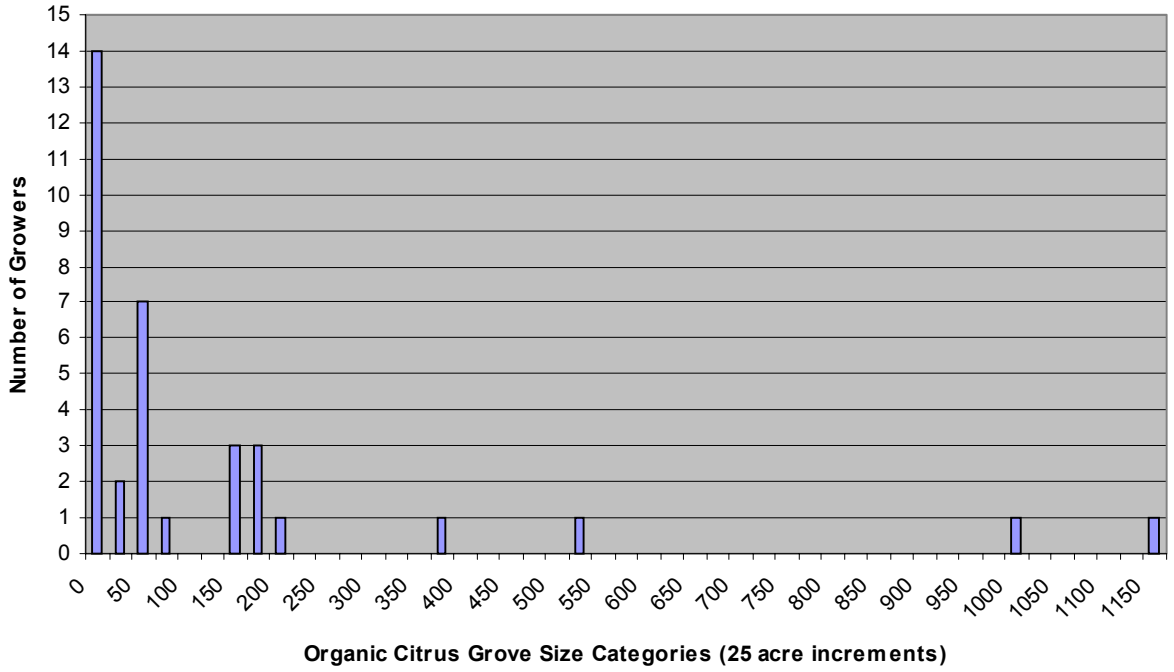

Figure 1. Distribution of Groves by Size Category.
Figure 1 shows the number of growers in each grove size category (25 acre increments). For example, fourteen growers have organic citrus acreage between 0 and 25 acres, two growers have organic citrus acreage between 26 and 50 acres, and seven growers have acreage between 51 and 75 acres.

3.2. Other Grower Characteristics

Most growers are exclusively organic, but some combine organic and conventional operations. Nine out of twenty-eight growers responding (32%) reported having conventional citrus acreage in addition to their organic groves. Several growers also grow other crops besides citrus or raise livestock, either organically or conventionally. Two small growers reported having polyculture systems, in which other organic tree crops are mixed together with organic citrus on the same land.

The majority of organic citrus growers own their citrus land, but some lease land. Out of twenty-six growers responding to this question, six (23%) lease some or all of their organic citrus land.

A variety of business structures are found among organic citrus growers. These include family businesses, family partnerships, non-family partnerships, cooperatives, limited liability companies, conventional "c" corporations and subchapter "s" corporations. Out of thirteen responses, seven growers (54%) consider their organic citrus enterprise a family business or partnership, five growers (38%) have the status of a corporation, and one has a cooperative structure.

Most organic growers have been growing citrus for many years. Eleven out of sixteen growers or managers answering this question (69%) have been growing citrus (conventional or organic) for at least fifteen years. Five out of these sixteen (31%) have been growing citrus for thirty or more years.

Fewer respondents have been growing citrus organically for very long. Out of twenty-nine responses, twenty-one growers (72%) have not been continuously certified organic for more than five years (since before 1999). Four (14%) have been continuously certified since 1998, but not since 1993. Another four (14%) have been continuously certified since 1993 or before.

Organic certification typically is obtained on mature, established groves. Out of twenty-six responses to the question of how the transition to organic was made, fifteen (58%) made a direct transition from conventional citrus to organic citrus, eleven (42%) bought or took over an established grove (either conventional or organic) and immediately started managing it organically. None of the twenty-six respondents reported planting an organic citrus grove entirely from resets of young trees.

Out of twenty-eight growers responding, seven have their own packinghouse and two own a processing plant in addition to their citrus groves. The majority of growers are not vertically integrated and sell their fruit to a packer or processor.

3.3. Organic Citrus Grower Typology

Organic citrus growers are a diverse group with a wide variety of characteristics. Five general farm types are identified. Although not all growers fit neatly into one particular category, these descriptions are useful for capturing a range of different farm types and some essential differences between them. The categorization of farm types is based on the following characteristics:

1. Organic acreage and total farm size,
2. Whether conventional citrus is part of the enterprise,
3. Ownership of packing or processing facilities and connection to the market,
4. Production cost and input intensity,
5. Yields,
6. Ownership vs. lease of the land,
7. Business structure,
8. If the owner lives on the farm, does significant grove work, or is actively involved in grove management,
9. If the grove is managed for the long-run (as determined by replanting and input intensity), and
10. Reliance on off-farm employment.

Type 1 farms are large citrus operations (500 total citrus acres or more) that appear to be in business for the long-run. These farms have converted some acreage to organic, but maintain significant conventional acreage as well. Organic management is used as a temporary interval in a grove's lifecycle. They prefer to establish young groves under conventional management, and convert some groves to organic once they are mature. With medium or high organic grove care costs, medium or high yields are obtained. Most of these operations are well connected to the market, and own a packing or processing facility. Typically having a corporate or cooperative business structure, these enterprises have started organic lines as part of their marketing strategy in response to increasing demand for organic products.

Type 2 farms are groves ranging from 25 acres to more than 1000 acres that run low cost grove operations and do not appear to be managing groves to sustain long-term yields. They may be exclusively organic, mixed organic and conventional, or combine citrus with other agricultural activities. Groves are managed organically as a short-term bridge between conventional management and sale of land or conversion to other use. Abandoned conventional groves may be acquired for this purpose. Organic certification is obtained rather quickly when no conventional inputs have been applied for three years prior to purchase or lease. Organic fruit is sold in an attempt to extract some returns from land in the short-run. High input

investment does not make sense if land will be sold or converted to another use within a few years. Yields are low. Land may be owned or leased. These growers typically have a corporate business structure. Some have their own packing facility and strong market connections, and others do not.

Type 3 growers have organic citrus groves ranging from 60 to 200 acres and are trying to sustain organic citrus production as a major part of their business, possibly with other agricultural activities, but not with conventional citrus. Agriculture is their primary source of income, and organic citrus is an integral part of their farm enterprise. These groves usually are managed with a medium or high cost program. The owner may or may not be actively involved in management or grove work. These farms do not have their own packing or processing facility, and they lack strong market connections.

Type 4 farms are small growers (less than 25 acres) with medium or high grove care costs and medium or high yields. Groves are managed intensively for the long-run. The land is owned, not leased, and the grower typically lives on the farm and contributes significant amounts of his own labor to grove care. Even while relying on own labor and management knowledge, costs tend to be high due to a conscious attempt to maintain high yields or due to a lack of economies of scale. They rely on off-farm work for a significant amount of their household income. Most of these growers do not have conventional groves in addition to their organic groves. With one exception, these growers do not own a packing or processing facility. Most sell their fruit to a packer or processor, and a small portion of fruit may be sold direct to consumers.

Type 5 farms are small growers (less than 25 acres) with low production costs and low or medium yields. Either they are risk averse and do not have enough confidence in methods that could boost yields profitably, or they are financially constrained, or possibly just very efficient. Unlike Type 2 growers, these growers intend to maintain land in organic production for the long-run. They do not have conventional groves, but some use a polyculture system with other types of fruit trees mixed together with their citrus. They own the land, live on the farm, and use significant amounts of their own labor for grove work. These farms typically are single family businesses or family partnerships. They do not have their own packing or processing facility, so they sell either to a packer or processor or direct to consumers.

Sufficient data was collected from twenty-three organic citrus growers to categorize them into one of the five typologies. The highest percentage of growers (30%) fit best in the Type 2 category; 22% are Type 3 farms; 17% are Type 1 farms; 17% fit Type 4; and 13% fit the Type 5 characterization. Based on the twenty-three growers categorized, the highest percentage of land in organic citrus production fits best in Type 1 (45%), followed by Type 2 (38%), Type 3 (16%), Type 4 (1%), and Type 5 (1%).

4. Grove Care Practices, Costs, and Profitability

Organic agriculture refers to holistic farming systems that "respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity" (USDA-AMS, p.E6). The USDA implemented a national organic standard for agricultural production and handling in 2002. This standard provides general guidelines for organic certification and includes a list of allowed and prohibited substances (USDA-AMS). Within the organic guidelines, growers are given considerable leeway to tailor individual practices to their "site-specific," economic and agronomic circumstances.

In this section, grove care practices utilized by organic citrus growers are described. Production costs are estimated for different grove care programs, and profitability analysis is conducted.

Table 4. Organic Grove Care Practices.

Nutrient Management	**Number of Growers (out of 18)**	**Percentage of Growers (out of 18)**
Poultry Manure	13	72%
Fish/Seaweed Emulsion	10	56%
Urban Plant Debris	5	28%
Micronutrients	5	28%
Ground cover / green manure	3	17%
Organic bulk blend fertilizer	3	17%
Potash	3	17%
Dolomite	2	11%
Horse manure	2	11%
Feather meal	1	6%
Colloidal Phosphate	1	6%
Weed Management	**Number of Growers (out of 18)**	**Percentage of Growers (out of 18)**
Mechanical Mowing	18	100%
Hand Weed / Hand Hoe	17	94%
Disk &/or Chop	9	50%
Ground Cover	5	28%
Mulch	3	17%
Tree Hoe	3	17%
Organic Sprays	2	11%
Other Pest Management	**Number of Growers (out of 18)**	**Percentage of Growers (out of 18)**
Fish/Seaweed Emulsion	10	56%
435 (petroleum-based) oil	7	39%
No Pest Management	4	22%
Copper	3	17%
Mechanical Tillage/Disc	2	11%
Beneficial Insect Release	2	11%
Vegetable Oil	1	6%
Organic Miticide	1	6%
Sulfur	1	6%
Irrigation System	**Number of Growers (out of 18)**	**Percentage of Growers (out of 18)**
Microjet/Microsprinkler	13	72%
Flood	2	11%
Drip	2	11%
Water truck	1	6%
Hose from House	1	6%
None	1	6%

4.1. Organic Grove Care Practices

Consistent with the variety of different types of organic citrus enterprises, grove care practices and costs varied widely among growers. Eighteen growers were asked to describe their specific nutrient management, weed management, and other pest management practices in an open-ended format. Growers were also asked what type of irrigation system was in their organic citrus groves. Responses are categorized and tabulated in Table 4.

Poultry manure, in various degrees of composting, is the most common primary nutrient source among organic citrus growers. Several growers combine urban plant debris with poultry manure at ratios of 3:1 or 5:2. A majority of growers use fish/seaweed emulsion as a foliar spray for tree nutrition and some pest control benefits. Several growers use some additional source of micronutrients often in the form of a liquid foliar spray. Some growers use organic bulk blend fertilizers or leguminous ground covers as an integral part of their nutrient management. Some growers also report using potash, dolomite, horse manure, feather meal, or colloidal phosphate.

In organic groves, weed management requires substantial amounts of mechanical and hand labor. All respondents mow, and all but one hand weed or hand hoe. Half of respondents disk, or disk and chop, as a major weed control activity. Some growers use ground covers, mulches, tree hoes, and organic sprays as well.

In addition to fish/seaweed emulsion, which reportedly has some pest control benefits, several growers use petroleum-based oil sprays as a major part of their pest control routine. A few growers report using copper, disking, beneficial insect releases, vegetable oil, organic miticide, or sulfur to control insect pests or fungus. Interestingly, four respondents (22%) report using no pest management practices (that is, nothing in addition to weed control).

Microjet irrigation systems are the most common. However some organic growers use flood, drip, water truck, or other irrigation systems on all or part of their property. Only one grower reported no irrigation system.

Most organic groves are owner (or leaser) managed. Sixty percent of twenty responding growers report that they never use a grove care company. However forty percent of responding growers report that they sometimes use a grove care company for certain practices. Only twenty percent of growers rely primarily on a grove care company for grove care.

4.2. Organic Grove Care Costs

Grove care costs were provided by some growers and calculated for the remaining growers that provided detailed information on grove care practices. Costs vary widely among organic citrus growers. A distribution of estimated grove care costs among 18 growers is provided in Table 5.

Grove care cost estimates reported here represent variable production costs only. They include materials, labor, fuel, equipment maintenance and repair for the following activities: nutrient management, weed management, other pest management activities, pruning, irrigation maintenance, and tree replacement of 3-4 trees per acre per year. The grove care cost estimates described in this report do not include harvesting and assessment costs, or fixed costs (indirect expenses) such as machinery depreciation, land charge, taxes and insurance, interest on capital investments, management charge, or the opportunity cost of fixed factors or unpaid labor.

Table 5. Distribution of Growers among Grove Care Cost Categories.

Grove Care Cost Category[1] ($ per acre)	Number of Growers (out of 18)	Percentage of Growers (out of 18)
$1000-$1250	7	39%
$800-$999	3	17%
$600-$799	3	17%
$400-$599	1	6%
$399 or less	4	22%

[1] Annual variable (direct) grove care cost.

Growers can be grouped into three broader categories: high cost ($1000-$1250), medium cost ($600-$999), and low cost ($599 or less). Seven growers fall into the high cost category, six growers are in the middle category, and five growers have low cost programs. Representative production budgets are provided for each of these three grove care cost categories in Table 6.

The production budgets in Table 6 represent estimated annual grove care costs for maintaining a mature citrus grove (i.e., replacing on average 3-4 trees per year) under three different programs. They are rough averages for growers in each cost category across regions and varieties. The production budgets in Table 6 are hypothetical, since none of the budgets represents a specific grower exactly. The actual combinations of practices used by individual growers vary widely. Certain combinations of practices were selected for the representative production budgets in Table 6, however all growers in the same cost category do not use the same combination of practices. For example, instead of using bulk blend fertilizer as shown in Table 6, a high cost grower may use poultry manure and urban plant debris. Alternatively, a medium cost grower may use bulk blend fertilizer and no poultry manure or urban plant debris. These budgets serve only as a general guide to reflect common practices and costs, calculate profitability, break-even prices or break-even yields. Most cost estimates for materials and application are based on data provided by growers. Some cost data, such as for labor, pruning, tree replacement, and irrigation are obtained from rates reported for conventional citrus budgets in Muraro, Hebb and Stover, Muraro and Oswalt, and Muraro, Roka and Rouse.

Organic certification cost is omitted from the budget, as it is a fixed cost associated with organic production. The certification cost depends on certification agent, farm size, sales revenue, and government cost-share reimbursement programs. A 1999 survey of eleven certifying agencies, found average first-year certification costs of "$579, $1,414, $3,623, and $33,276 for farms with incomes of $30,000, $200,000, $800,000, and $10,000,000, respectively" (Ferguson). Currently a national organic certification cost-share program reimburses organic growers up to 75% or $500 of annual certification costs. Also, paperwork and recordkeeping necessary for organic certification entail additional costs for the grower.

Table 6. Representative Production Budgets[1]

Grove Care Practice and Unit Cost	Amount or Frequency			Annual Cost per Acre		
Cost Category:	High	Middle	Low	High	Middle	Low
Weed Management						
Mechanical Mow ($10/acre)	5 x	4 x	3 x	$50	$40	$30
Hand Weed/Hoe/Pull Vines ($12/hour)	25 hrs	14 hrs	7 hrs	$300	$168	$84
Mechanical Hoe/Disk/Chop ($10/acre)	3 x	2 x		$30	$20	
				$380	**$228**	**$114**
Other Pest Management						
435 Oil ($2/gal)	8 gal	4 gal		$16	$8	
Copper ($1.50/lb)	10 lbs			$15		
Application ($25/application)	2 x	1 x		$50	$25	
				$81	**$33**	**$0**
Nutrient Management						
Poultry Manure ($38/ton)		2 tons	3 tons		$76	$114
Application ($8/application)		2 x	2 x		$16	$16
Urban Plant Debris ($35/ton)		5 tons			$175	
Application (with manure)						
Fish/Seaweed Emulsion ($5/gal)	6 gals	3 gals		$30	$15	
Application ($25/application)	2 x	1 x		$50	$25	
Organic Bulk Blend Fertilizer($430/ton)	.7 ton			$301		
Application ($7/application)	2 x			$14		
Dolomite ($12 per 1/3 ton)	1	1		$12	$12	
Micronutrients ($7/gal)	1 gal	1 gal		$7	$7	
				$414	**$326**	**$130**
Pruning						
($36 conventional estimate)	100%	75%	50%	**$36**	**$27**	**$18**
Tree Replacement						
3-4 trees ($90 conventional estimate)	100%	100%	100%	**$90**	**$90**	**$90**
Irrigation						
Microsprinkler ($145 conventional est.)	1	1		**$145**	**$145**	
Flood ($39 conventional estimate)			1			**$39**
TOTAL[2]				**$1,146**	**$849**	**$391**

[1] Cost estimates are based on data provided by organic grower interviews and conventional rates reported in Muraro, Hebb & Stover; Muraro & Oswalt; Muraro, Roka & Rouse.

[2] Total estimated costs are annual per acre variable (direct) expenses for grove care only. They represent rough averages among growers in each cost category and across regions. Actual grower costs vary according to site-specific conditions, farm type, and growing region.

4.3. Single Enterprise Profitability Analysis

Production budgets are useful for estimating the profitability of a farming operation or a change in farm plan, as well as for predicting the effects of changes in agricultural policy. Profitability can be measured in terms of gross margin or income above variable cost. Gross margin is calculated by subtracting variable costs from gross revenue. It represents the per acre return to fixed factors. That is, it does not account for fixed costs, such as machinery depreciation, land charge, taxes and insurance, interest on capital investments, management charge, or the opportunity cost of fixed factors or unpaid labor (Kay and

Edwards). Fixed costs add significantly to the total cost of organic production, but are not reflected in the variable cost and gross margin estimates presented in this section.

The most basic type of profitability analysis relies on a single production budget and is static with respect to time. Gross margin, average variable cost of production, break-even price, and break-even yield can be calculated using three pieces of information: variable cost per acre, yield per acre, and output price.

The wide variation in grove care costs and yields has been described above. For example, organic growers reported red grapefruit yields ranging from 27 boxes per acre (for a very low cost grower with sparsely planted trees) to 250 boxes per acre (for a medium cost grower) to 1000 boxes per acre (for a high cost grower). Organic round orange yields were reported ranging from about 201 to 600 boxes per acre among organic growers, and organic tangerine yields of 100 boxes per acre and 298 boxes per acre were reported. Yield figures were not obtained for the lowest cost orange and tangerine growers. Price reports were all similar. Growers reported on-tree prices ranged from $5 to $6 for grapefruit, $8 to $10 for tangerines, and were all around $6 for round oranges. Delivered-in prices for processed oranges were reported ranging from $1.25 to $1.45 per pound solid.

Table 7. Gross Margin and Average Variable Cost Estimates for Organic Grapefruit

Cost Category	Variable Grove Care Cost (per acre)	Yield (per acre)	Price (per box)	Gross Margin (per acre)	Average Var. Cost (per box)
High	$1,146	450	$5.67	$1,406	$2.55
Middle	$849	300	$5.67	$852	$2.83
Low	$391	80	$5.67	$63	$4.89

Table 8. Gross Margin and Average Variable Cost Estimates for Organic Round Oranges

Cost Category	Variable Grove Care Cost (per acre)	Yield (per acre)	Price (per box)	Gross Margin (per acre)	Average Var. Cost (per box)
High	$1,146	400	$6	$1,254	$2.87
Middle	$849	250	$6	$651	$3.40
Low	$391	70	$6	$49	$5.59

Table 9. Gross Margin and Average Variable Cost Estimates for Organic Tangerines

Cost Category	Variable Grove Care Cost (per acre)	Yield (per acre)	On-tree Price (per box)	Gross Margin (per acre)	Average Var. Cost (per box)
High	$1,146	300	$9	$1,554	$3.82
Middle	$849	200	$9	$951	$4.25
Low	$391	60	$9	$149	$6.52

Given the estimates of costs, yields and prices for low, middle, and high cost growers, gross margin and average variable production cost are calculated for organic grapefruit in Table 7, round oranges in Table 8, and tangerines in Table 9. The margins and costs presented in Tables 7-9 do not include harvesting costs, assessment fees, or fixed costs. Costs and yields vary widely, and the figures in Tables 7-9 do not represent any particular grower. Therefore the figures should be treated as hypothetical.

For a particular cost category, gross margins are similar for the three varieties of citrus. Gross margins are highest for the high cost category and lowest for the low cost category. It is apparent from these figures that more intensive grove care pays off for growers who can support the necessary investment and

bear the risk. Assuming that growers can obtain above average reported yields by managing groves more intensively (in the medium to high cost range), the resulting improvement in returns more than offsets the increased grove care expenses.

Average (per box) variable costs are lowest for the intensively managed (high cost) representative grove. Average variable cost equals the minimum price necessary to just cover variable costs. The distribution of average variable costs among growers provides an indication of short-run supply. Only the growers with an average variable cost at or below a given price would be willing to continue producing in the short-run.

Given the considerable variation in grower costs and yields, calculation of break-even yields for a range of prices or break-even prices for a range of yields can aid growers in forming "their own expectations about the probability of obtaining a price and yield combination that would just cover total costs" (Kay & Edwards). Short-run break-even yields and break-even prices based on variable grove care costs are shown in Tables 10 and 11. Short-run break-even yield is the yield needed to just cover variable costs, which is where gross margin equals zero. Short-run break-even price is the on-tree price needed to just cover variable costs, which is where the gross margin equals zero.

Table 10. Short-Run Break-Even Yields (boxes per acre) Under Three Pricing Scenarios.

Variable Grove Care Costs (per acre)	On-tree price of $5 per box	On-tree price of $6 per box	On-tree price of $7 per box
$300	60	50	43
$500	100	83	71
$700	140	117	100
$900	180	150	129
$1100	220	183	157

Table 11. Short-Run Break-Even Prices ($/box) Under Six Yield Scenarios.

Variable Grove Care Costs (per acre)	Yield of 50 boxes	Yield of 100 boxes	Yield of 150 boxes	Yield of 200 boxes	Yield of 250 boxes	Yield of 300 boxes
$300	$6.00	$3.00	$2.00	$1.50	$1.20	$1.00
$500	$10.00	$5.00	$3.33	$2.50	$2.00	$1.67
$700	$14.00	$7.00	$4.67	$3.50	$2.80	$2.33
$900	$18.00	$9.00	$6.00	$4.50	$3.60	$3.00
$1100	$22.00	$11.00	$7.33	$5.50	$4.40	$3.67

According to the calculations shown in Table 10, a typical high cost grower ($1100 per acre) would need a yield of at least 220 boxes per acre to just cover variable costs with an on-tree price of $5 per box. The figures in Table 11 demonstrate that the same high cost grower who obtains a yield of 200 boxes/acre would need to receive an on-tree price of $5.50 per box to just cover variable costs. The figures are applicable to any citrus variety.

4.4. Partial Budgets

Sometimes a grower would like to anticipate the effect on profits of making a change to his farm operation. Partial budgets are used to calculate the expected change in profit that would result from changing a farm plan or adopting a new farming system (Kay & Edwards). Two different types of production methods, such as conventional and organic, can be compared using partial budgets. A partial budget sums additional costs, reduced costs, additional revenue, and reduced revenue associated with a change in farm plan to calculate the net change in average profit (Kay & Edwards). In order to create

partial budgets for comparing conventional and organic production, data on costs, yields, and prices for both systems are needed.

Conventional production budgets by region and variety for the 2002-03 season are reported in Muraro, Hebb & Stover; Muraro & Oswalt; and Muraro, Roka & Rouse. Representative grove care costs for conventional citrus ranged from $723 to $916 per acre for conventional oranges and from $697 to $1,025 per acre for conventional grapefruit depending on growing region.

Average per acre yields for all Florida regions over the last five seasons (1998-99 through 2002-03) are reported as 360 boxes for conventional round oranges, 433 boxes for conventional grapefruit, and 239 boxes for conventional tangerines (FASS). Average on-tree prices per box over the last five seasons are reported as $3.70 for conventional round oranges, $2.29 for conventional grapefruit, and $8.29 for conventional tangerines (FASS).

An example shown in Table 12 compares a typical fresh fruit (high cost) cultural program for conventional Indian River Grapefruit with a hypothetical high cost organic grapefruit cultural program. Despite higher per acre grove care costs for organic grapefruit (when comparing fresh—high cost—cultural programs) and lower expected yields, gross margin is significantly higher in the representative partial budget shown in Table 12. The greater profitability of organic grapefruit in this example is due to the low price of conventional grapefruit and the organic price premium of nearly 100% (on-tree). If the organic price were to fall below $4.23 (38% on-tree premium), the organic gross margin would be less than the conventional gross margin of $251 for the yields, costs, and conventional price in this example.

Table 13 presents a partial budget comparing conventional Valencia oranges with organic Valencia oranges in the central region. In this example, revenue and costs are quite similar for the two different production methods. Given these representative costs, yields, and prices, organic Valencia oranges have a gross margin that exceeds that of conventional Valencia oranges by $174. The price premium for processed organic Valencia oranges is not as large as the premium for organic grapefruit. The typical on-tree price premium per box for organic Valencia juice oranges is 32%. This figure assumes 6.7 pounds solid per box for conventional Valencia oranges and 6.3 pounds solid per box for organic Valencia oranges. Some growers and processors claim that organic pounds solid per box are higher than conventional, while others claim that pounds solid are about the same or lower for organic oranges. Based on specific records obtained from two growers of organic Valencia oranges, 6.3 pounds solid per box is typical. The figure for conventional Valencia oranges, 6.7 pounds solid per box, is taken from Muraro & Oswalt. Given the yields, costs, and conventional price for Valencia oranges in this example, organic Valencia oranges would have a lower gross margin if the organic on-tree price per box fell below $5.69 (a premium of 20% per box). This price translates to a delivered-in price of $1.28 per pound solid.

Table 12. Hypothetical Partial Budget Comparing Conventional Grapefruit with Organic Grapefruit in the Indian River Region (high cost fresh cultural programs)

	Conventional Grapefruit[1]	**Organic Grapefruit**[2]	**Change in Gross Margin**[3]
On-tree price (per box)	$3.06	$5.67	
Yield (boxes per acre)	417	350	
Total Revenue (per acre)	$1276	$1985	+$709
Grove Care Category			
Weed Management	$211	$380	-$169
Other Pest Management	$339	$81	+$258
Nutrient Management	$120	$414	-$294
Pruning	$43	$43	no change
Tree Replacement	$128	$128	no change
Irrigation	$184	$184	no change
Total Variable Cost	$1025	$1230	-$205
Total Gross Margin	$251	$755	**+$504**

[1] Prices, yields, and costs for conventional grapefruit taken from Muraro, Hebb & Stover; rounding errors account for slight differences in figures.
[2] Costs differ slightly from the high cost production budget in Table 6, as some costs are specific to Indian River grapefruit.
[3] A plus sign represents greater revenue or lower costs for organic; a minus sign represents lower revenue or greater cost for organic.

In the partial budget calculations, on-tree prices are assumed to be unaffected by packout rates. For organic citrus, it is not uncommon for growers to receive a fixed on-tree price regardless of packout rate. This assumption may be less realistic for conventional citrus.

Break-even prices and break-even yields can be calculated for partial budgets, as well. Given a particular organic price premium, partial break-even yield identifies the maximum drop in yield under organic management that would support an organic gross margin at least as high as the conventional gross margin. For the organic gross margin to exceed the conventional gross margin given an organic price premium of 30%, the conventional yield must be no more than 30% higher than the organic yield (assuming per acre production costs are the same).

Table 13. Hypothetical Partial Budget Comparing Conventional Valencia Oranges with Organic Valencia Oranges in the Central Region (medium cost cultural program for processed market)

	Conventional Oranges[1]	**Organic Oranges**[2]	**Change in Gross Margin**[3]
Delivered-In price (per P.S.)	$1.05	$1.35	
On-Tree price (per P.S.)	$0.70	$0.98	
Pounds Solid per Box	6.7	6.3	
On-Tree price (per box)	$4.69	$6.17	
Yield (boxes per acre)	446	365	
Total Revenue (per acre)	$2092	$2252	+$160
Grove Care Category			
Weed Management	$220	$228	-$8
Other Pest Management	$214	$33	+$181
Nutrient Management	$158	$326	-$168
Pruning	$36	$27	+$9
Tree Replacement	$63	$63	no change
Irrigation	$145	$145	no change
Total Variable Cost	$836	$822	+$14
Total Gross Margin	$1256	$1430	**+$174**

[1] Prices, yields, and costs for conventional oranges taken from Muraro and Oswalt; rounding errors account for slight differences in figures

[2] Costs differ slightly from the medium cost production budget in Table 6, as some costs are specific to Central region Valencia oranges.

[3] A plus sign represents greater revenue or lower costs for organic; a minus sign represents lower revenue or greater cost for organic.

The partial budgets presented above represent the authors' best judgment regarding typical prices, yields, and variable production costs over the last two years. As with the representative production budgets, these figures do not correspond to any one grower in particular. The actual differences in gross margin for specific groves will vary widely according to grower and farm characteristics. Also, these partial budgets do not include any changes in fixed costs, such as organic certification costs or the costs of additional recordkeeping and paperwork required for certification. Furthermore, this static analysis does not consider the three-year transition period, in which yields may fall considerably but an organic price premium cannot be obtained.

For perennial fruit crops, like citrus, static budgets do not capture the changes in profitability over the entire life cycle of the crop. It takes several years after a grove is first planted for the trees to produce significant yields. Likewise, the three-year conversion period required for organic groves represents a special interval with typically declining yields and no price premium. Static budgets like those presented above should ideally include a prorated share or amortization of costs incurred during grove establishment or the conversion period. Establishment costs are partially captured in the budgets described above by requiring annual replacement of 3-4 trees. Investment analysis can add more detail regarding the effects of changes over time.

4.5. Investment Analysis

The establishment of a grove or the decision to convert to organic management is an investment that requires short-term costs with the expectation of future returns. Investment analysis is appropriate for assessing the profitability of such investments in which costs and revenues are generated unevenly over time (Kay & Edwards). Juliá and Server conduct an investment analysis for organic citrus in the Valencia region of Spain. They calculate the Net Present Value, Internal Rate of Return, and Investment Recovery Period (or payback period) for typical organic and conventional citrus groves. They consider a 25-year time horizon, in which the grove is newly planted in the first year, and the organic grove is converted from conventional management in the tenth year. Based on Spanish citrus data, they estimate that organic yields fall to 81% of conventional yields during the first four years after conversion, but then rise to 90% of conventional yields for the remaining years of organic management. They calculate total costs per hectare to be 37% higher for organic oranges than for conventional oranges during sustained management (years 11-25). In their study, labor costs and fertilizer costs are higher, but irrigation, insecticide, fungicide, and herbicide costs are lower under organic management. Using a 29% price premium for organic oranges, they estimate the net present value and internal rate of return to be slightly higher for the conventional grove than for the organic grove. Also, the investment recovery period is slightly shorter for the conventional grove. They conclude that a 30% price premium is necessary for the internal rate of return on the organic grove to exceed that of the conventional grove. The results of this Spanish study seem roughly consistent with figures gathered in the present study of Florida citrus, at least for a high cost/medium yield organic grove.

5. Incentives, Disincentives, and Alternative Land Uses

5.1. Reasons for Growing Organically

Although gross margin or profit is typically an important consideration, other factors may affect growers' decisions on a particular farm plan and method of farming. These might include various types of risk, cash or credit constraints, expectations regarding legal liability issues, environmental perceptions and preferences, or health concerns.

Growers were asked the question: "What were the primary reasons you decided to grow organically, instead of conventionally?" First, their open-ended responses were recorded. The following paraphrases are a selection of open-ended responses to the question about their primary reasons for growing organically.

- I'm tired of chemicals; if others had to do their own spraying, they'd get tired of them too.
- I believe in it, and I'm concerned for the health and safety of my workers.
- I noticed that conventional fertilizer would burn my hands, and I was concerned about flora and fauna, the soil and the environment. It seemed like a good idea to let the soil revert to its natural state.
- My grove borders duplexes and high class homes and I already knew of some environmental liability problems. I wouldn't go back to conventional—chemicals kill everything, including beneficial insects.
- Because that was what I wanted to eat—better for health of plant and people.
- Primarily economic, secondarily health and the environment.
- Returns, prices.
- I didn't have the money to push grapefruit and replant, and conventional grapefruit wasn't making any money. I decided to fill out the paperwork to sell it as organic. I don't believe in the organic concept.

- Because of economics.
- The economics are better.
- I don't know any other way.

After being given the chance to respond to the open-ended question, growers were presented with a list of possible factors that could influence a grower's decision to grow organically and were asked to indicate the importance of each factor in their decision. Thirteen responses were obtained rating the list of factors. The distribution of scores and the mean score on a zero-three scale (0=not important or not applicable, 1=slightly important, 2=moderately important, 3=very important) are reported in Table 14.

Table 14. Importance of Factors in Growers' Decision to Adopt Organic Methods.

	Not Important (0 points)	Slightly Important (1 point)	Moderately Important (2 points)	Very Important (3 points)	Total Points	Mean Score
Price Premiums	1	0	5	7	31	2.38
Concern for Environ	3	2	2	6	24	1.85
Concern for Health	5	1	3	4	19	1.46
Envirn Liability Risk	6	3	2	2	13	1.00
Reduce Costs	9	2	1	1	7	0.54
Environmental Regs	11	1	1	0	3	0.23
Credit Difficulties	13	0	0	0	0	0.00

Note: Numbers in first four columns represent number of growers indicating that level of importance for each factor (out of 13 responding growers).

Not surprisingly, the organic price premium was rated as the most important incentive on average, followed by concern for the environment, concern for personal or family health, and lower risk of environmental liability. Reducing production costs and environmental regulations were relatively insignificant factors, and none of the thirteen respondents assigned any importance (or applicability) to difficulty obtaining credit.

The results demonstrate that the profit motive is a dominant factor influencing the decision of most growers to adopt organic methods. The difference in scores between "obtain price premium" and "reduce production costs" is consistent with other data that show that organic growers obtain a sizeable price premium, but that most organic growers have production costs equal to or greater than typical conventional costs. Only one of the thirteen respondents indicated that obtaining a price premium was not important in his decision to grow citrus organically. That respondent was the only grower for whom the profit motive did not seem important at all. Most organic growers state that other factors, besides profitability, were important in their decision as well. Concern for the environment, concern for personal or family health, and a perceived lower risk of liability for environmental damages were significant factors for several growers and received average scores falling between "slightly important" and "moderately important."

5.2. Problems and Difficulties

Various risks, difficulties, and obstacles can hinder the adoption of alternative agricultural methods. In order to identify some of the disincentives for organic citrus production, growers were asked: "What are the main difficulties associated with growing certified organic citrus on your land?" Growers' open-ended responses to the question are listed below:

- Weeds and fire ants.
- Not being able to use herbicide.

- Nutrition and soil management; also lack of information.
- Weeds and nutrition.
- Weeds and vines.
- Still a small market with a limited number of organic packers and processors.
- Capital constraints and Brazilian pepper trees.
- Fertilization and weed control.
- Weeds.
- Weeds/vines and grasshoppers.
- Weeds.
- Weed control.
- Paperwork and finding markets.
- Cash flow.
- Paperwork and greasy spot.
- Fire ants and fertilization.
- Weeds, especially Johnson grass and pepper trees.
- Weed control.
- Paperwork.

After being presented with the open-ended question, growers were given a list of possible problems or issues associated with growing organic citrus and were asked to indicate whether each issue is not a problem, a small problem, a large problem, or a severe problem for them.

Based on fifteen responses, weed problems were the most significant, followed by "obtaining marketing information" and "finding buyers, packers, or processors." Fungus problems, nematode problems, and chemical drift from neighboring property were the least significant of the issues presented to growers. Values were assigned to the responses so that 0=not a problem, 1=small problem, 2=large problem, and 3=severe problem. The distribution of scores and mean score are presented in Table 15.

Table 15. Difficulties Associated with Growing Certified Organic Citrus.

	Not a Problem (0 points)	Small Problem (1 point)	Large Problem (2 points)	Severe Problem (3 points)	Total Points	Mean Score
Weed Problems	1	1	5	8	35	2.33
Market Info	4	2	5	4	24	1.60
Finding Buyers	4	5	1	5	22	1.47
Labor Costs	5	3	4	3	20	1.33
Production Info	7	1	3	4	19	1.27
Soil Fert./Nutrients	5	2	7	1	19	1.27
Recordkeep/Paperwrk	5	3	5	2	19	1.27
Disease Problems	5	7	2	1	14	0.93
Insect Problems	5	8	1	1	13	0.87
Certification Costs	7	5	2	1	12	0.80
Fungus Problems	7	6	2	0	10	0.67
Nematode Problems	12	3	0	0	3	0.20
Chem Drift/Neighbor	14	1	0	0	1	0.07

Note: Numbers in first four columns represent number of growers indicating that strength of each potential problem (out of 15 responding growers).

Six exiting growers that had been growing citrus organically, but gave up organic citrus within the last two years were contacted to provide additional insight regarding obstacles to growth in the organic citrus sector. Two exiting growers indicated that unfavorable market conditions were primary reasons for giving up organic citrus. Another suggested that it was not profitable or financially feasible. One exiting grower said that he had difficulty managing a relatively small organic grove separately from large conventional groves and that conventional chemicals were sprayed on the organic grove by accident. One said that stricter requirements for organic certification were a factor, and another grower indicated that personal illness was the main factor.

5.3. Alternative Land Uses

Upon giving up organic citrus, the land may be converted to a variety of alternative uses. Among the six exiting growers contacted, three said that they are selling the land for development, two said that they continue to grow citrus conventionally, and one said they maintain the land as their primary residential property.

Current organic citrus growers were also asked what they would do with their organic citrus land if they could not succeed at meeting their minimum goals growing citrus organically. Among sixteen growers that responded to this question and provided only one answer, seven (44%) said that they would sell or give up lease on the land. Five (31%) said they would grow a different agricultural product, and four (25%) said they would grow citrus conventionally.

The high percentage of respondents indicating that selling the land would be the next best alternative is not surprising given current trends in Florida. First, returns from conventional citrus have been low and the economic outlook for Florida citrus remains weak. Second, rapid residential development in Florida has increased land values and the pressure to sell land for housing.

6. Dissemination of Organic Knowledge

6.1. Current Information Sources

Growers were asked to name their two most helpful sources of organic citrus production information by category. Responses are listed in Table 16. Own trials and other growers were most frequently mentioned as the two most helpful sources of organic citrus production information.

Table 16. Sources of Organic Citrus Production Information.

Sources of Organic Citrus Production Info	**Number of Mentions (21 respondents)**
Own Trials	7
Other growers	6
Consultants	4
USDA Standards or OMRI list	4
Trade magazines, books, or websites	3
Old ways or family heritage	3
UF/IFAS Extension Agents	2
Certification Agencies	2
Input Suppliers	2
Conferences, seminars, or workshops	1

Only nine responses were obtained regarding growers' two most helpful sources of organic citrus marketing information. Results are listed in Table 17. "Individual customers, handlers, or brokers,"

followed by "own trial and error" were the most frequently mentioned sources of organic citrus marketing information. As with organic production, organic citrus market information is not readily available to growers.

Table 17. Sources of Organic Citrus Marketing Information.

Source of Marketing Information	**Number of Mentions (9 respondents)**
Individual customers, handlers, or brokers	5
Own trial and error	3
Other growers	1
Consultants	1

The University of Florida, IFAS, recently has initiated on-farm and experiment station research on the use of cover crops and organic sprays as part of a weed management program for organic citrus. A list of extension documents and articles on organic citrus that were not cited in this report is presented in Appendix A. These information sources may be helpful to growers and others in the organic citrus industry.

6.2. Research Needs

Growers were asked an open-ended question: "In your opinion, what are the highest priority research needs for organic citrus production and marketing." Multiple responses were recorded for each of the twenty growers responding to this question. Results are presented in Table 18. Weed management, soil fertility & nutrition, and market outlets/information were the most frequently cited research needs. More than one grower mentioned rootstock research, organic advertising and promotion, and soil or leaf sampling aids as well.

Table 18. Highest Priority Research Needs Reported by Organic Citrus Growers

Research Need	**Number of Mentions (20 respondents)**
Weed management	10
Soil Fertility and Plant Nutrition	5
Market Outlet Information	5
Rootstock research and development	3
Organic advertising and promotion	2
Soil or leaf sampling devices for growers	2
A device to check for pesticides	1
Water storage and excess salt removal	1
Additional organic-approved inputs	1
Pest management	1
Post-harvest handling	1
Comparison of organic vs. conventional in terms of impact on soil flora and fauna	1
Tighter inspection and control of fraud	1

Other concerns among organic citrus growers were noted during the interviews. These are summarized in Table 19. Multiple growers mentioned concerns about Department of Citrus imposed marketing constraints, production and marketing difficulties specific to small growers, and international competition.

Table 19. Additional Concerns of Organic Citrus Growers.

Concern	Number of Mentions
Department of Citrus marketing constraints	3
Small farmer difficulties in production and marketing	2
International competition	2
Dominance of organic market by big companies	1
Grower share of final food dollar	1
Too many growers flooding the organic market	1
Few processors that buy organic fruit from other growers	1
Inability to sell transitional fruit	1
High cost of organic nitrogen sources relative to conventional	1
Organic growers being over-interviewed and under-served	1

7. Summary of Findings

Since 1993, when 568 acres of organic citrus acreage in Florida were documented (Swisher, Monaghan and Ferguson), organic citrus production has expanded considerably. The USDA-ERS estimates that organic citrus acreage in Florida jumped from 2,296 acres in 1997 to 6,056 acres in 2001. Data provided by this survey and the FDACS organic registration program estimate current organic acreage at about 4,800 acres spread among thirty-one certified organic growers. The cause of the decline since 2001 is open to speculation. Estimates of transitional acreage due to become fully certified next season suggest that certified organic citrus land will increase to approximately 6,000 acres in 2004-05.

The fresh market is of greater importance for Florida's organic citrus sector than it is for Florida's conventional citrus. Whereas about one-quarter of conventional citrus acreage in Florida is intended for the fresh market, approximately one-half of Florida's organic citrus acreage is intended for the fresh market. Grapefruit and tangerines represent a higher portion of the organic citrus crop than they do for the conventional citrus crop in Florida.

Primary market outlets for fresh organic citrus are specialty supermarkets, natural food stores, and supermarket chains in urban centers of the Northeast and Midwest. Organic orange and grapefruit juice are sold nationwide at the same retail outlets. Both fresh citrus and juice are exported to Europe and Japan as well.

Growers report significant organic price premiums typically ranging from 20% to 100% above the conventional on-tree or delivered-in price. A few growers, however, report difficulty finding adequate markets for their crop and complain about the small number of packers and processors that buy fruit from independent growers. Eight certified organic packinghouses and five certified organic processing plants were identified as active during the first half of the 2003-04 season.

A diverse group, organic citrus growers and groves vary widely in terms of their characteristics and individual circumstances. Farm size, ownership vs. lease of land, market connections, integration with conventional citrus or other agricultural activities, business structure, input intensity and production costs, specific production practices, owner involvement with grove care, and reliance on off-farm employment serve to differentiate organic growers.

Out of thirty-five growers who were certified organic in either the 2002-03 or 2003-04 seasons, fourteen (40%) had organic citrus groves of 25 acres or less. Two growers owned or leased organic citrus groves

totaling more than 1,000 acres. The mean acreage of a certified entity's citrus groves is 148 acres, and the median is 63 acres.

Five different types of organic citrus operations are described in this report. More generally, organic citrus growers can be divided by the intensity and cost of their grove care practices. One segment of growers manages the groves intensively to support good yields over the long-run. Another segment of growers invests in minimal grove care. Intensively managed groves have per acre costs that tend to be somewhat higher than conventional production costs. These organic groves obtain yields that are similar to, or in a few cases higher than, average conventional yields. Low input and low cost organic citrus operations typically obtain yields that are significantly lower than average conventional yields.

Specific grove care practices and reported yields vary substantially. Compared to conventional production, organic grove care typically requires higher costs for weed management and nutrient management, but lower costs for insect and other pest control. Human labor and machine time employed to control weeds is a major cost for organic growers. Organic production tends to be more labor intensive, but avoids the use of synthetic inputs. A majority of organic citrus growers use poultry manure and fish emulsion as primary nutrient sources, depend on mechanical mowing, hand weeding and hoeing, and mechanical disking to control weeds, and do not rely on anything other than fish emulsion for insect control.

Gross margins are highest for the more intensively managed organic groves that obtain yields similar to or higher than average conventional yields. Hypothetical budgets for medium to high cost (and medium to high input intensity) organic groves suggest that gross margins can be significantly higher than conventional gross margins. Gross margin, however, does not include certification costs, additional managerial costs, and other fixed costs that may be associated with organic production. Also, the higher gross margin is dependent upon an organic price premium.

Growers report adopting certified organic production systems for a variety of reasons. Significant factors reported to be important include profitability, environmental or health concerns, and environmental liability risk. Financial incentives are paramount for most growers. The organic price premium is a crucial factor creating a financial incentive. Although an important segment of organic growers utilizes a low cost production system, most organic growers have grove care expenses similar to or higher than conventional expenses.

Weed control stands out as the most difficult challenge facing organic citrus growers. Obtaining market information and finding buyers, packers, and processors for organic fruit are large problems for some organic growers. Labor costs, soil fertility under organic management, obtaining production information, and recordkeeping and paperwork present additional challenges for organic growers.

Conventional citrus, organic citrus, and selling land for development are three competing land uses in many areas. Half of the exiting growers sampled said that they are selling their land for development. Forty-four percent of current organic respondents said that they would sell or give up the lease on their land, if they could not succeed meeting their minimum goals growing citrus organically.

Organic growers rely heavily on their own trials and other growers for information on organic citrus production. Individual customers, intermediate handlers or brokers are the primary sources of market information.

Consistent with the greatest difficulties expressed by organic growers, weed control is most frequently mentioned as a high priority research need. Market research and research on soil fertility and plant

nutrition under organic management are frequently mentioned needs as well. Other research needs reported by growers include rootstock research, improved support for soil and leaf sampling, and advertising and promotion.

8. Conclusions and Avenues for Further Research

Organic citrus acreage appears to be on the rise once again, despite an apparent dip in certified acreage between 2001 and 2002. New growers are becoming certified this year and next. In addition, some current organic growers are expanding their certified acreage.

Although increasing supply without a concurrent increase in demand could erode the organic price premium, that possibility does not appear likely in the short-run. Most growers and handlers report that demand has been strong and seems to be increasing. Growers have reported receiving five- to ten-year contracts from processors for their fruit. These long-term contracts suggest that marketers have confidence in the continued strength of demand for organic citrus.

Some growers have established grove care systems and found market outlets that appear to be economically viable for the long-term. Others utilize the organic option as a short-term bridge between alternative land uses, especially between conventional citrus and conversion of land to residential development. Reflecting in part the weak economic outlook for conventional citrus in Florida and the pressure from development, organic citrus growers are more likely to sell their land for development than revert to conventional citrus production. These findings suggest that as long as it continues to be economically viable, organic citrus presents an alternative that can slow the rate of conversion of agricultural land to housing developments in Florida.

Organic citrus production is not without pitfalls however. The wide variety of production practices reflects considerable experimentation and a lack of consensus regarding the most efficient organic grove care practices. A few growers report yields above typical conventional yields, but most report yields that are somewhat lower than conventional. Some growers describe a learning curve, reporting that they struggled to find an organic system that maintained the health of their trees and satisfactory yields during the early years of transitioning to organic management. The variety of production practices and difficulties that some growers have faced highlight the fact that good information on organic citrus production is not widely available. Own trial and error is mentioned more frequently than any other source of organic production information.

The University of Florida has published extension bulletins on organic citrus and is engaging in research on organic weed control methods. This research, as well as research on organic nutrient management and other needs expressed by growers, could bring substantial benefits to growers.

Additional market research could help growers and handlers identify potential new market outlets or adjust their marketing practices. Advertising and promotion aimed at consumers could boost demand for organic citrus. Research on the benefits of organic citrus production, including consumer benefits such as lower pesticide residues and public benefits relating to biodiversity or water quality could help stimulate demand for organic citrus. Research and education about impacts on the environment and human health, including farm worker health, could increase incentives for growers to adopt organic systems.
Long-term sustainability and growth of organic citrus production depend on a variety of factors. Unless effective cover cropping systems, organic sprays, or other weed control methods are found, organic citrus production will remain highly dependent on labor and machine inputs to control weeds. As labor and fuel costs rise, this is a cause of some concern. Likewise, organic citrus production is dependent on organic nutrient sources, such as poultry manure, urban plant debris, organic bulk blend

fertilizers, and fish emulsion. As organic production increases and input demand rises, the availability and cost of these inputs will become more critical. Research on the potential of expanding supply of organic inputs and on new organic input sources would provide insight regarding the long-term sustainability of organic citrus production.

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No.___

Organic Citrus Grower Survey 2003-04

Grower Interview Sheet

Acreage & Production

1. What is the acreage of your certified organic citrus groves (with trees planted)? What percentage of this do you own and what percentage do you lease?

   Certified organic citrus: _____ acres Own: _____% Lease: _____%

2. Do you have any uncertified organic, or transition citrus groves? If so, how many acres? Do you also grow citrus conventionally? If so, how many acres?

   Uncertified organic citrus: _____ acres
   Conventional citrus: _____ acres

3. Do you currently grow other crops, besides citrus? If so, what crops? What is the total acreage of your farm, including all crops?

   Other crops:

   Total farm acreage (all crops): _____ acres

4. In which counties are your **certified organic** citrus groves located? Can you tell me how many acres (with trees planted) in each county?

County	Certified Organic Acreage

5. Can you tell me how many acres by variety, or variety category?

Variety	Organic Acreage (*number of acres*)
Early/Mids	
Navels	
Valencias	
White Grapefruit	
Red Grapefruit	
Tangelos	
Temples	
Tangerines/Mandarins	
Other: _____	

6. Can you tell me how many acres (or what percentage of your acreage) is intended for the fresh market?

   Fresh Acreage: _____
   Processing Acreage: _____

7. Do you sell your citrus to a packinghouse, processing plant, marketing coop, wholesaler or brokers, direct to retail, or direct to the consumer? If direct to retail or consumer, what is the final destination? Own packinghouse or processing plant?

   Primary Market Outlets/Buyers (packhouse, proc.plant, wholesaler/broker, marketing coop, direct to retail, direct to consumer):
   Own packhouse/proc.plant?
   Final Destination:

8. What price do you receive for your fruit? What is the typical packout rate (for fresh)? How much do you receive for eliminations and where do they go?

   Price:

   Packout Rate:

   Eliminations:

Organic Grove Care Practices

9. Did you ever hire a grove care company for your **certified organic** citrus groves during the past 2 seasons? Do you use a grove care company for most of your **certified organic** citrus grove care needs?

   Grove Care Company
   Ever: yes / no
   Most: yes / no

10. I will read a list of grove care practices. Could you please respond "yes" or "no" whether or not you use each one as part of your regular grove care system?

Grove Care Practice	**yes**	**no**	**frequency/amount**
Nutrient Management			
Poultry litter / chicken manure			
Other animal manure			
Fish/Seaweed foliar spray			
Urban plant debris			
Ground cover / green manure			
Organic bulk blend fertilizer			
Potash			
Dolomite			
Minor Elements / Micronutrients			
Other nutrient sources:_____			

Weed Management			
Mow			
Hand Weed / Hand Hoe			
Disc			
Organic Sprays			
Ground Cover			
Other weed control:_____			
Other Pest Management			
435 (petroleum-based) oil			
Copper			
Sulfur			
Mechanical Tillage/Disc			
Vegetable Oil			
Beneficial Insect Release			
Organic Miticide			
Other pest control: _____			
Irrigation System			
microjet/microsprinkler			
flood			
drip			
watertruck			
other irrigation: _____			

11. Considering your annual per acre grove care costs, not including harvesting costs, please indicate which cost category best represents your typical grove care plan. Does this grove care cost estimate include fixed costs, such as machinery depreciation or interest, taxes or insurance, land charges, management charges, or overhead? If so, what would your per acre variable costs be (without fixed costs)? *Check most representative.*

Cost category	Variable	Var + Fixed
$399 or less		
$400 to $599		
$600 to $799		
$800 to $999		
$1000 to $1199		
$1200 or greater		

12. How many full-time, part-time, and seasonal paid employees do you rely on for the care of your **certified organic** citrus groves? Could you provide an estimate of the number of hired labor hours per acre per year? Could you provide an estimate of the number of hours of your own labor used directly for grove care in your **certified organic** groves?

    Labor requirements:

The Grower and Farm Enterprise

13. What are your responsibilities with regard to the farm enterprise? Are you an owner or manager? In particular, do you have primary responsibility for the choice of what crops to grow, including the decision of whether or not to obtain organic certification? Do you have primary responsibility for choosing specific grove care practices? Are you involved in day-to-day grove operations? Do you perform much of the grove care labor yourself? Do you live on your farm?

    Own words:

    Owner / Manager
    Number of managers:
    Organic certification decision: yes / no
    Grove care decisions: yes / no

14. How would you describe the business structure of your farm enterprise?
    Would you consider it:
    (a) a single-family business?
    (b) a family partnership?
    (c) a non-family partnership?
    (d) a limited liability company?
    (e) a conventional "c" corporation?
    (f) a subchapter "s" corporation?
    (g) a grower cooperative (not marketing coop)
    (h) other: _____

15. How many years have **you** been growing citrus? And your farm enterprise or family?

    Respondent: _____
    Family/Enterprise: _____

16. How many years have **you** been growing citrus organically (certified, uncertified, or in transition)? And your farm enterprise or family?

    Respondent: _____
    Family/Enterprise: _____

17. Of those years growing citrus organically, how many were **you** certified? And your farm enterprise or family? How did you make the transition to organic (gradually or all at once)?

    Respondent: _____ Transition:
    Family/Enterprise: _____

Incentives & Disincentives

18. What were the primary reasons you decided to grow organically instead of conventionally? (open-ended)
    I will read a list of factors that have been suggested as influencing the decision of some growers to farm organically instead of conventionally. Please indicate whether each factor was not important (or not applicable), slightly important, moderately important, or very important in **your** decision.

    Own words:

	Not Important	Slightly Important	Moderately Important	Very Important
Obtain price premiums	0	1	2	3
Reduce production costs	0	1	2	3
Difficulty obtaining credit	0	1	2	3
Access special market	0	1	2	3
Diversification to lower prod/price risk	0	1	2	3
Lower risk of env liability or neg PR	0	1	2	3
Environmental regulations	0	1	2	3
Desire to maintain value of land	0	1	2	3
Concern for the environment	0	1	2	3
Concern for personal/family health	0	1	2	3
Philosophical reasons	0	1	2	3
Other (*please specify*) _____	0	1	2	3

19. What are the main difficulties associated with growing certified organic citrus on **your** land? (open-ended)
    I will read a list of problems or issues related to growing organic citrus. Please indicate whether each issue is not a problem, a small problem, a large problem, or a severe problem for **you**. You may fill this table out on your own if you prefer.

    Own words:

	Not A Problem	Small Problem	Large Problem	Severe Problem
Soil fertility/nutrient sources	0	1	2	3
Weed problems	0	1	2	3
Insect problems	0	1	2	3
Nematode problems	0	1	2	3
Disease problems	0	1	2	3
Fungus problems	0	1	2	3
Post-harvest storage/shelf life	0	1	2	3
Chemical drift from nbr property	0	1	2	3
Labor costs	0	1	2	3
Certification costs	0	1	2	3
Obtaining info on organic prod mtd	0	1	2	3
Obtaining market info for OC	0	1	2	3
Finding buyers, packers, or prcssrs	0	1	2	3
Recordkeeping & paperwork	0	1	2	3
Other (*please specify*):	0	1	2	3

20. Do you plan to increase or decrease your organic citrus acreage within the next five years? Why or why not?

    Increase / Decrease / Same

    Why:

21. If you could not succeed in meeting your minimum goals by growing organic citrus, what would you do? For example, would you grow citrus conventionally, grow a different agricultural product (other than citrus), use land for non-agricultural purpose, sell or give up lease to land?

    (a) grow citrus conventionally
    (b) grow a different agricultural product
    (c) use land for non-agricultural purpose
    (d) sell land
    (e) give up lease on land
    (f) other: _____

Information Sources and Research Needs

22. Name your two most helpful sources of organic citrus production information (by category).

    (a) Cooperative Extension Agents
    (b) Other UF/IFAS personnel
    (c) IFAS publications
    (d) Certification Agency
    (e) Organic Trade Association
    (f) Trade magazines/books/periodicals/websites
    (g) Consultants
    (h) Other Growers
    (i) Own Trials
    (j) Conferences, seminars, workshops
    (k) Input Suppliers
    (l) Other: _____

23. Name your two most helpful sources of organic citrus marketing information (by category).

    (a) Cooperative Extension Agents
    (b) Other UF/IFAS personnel
    (c) IFAS publications
    (d) Certification Agency
    (e) Organic Trade Association
    (f) Trade magazines/books/periodicals/websites
    (g) Consultants
    (h) Other Growers
    (i) Individual customers
    (j) Conferences, seminars, workshops
    (k) State or federal agencies
    (l) Non-govtl market info services
    (m) Other: _____

24. In your opinion, what are the highest priority research needs for organic citrus production and marketing?

No.___

Organic Citrus Grower Survey 2003-04

Packer/Processor/Distributor Interview Sheet

1. How many different growers do you purchase fruit from?

2. Are they under contract or spot market purchases?

3. How is the price determined?

4. What has the purchase price been over the past couple years (on-tree or delivered-in)?

5. Does that price include picking & hauling?

6. Who arranges & pays for picking & hauling?

7. What are typical packout rates?

8. Where do eliminations go (organic or conventional outlets)?

9. What is the net price for eliminations?

10. How do organic pounds-solid compare to conventional pounds-solid (per field box)?

11. Where do you sell your fruit/juice? What are the primary market outlets?

12. How many different buyers do you have?

13. What are the main final destinations or your fruit/juice?

14. What type of market trends have you witnessed or do you anticipate?

15. In your opinion, what are the highest priority research needs for organic citrus marketing?

No. _____

Organic Citrus Grower Survey 2003-04

Exiting Grower Response Sheet

1. Why are you getting out of organic citrus?
    a. poor health, illness, or death
    b. not profitable
    c. legal/ethical issues or fraud
    d. production difficulties
    e. marketing difficulties
    f. other: _____

2. What do you plan to do with your land/groves?
    a. grow citrus conventionally
    b. grow a different agricultural product
    c. use land for non-agricultural purpose
    d. sell land
    e. give up lease on land
    f. other: _____

3. When did you or will you stop selling organic citrus? What was/is the last year?
    a. 01-02
    b. 02-03
    c. 03-04
    d. 04-05

4. Other Comments: