Research Reports

Economic Impact of Florida's Environmental Horticulture Industry[1]

Alan W. Hodges and John J. Haydu[2]
University of Florida, Food & Resource Economics Department
PO Box 110240, Gainesville, FL 32611

Abstract

The economic impact of Florida's environmental horticulture industry in 1997 was estimated based on a telephone survey of wholesale plant nurseries, horticultural retailers, and landscape service firms. Sales of ornamental plants and related horticultural goods and services by the production, retail, and service sectors were estimated at $1.46 billion (B), $1.75B, and $2.70B, respectively. Domestic and international exports of horticultural products and services from Florida amounted to $659 million (M). Economic multiplier effects of commercial activity associated with purchased inputs from other industries and personal consumption expenditures by employees were estimated with an input-output model. Regional impacts of the wholesale nursery sector were also estimated separately for seven areas of the state. Economic impacts of Florida's environmental horticulture industry included total value added of $5.42B and employment of 187,000 people. These impacts are greater than for any other sector of agriculture and associated manufacturing in Florida, including the large fruit and vegetable industry.

Index words: economic impact, Florida, environmental horticulture industry, economic multipliers, input-output models, employment, value added, plant nurseries, horticultural retailers, landscape services.

Significance to the Nursery Industry

The environmental horticulture industry is an important part of the economy of Florida and other states; however, very few studies have documented its economic impacts using scientific survey methods and regional economic models. Reliable information on economic impacts is essential for promotional and development activities by industry associations, and for formulation of sound policies by legislators, regulatory agencies, and local governments. This study establishes the value of the horticultural retailing and landscape service sectors, which are closely linked to the wholesale nursery sector, and provide associated products and services.

Introduction

Nursery and greenhouse crops, including bedding plants, potted flowering plants, foliage plants, cut flowers and cultivated greens, landscape nursery plants, unfinished plant material, sod, flower and vegetable seeds, are the sixth largest agricultural commodity group in the United States, with a farm gate value of $10.9 billion in 1997, representing eleven percent of total farm cash receipts (7). The high unit value of ornamental crops is illustrated by the fact that nursery and greenhouse farms had the highest average net income of all agricultural commodities, nearly four times greater than traditional food and fiber farms (4). Floriculture and environ-

[1]Received for publication July 7, 1999; in revised form March 31, 2000. The authors wish to acknowledge funding for this project provided by the Florida Nurseryman and Growers Association, Orlando, FL, and AgFirst Farm Credit Bank of Columbia, SC. Survey interviews were conducted be the University of Florida's Bureau of Economic and Business Research.

[2]Coordinator of Economic Analysis, and Professor and Extension Economist, respectively.

The *Journal of Environmental Horticulture* (ISSN 0738-2898) is published quarterly in March, June, September, and December by the Horticultural Research Institute. Subscription rate is $65.00 per year for educators and scientists; $85.00 per year for others; add $25.00 for international orders. Periodical postage paid at Washington, D.C. and at additional mailing office. POSTMASTER: Send address changes to HRI, 1250 I Street, N.W., Suite 500, Washington, D.C. 20005.

Table 1. **Sampling and expansion factors for survey of Florida's environmental horticulture industry, 1997.**

Survey group	Number of firms sampled	Firms reporting complete information		Population Florida firms	Percentage firms contacted ineligible	Expansion factor
Wholesale nurseries	581	511	(88%)	4,042	28.7%	4.4
Horticultural retailers	225	125	(56%)	1,478	30.5%	8.2
Landscaper services	202	182	(92%)	4,655	16.1%	13.5

mental horticulture is also the fastest growing segment of U.S. agriculture, averaging seven percent annually since 1992 (3). This striking growth is due to increasing urbanization and rapid growth of new residential and commercial developments, and to the continued strength of the U.S. economy, resulting in greater disposable personal income and increased consumption of horticulture products. U.S. retail expenditures for floriculture and environmental horticulture products have grown an average of 5 percent annually since 1989, reaching $54.8 billion in 1998, or $203 per capita (3).

The state of Florida ranks second in the United States in nursery and greenhouse industry production, with cash receipts valued at $1.45 billion in 1997 according to the Census of Agriculture (7). Ornamental plants are among the largest agricultural commodities in Florida, together with citrus, vegetables and livestock. The state's subtropical climate and strategic geographic location with respect to offshore stock plantations in Latin America provides a comparative advantage for production of horticultural crops. Florida has traditionally been a dominant supplier of plant products to the eastern United States, Canada and Europe, and holds a dominant 90 percent market share for potted tropical foliage plants and cut foliage (4). Florida's nursery industry grew rapidly during the 1970s and 1980s, then growth slowed as the industry matured in the 1990s (3, 4). Sales of Florida nursery and greenhouse products have increased substantially for bedding plants, potted flowering plants, foliage plants, and other environmental crops, while sales have remained level for cut cultivated greens and decreased for cut flowers.

Like many agricultural sectors, the nursery industry has been forced to adapt to an increasingly global and competitive marketplace by developing new products and marketing strategies, achieving greater efficiencies through the use of new technologies, and through consolidation to achieve economies of scale. The product mix of Florida-grown plants has become much more diverse, with sales of 'other' unspecified plant products increasing from 5 to 39 percent of total sales (2). Markets were substantially expanded in other regions, with sales to destinations outside the state increasing to 33 percent of total sales. Mass merchandising retailers have become the dominant market outlet for ornamental plants. Since the mid-1980s, nursery firms have increased in size dramatically; however, production efficiencies have remained relatively constant while costs of production have increased for labor and overhead, resulting in a slight decline in profitability (1).

Materials and Methods

Estimation of the economic value of Florida's environmental horticultural industry was based upon information obtained in over 1000 telephone interviews conducted with wholesale nurseries, horticultural retailers, and landscape service firms (Table 1). Survey data collected for fiscal year 1997 included annual sales, employment, production area (nurseries) or retail sales area (retailers), types of horticultural goods, plant products or services sold, sales by type of customer and geographic region, marketing practices, and changes in business volume and pricing. To evaluate the regional economic impacts of exports of horticultural products and services, sales were classified as international, national, state or local, with the local area defined as the city or county in which the business was located, or within a 50 mile radius. Survey questionnaires were developed separately for each industry sector and pretested in personal interviews with industry representatives.

Firms interviewed for the survey were qualified as having sold horticultural products or services within the past year, and interview respondents were qualified as being knowledgeable about the company's business practices. Telephone interviews with computer-assisted survey protocols and data entry were conducted in April–June, 1998. Nearly 3900 telephone calls were made for the survey, of which 18 percent were completed interviews, 9 percent were incomplete interviews, 10 percent refused to be interviewed, 33 percent were disqualified, and 20 percent were non-working numbers or were not answered. Listings of nursery and retailer firms surveyed were obtained from the Florida Department of Agriculture, and listings of landscape service firms were obtained from a market research information vendor (Marketing Systems Group, Fort Washington, PA). For the nursery and landscape service sectors, a stratified sampling plan was used, with probability of sampling proportional to firm size, and for wholesale nurseries, sampling was controlled within seven different regions of the state (Fig. 1). For horticultural retailers, sampling was proportional to the population of firms in each telephone area.

Fig. 1. Florida regions evaluated for the nursery sector of the horticulture industry.

Table 2. Economic multipliers for Florida's environmental horticultural industry.

Multiplier type[z]	Wholesale nurseries	Horticultural retailers	Landscape services
Output	1.698	1.654	1.778
Total value added	1.167	1.346	1.406
Personal income	0.636	0.830	0.977
Employee compensation	0.453	0.783	0.825
Indirect business taxes	0.059	0.240	0.097
Employment (jobs/M$)	28.1	34.9	52.2

[z]Total effects multipliers include direct, indirect and induced impact effects. Values represent dollars per dollar of output, except for employment which is in terms of number of jobs per million dollars output.

Table 3. Sales and employment by Florida's environmental horticulture industry, 1997.

Industry sector	Average sales per firm (thousand $)	Total sales (billion $)	Employment (persons)
Wholesale nurseries	362	1.462	32,989
Horticultural retailers	1,185	1.751	na
Landscape services	581	2.704	87,528
Total		5.917	120,517

The value of industry sales for each sector was estimated based on expansion factors that represented the ratio of the population of firms to the number of firms sampled that reported sales information (Table 1). Expansion factors for nurseries and landscape service firms were compiled by firm size strata. The population of firms was adjusted to account for firms disqualified under the survey eligibility requirements. Sales of specific products or services and by market segment or region were estimated as a percentage of total sales for each industry, with the total amount controlled to that estimated from the expansion formula.

Regional economic impacts were estimated with the IMPLAN Pro input-output model and social accounting software package and the associated databases for Florida counties (6). The IMPLAN databases consist of a set of social-economic accounts which describe the structure of the U.S. economy in terms of transactions between households, governments, and 528 industry sectors corresponding to the standard industrial classification system (SIC). At the county level, the databases include information on industry output, value added, and employment. Regional models of the Florida economy were constructed for the state as a whole, and for seven sub-regions (Fig. 1), which roughly corresponded to the chapters of the Florida Nurserymen and Growers Association.

Input-output models develop economic multipliers which reflect the direct, indirect and induced effects of changes in final demand, output or employment for any given industrial sector. Exports from a region increase the economic base, and stimulate additional economic activity through recirculation of money within the local economy. Indirect impacts capture the economic activity of other industrial sectors which supply goods or services to the sector(s) evaluated, while induced impacts represent the effect of personal consumption expenditures by industry employees. Economic multipliers are calculated using a procedure applied to the matrix of transactions between industry sectors (5). Multipliers for for the environmental horticulture industry in Florida are given in Table 2 for economic output, value added, employment, employee compensation, personal income, and indirect business taxes. Economic impacts of each sector of the horticultural industry were calculated by applying these multipliers against the value of sales exported from the region, and adding to these results the direct effects of local or state sales. For example, given an output multiplier of 1.65, a change in export sales of $100,000 would result in a change in total economic output of $165,000 in the local economy.

Results and Discussion

Wholesale nurseries had sales of $1.46 billion (B), or an average of $362,000 per firm (Table 3). Nurseries employed nearly 33,000 people, an average of 11.5 full-time and 6.4 part-time employees per firm, and also utilized a production area of over 38,000 acres. Types of plants sold by growers included tropical foliage or palms ($503 million [M], 34%), woody ornamental trees and shrubs ($420M, 29%), potted flowering plants and bedding plants ($265M, 18%), and other plant products ($255M, 17%). Also, $101M (7%) of nursery sales were considered native Florida plants. Major customers for nurseries were other growers ($411M, 28%), landscape service firms ($341M, 23%), retail mass merchandisers ($215M, 15%), retail garden centers ($143M, 10%), rewholesalers and brokers ($170M, 12%), property developers and mangers ($51M, 3%), and the public at-large ($131M, 9%).

Horticultural retailers had total sales of $1.75 billion, or average sales per firm of $1.19 million (Table 3). Retailers managed 64.7 million square feet of retail sales area. Products sold by retailers included plants ($417M, 24%), lawn and garden supplies ($212M, 12%) lawn and garden hard goods ($125M, 7%), and other items ($996M, 57%).

Landscape service firms had total sales of $2.70 billion, and employed over 87,000 persons (Table 3). The average landscape service firm had sales of $581,000 and employed 26.3 full-time and 13.3 part-time persons. Products and services sold by landscape service firms included landscape installation ($1129M, 42%), landscape maintenance ($632M, 25%), landscape design ($384M, 14%), plants ($475M, 18%), and other lawn and garden supplies ($83M, 3%).

Table 4. Geographic distribution of sales by Florida's environmental horticulture industry, 1997.

Geographic market area	Wholesale nurseries	Horticultural retailers	Landscape services
	Million dollars (percent of total)		
Local (city, county)	572 (39%)	1,569 (90%)	2,141 (79%)
State (within Florida)	392 (27%)	125 (7%)	459 (17%)
National	427 (29%)	57 (3%)	103 (4%)
International	71 (5%)	0	0
Total	1,462	1,751	2,704

Table 5. Economic impacts of Florida's environmental horticulture industry, 1997[z].

Type Impact	Wholesale nurseries	Horticultural retailers	Landscape services	All sectors
	million dollars			
Output	1,791	1,789	2,784	6,363
Value added	1,259	1,655	2,509	5,424
Personal income	675	1,041	1,884	3,600
Employee compensation	443	1,000	1,556	2,999
Indirect business taxes	40	340	122	501
	jobs			
Employment	30,650	45,140	111,413	187,203

[z]Impacts represent direct, indirect, and induced impacts of export sales plus direct impacts of local/state sales.

The wholesale nursery sector sold a significant share of production, $499M or 34 percent of total sales, to national and international markets, while $964M (66%) of sales were to state or local markets (Table 4). For retailers and landscapers, over 96 percent of sales were to local or state markets, and sales outside of Florida amounted to $160M. Total domestic and international exports of horticultural products and services from Florida were $659M.

The total economic impacts of Florida's environmental horticulture industry, including the indirect and induced multiplier effects of exports as well as the direct impacts of local sales, are summarized in Table 5. The total output impact was estimated at $6.36 billion, with $1.13B in output associated with exports, primarily by the wholesale nursery sector. However, because the retail and landscape service sectors purchase plants from wholesale nurseries, some of this economic output amount is double-counted. A more narrow measure of the environmental horticulture industry's contribution to the economy is value added, defined as the difference between sales revenues and the cost of purchased inputs from other businesses. Value added represents the creation of wealth because it captures the value of labor and capital provided by an industry. The sum of value added for all industries for a nation equals the gross national product. Value added by Florida's environmental horticulture industry in 1997 totaled $5.42B, including $1.26B for nurseries, $1.66B for retailers, and $2.51B for landscape services (Table 5). Components of value added impacts included personal

Table 6. Economic impacts of Florida's environmental horticulture industry on other selected industries, 1997[z].

Industry impacted	Output (thousand $)	Value-added (thousand $)	Employment (jobs)
Wholesale trade	78,769	51,803	731
Real estate	66,625	44,913	296
Electric services	50,811	39,545	119
Maintenance and repair other facilities	35,661	19,556	527
Agricultural, forestry, fishery services	32,519	25,737	1,747
Owner-occupied dwellings	28,528	22,785	0
Banking	24,408	18,825	160
Motor freight transport and warehousing	21,894	9,553	257
Doctors and dentists	21,048	13,385	217
Insurance carriers	20,227	11,785	147
Eating & drinking	20,134	10,372	544
Hospitals	18,431	11,890	319
Legal services	18,385	14,321	218
Other business services	15,451	7,991	214
Communications, except radio and TV	15,442	11,528	67
Air transportation	10,984	4,993	79
Computer and data processing services	10,733	6,294	111
Automotive dealers & service stations	10,657	8,120	157
State and local electric utilities	10,136	6,557	42
Miscellaneous retail	9,867	7,234	327
Automobile rental and leasing	9,673	5,254	98
Hotels and lodging places	9,297	5,371	156
Nitrogenous and phosphatic fertilizers	9,174	2,024	17
Credit agencies	8,622	4,142	202
Automobile repair and services	8,420	3,054	76
Food stores	8,389	7,178	291
Management and consulting services	7,984	4,373	112
Other state and local government	7,388	2,927	40
Personnel supply services	7,343	6,615	353
Radio and TV broadcasting	7,191	3,659	45

[z]Impacts represent induced effects of exports sales plus indirect effect of local state sales.

Table 7. Regional economic impacts of Florida's wholesale nursery sector, 1997.

Region[z]	Non-local sales (million $)	Output (million $)	Employment (jobs)	Value added (million $)
Northwest	12	40[y]	1,730[y]	32
Northeast	53	127	1,952	93
Central	122	329	6,162	232
Tampa Bay	208	425	7,002	313
Southwest	216	364	7,852	303
Lower east coast	130	435	7582[y]	221
Dade county	150	304	4,859	183
All	891	2,021	32,922	1,377

[z]Refer to Fig. 1 for delineation of regions.

[y]Impact estimated directly from survey data is higher than computed from multiplier.

income of $3.60B, employee compensation of $3.00B, and indirect business taxes paid to local, state and federal governments of $501M. Total employment associated with Florida's environmental horticulture industry was over 187,000 people, with 30,650 jobs in nurseries, 45,140 job at retailers, and 111,413 jobs in landscape services (Table 5).

The environmental horticulture industry had a considerable economic impact on many other industries in Florida's economy. Indirect and induced output, value added, and employment impacts upon the thirty most-affected industry sectors are presented in Table 6. Some of the other industries most-affected were wholesale trade, real estate, electric services, maintenance and repair of facilities, agricultural, forestry and fishery services, owner-occupied dwellings, banking, motor freight transport and warehousing, doctors and dentists, insurance carriers, eating and drinking establishments, hospitals, legal services, other business services, communications, air transportation, computer and data processing services, automotive dealers and service stations, and state and local electric utilities.

Economic impacts of wholesale nurseries were estimated separately for seven regions of Florida in similar fashion to the state as a whole (Table 7). For this analysis, the total multiplier effect was applied to non-local sales within Florida as well as exports to national and international markets, and the direct multiplier was applied to local sales. The sum of impacts for these subregions were somewhat greater than for the state as a whole because a larger share of nursery sales were non-local, i.e., exported from the region to other markets within Florida. It is apparent that the nursery industry is largely concentrated in the central and southern portions of the state. Output impacts were highest in the lower east coast region ($435M), followed by Tampa Bay ($425M), southwest Florida ($364M) and central Florida ($329M). Value added, personal income, and employee compensation impacts were highest in the Tampa Bay and southwest Florida regions.

This study demonstrated that the environmental horticulture industry in Florida has a very large impact on the state and local economies. The value estimated for nursery industry sales ($1.46 billion) closely matches that of the 1997 Census of Agriculture (7) for nursery and greenhouse crops ($1.45B). According to USDA statistics, sales by the wholesale nursery sector were comparable to that for other major agricultural commodities for which the state is more widely recognized, such as citrus ($1.38B), vegetables ($1.57B), and livestock ($1.26B). Moreover, the production, retail, and service sectors of the environmental horticulture industry in Florida together provided more permanent jobs than for all other agricultural sectors combined, and the total value added exceeded that for the fruit and vegetable farming and associated food manufacturing industries (IMPLAN data for Florida (6)). A significant portion of sales by the wholesale nursery sector were exported from the state, and this percentage has continued to increase since previous surveys. These exports bring about a large economic impact due to the influx of earnings into the state economy. However, the retailer and landscape services sectors were largely local in nature. Substantial indirect impacts of the environmental horticulture industry are the result of its extensive linkages to numerous other economic sectors. Specialization within the nursery sector is indicated by the significant share of product sales to other nursery firms for additional value added production. The large induced multiplier effects, particularly for value added, are due to the high level of labor inputs in the environmental horticulture business. Economic impacts were highest for the landscape services sector, which is especially important to the state's enormous tourism industry. It is expected that the environmental horticulture industry in other states would have similar economic linkages and levels of indirect and induced impacts.

Literature Cited

1. Hodges, A., L. Satterthwaite, and J. Haydu, 1997. Business analysis of ornamental plant nurseries in Florida, 1995. UF/FRE Dept., Economic Information Report EI 97–3.

2. Hodges, A. and J. Haydu, 1996. Adaptation to competition and structural change in Florida's Ornamental Plant Nursery Industry, 1989 to 94. Acta Hortic. 429:309–316.

3. Johnson, D. 1999. Floriculture and Environmental Horticulture: Situation and Outlook Report, USDA/ERS, FLO-1999.

4. Johnson, D. 1990. Floriculture and Environmental Horticulture Products: A Production and Marketing Statistical Review, 1960–88. USDA-ERS, Statistical Bulletin 817, Washington, DC.

5. Miller, R.E. and P.D. Blair, 1985. Input-Output Analysis: Foundations and Extensions. Prentice-Hall, Englewood Cliffs, NJ, 464 p.

6. Minnesota Implan Group (MIG), Inc., 1997. Implan Professional Social Accounting and Impact Analysis Software, User's Guide, Analysis Guide and Data Guide, 2nd ed., Stillwater, MN, 378 p.

7. National Agricultural Statistics Service (NASS), 1999. Census of Agriculture, 1997, Volume 1, National and State Summary. Washington, DC.