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ECONOMIC IMPACT OF THE FLORIDA CITRUS NURSERY INDUSTRY

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Abstract. **Economic impacts of an industry represent the collective impacts of individual firms. The Florida citrus nursery industry is comprised of approximately 115 commercial firms. Collectively, the citrus nursery industry generates more than $30 million of sales and employs 600 people. However, when indirect and induced economic impacts are included, the citrus nursery industry supports more than $60 million in sales, $23 million in income payments and 1,000 jobs.**

Introduction

The Florida citrus nursery industry is comprised of approximately 115 commercial firms and performs a fundamental role to the overall citrus industry in Florida. The Florida citrus nursery industry provides all the trees for resets and new grove development in commercial citrus operations. As a part of the propagation of new trees, nursery enterprises produce much of the required seed and budwood material. The recent mandatory budwood registration program will increase the value of citrus nursery stock by helping to insure that "clean" (graft-transmissible pathogen-free) trees are delivered to customers in commercial groves and retail door-yard outlets.

Beyond the support role the nursery industry provides to citrus growers, the industry generates economic activity which has impacts within the broader regional and state economic picture. The purpose of this paper is to describe the total economic impact on Florida's economy by the Florida citrus nursery industry.

Economic impacts are measured in terms of sales, employment and income. Sales, or revenue, define the value of a firm or industry's total output. Sales are a gross measure of economic impacts because they include materials and services purchased from other firms as well as income payments made to workers (wages), government (taxes), property owners outside the firm or industry (rents and interest payments), and property owners inside the firm or industry (profits). Income payments measure the "value-added" of a firm or industry's economic contributions. The accounting axiom of economic impact analysis is that the sum of purchased inputs and income payments equal the value of a firm/industry's output. Employment is closely related to value-added because higher employment levels translate to higher total wages. Since labor tends to live in close geographic proximity to the firm site, higher employment levels mean greater income payments into the regional economy.

Economic impacts are quantified with respect to a geographic boundary. Setting the geographic boundary depends on the purpose(s) behind the economic impact analysis. For example, if a state legislature is considering spending public monies to attract new businesses, then the regional economy to be affected should coincide with state political boundaries. Likewise, if a project or new firm affects only a county or municipality, the boundaries of the regional economy should be adjusted accordingly. The overall magnitude of economic impacts depends on the geographic boundary because transactions and income payments to parties outside the region are not included in any multiplier effects.

Total economic impacts can be separated into three categories—direct, indirect and induced. Direct impacts measure sales, income and employment generated solely by the primary firm or industry. Revenues are a measure of sales and includes the value of all products sold. In the case of the citrus nursery industry, the principle product sold is the budded tree. Other products such as seed, budwood, and liners are added to industry output only if they are sold outside the study region's boundary (i.e. state of Florida for this study). The value of seed, budwood and liners sold within Florida are included in the value of the final budded tree.

Value of industry output and income payments are measured in terms of dollars. Direct employment impacts are measured in terms of full-time equivalents (FTE). Typically, one FTE works 2,080 hours per year (40 hours per week over 52 weeks per year). Two people working half time would be counted as one FTE.

Indirect impacts depend on the primary firm's purchases of materials and services from vendors within the region's geographic boundary. The purchases by the primary firm represent sales to the vendors which provide materials and services. As in the case of the primary firm, a vendor's sales are allocated between the purchases of materials and services and the income payments to employees, government and property owners of the vendor's operation. Thus, the transactions among the primary firm, its vendors, and the vendors of the vendors generate multiple rounds of indirect economic impacts.

Induced impacts are a third category of economic impacts. Induced impacts occur as the result of workers and property owners spending their income payments on consumer goods and services within the region's geographic boundary. Therefore, while the primary firm may have sold citrus nursery trees, the purchases of television sets, theater tickets, bedroom furniture and the like by the employees of nursery operations can be credited as an induced economic impact of the citrus nursery industry. Similar to indirect impacts, induced impacts accumulate through the layers of affiliated business that serve as vendors to the primary firm.

Total economic impacts are the sum of direct, indirect and induced impacts. Measures of total economic impact are "backward" looking because they only reflect transactions up to the level of the primary firm/industry. For example, total economic impact of the

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Florida citrus nursery industry would ***not*** include sales, income or employment at citrus processing plants because the processing of citrus products occurs at a stage after the production of a nursery citrus tree. However, measuring the economic impacts of citrus processing ***would*** include the economic contributions of nursery operations because they are an input into the final product sold at the processing level.

Multipliers are used to summarize total economic impacts. An income multiplier of "1.5" indicates that for every dollar of income generated by the primary firm, an additional 50 cents of income payments are generated within the regional economy from indirect and induced impacts. Total economic impact within the region, as measured by income payments, is $1.50 per dollar of income earned by the primary firm/industry. Similar multipliers can be calculated for sales and employment measures.

Materials and Methods

Estimating the economic impact of the Florida citrus nursery industry depended on collecting data in three areas. First, the value of total industry output was estimated. Second, total industry expenditures were allocated between purchased inputs and income payments. Purchased inputs were further itemized by vendor categories. Finally, the number of people employed by the citrus nursery industry was estimated.

The value of industry output was estimated by determining the number of trees sold and multiplying by average market prices. Data from the Bureau of Citrus Budwood Registration, Division of Plant Industries, and comments from Michael Kesinger formed a consensus as to the number of trees sold during 1995 (Crawford, 1995 and Kesinger, 1998). Members of the executive board of the Florida Citrus Nurserymen's Association estimated the allocation of trees sold to container and field grown categories. They also provided an estimate of tree prices for both container and field grown trees. A market value was determined for all trees including those trees produced for "in-house" commercial grove plantings.

Previously developed enterprise budgets for citrus nursery trees provided a basis for estimating and allocating industry expenditures (Muraro, 1985). The executive board of the Association provided more detailed information on material costs, wages and benefits paid to workers, equipment, building and overhead costs. The executive board also developed estimates of labor requirements of field, office staff and supervisory labor.

The data collected was compiled into a regional input-output model. This study used Micro IMPLAN (Olsen et.al, 1993), a software package for microcomputers that allows regional economic impact analysis. IMPLAN divides a regional economy into 528 sectors according to the 4-digit Standard Industrial Classification (SIC) codes. IMPLAN comes with a data package that describes the set of technological relationships that exist among the sectors within the regional economy. This study used the 1995 IMPLAN structural base.

Results and Discussion

In 1995, the Florida citrus nursery industry sold 9.5 million trees. Of the total number of trees sold, 35 percent were sold as container trees with an average price of $3.75 per tree. The balance of the nursery trees (65%) were sold as field grown trees with an average price of $3.50 per tree. The value of total output was estimated to be $34 million. This value includes both revenues from actual sales and the value of trees grown for "in-house" citrus grove operations.

More than $14 million were spent on materials and services. Table 1 provides a break down of industry expenditures by vendor categories. Approximately thirty-five percent of industry expenditures went to materials directly applied to the production of a nursery tree, such as budwood material, soil mix, containers and stakes. In addition, the citrus industry purchased $1.36 million of fertilizers and chemicals. Contract and professional services, which include the services of a tree budder, accounted for more than $2 million.

Almost $20 million, or 58 percent of the total output was spent in the form of income payments - wages, taxes, rents, bank interest, and profits. On a per tree basis, purchased materials and services cost $1.50 per tree, while income payments to workers and property owners accounted for $2.08 per tree. Per tree costs were based on the number of trees sold, and therefore, include the cost of producing unsold trees. Nurserymen estimated that the industry produces 20 to 25 percent excess nursery trees.

Almost 600 people were employed by citrus nursery operations. It was estimated that one full-time worker was needed per 20,000 container trees and 30,000 field grown trees. One office staff person was needed per 250,000 trees and one supervisor was needed per 200,000 trees.

Table 2 presents the dollar value of economic impacts attributed to the citrus nursery industry. Total economic impact, as measured by output, was $62 million. Direct sales by citrus nursery operations accounted for $34 million. Indirect and induced impacts were responsible for another $29 million. The Florida citrus nursery industry can be credited for income payments of $33 million per year to the people of Florida. Almost half of the income payment come direct from nursery operations. The remaining half filters though indirect and induced channels. In addition to the nearly 600 people employed directly by nursery operations, the industry's purchases and transactions support the employment of another 450 people.

Table 1. Estimated expenditures by Florida citrus nursery industry by vendor categories.

Vendor Category	Expenditures ($ thousand)
Budwood material, seed, soil mix, stakes, containers	$ 5,100
Fertilizer and chemicals	$ 1,360
Utilities (phone and electric)	$ 680
Equipment and repairs	$ 1,700
Building construction and maintenance	$ 680
Insurance	$ 1,360
Fuel	$ 340
Office supplies and postage	$ 1,020
Contract and professional services	$ 2,040
Total expenditures to vendors	$14,280

Table 2. Total economic impacts of the Florida citrus nursery industry as measured by output, income and employment.

	Direct	Indirect	Induced	Total
Output ($million)	34	12	17	62
Income ($million)	16	7	10	33
Employment (full-time equivalent)	596	220	249	1054

Table 3 presents multipliers summarizing the economic impact of the Florida citrus nursery industry. Column A includes only indirect impacts, or only transactions within the network of suppliers who deal with citrus nursery operations. Column B extends the economic impact to include induced effects which occur when em-

ployees of nurseries and their suppliers spend income payments on various consumer products. A multiplier of 1.35 (column A) means that for every dollar of sales within the citrus nursery industry, another 35 cents of sales is generated by Florida suppliers of materials and services to the industry. When induced impacts are included (column B), additional sales of 82 cents are generated throughout Florida for every dollar of citrus nursery sales. The multiplier for employment describes the number of full-time equivalents impacted by the citrus nursery industry. An employment multiplier of 1.37 indicates that for every full-time person hired by a nursery another third of a person is hired within the industry's network of suppliers.

Sales, employment and payroll are economic statistics that describe the scope of business activity. For a profit-seeking firm, these statistics are important only in the way they effect the color of the firm's "bottom line," that is whether it is black or red. Generally, when these economic statistics are used to describe an industry, they say little about the profitability of an individual firm.

Table 3. Multipliers summarizing the total economic impacts of the Florida citrus nursery industry.

	A Indirect impacts only (suppliers)	B Indirect + Induced Impacts (+ consumers)
Output	1.35	1.82
Income	1.44	2.06
Employment	1.37	1.77

The real value of documenting the overall economic impact of an industry on a region's economic base, is to improve understanding of how an industry connects within the regional economy. Such understanding is important for both members of the industry and organizations outside the industry.

The Florida citrus nursery industry produces product valued at more than $30 million annually and provides employment to more than 600 people. However, the total economic impacts of the Florida citrus nursery industry are larger than the industry's estimate of direct sales and employment. Through the interaction with other firms and sectors within the state of Florida, the economic contribution of the nursery industry is extended. When the induced impacts, coming from the spending of income earned directly and indirectly through the nursery industry are included, the economic impact almost doubles from the industry's direct contribution for each measure of economic activity.

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