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Contributions of the Ornamental Horticulture and Turfgrass Industries to the State Economy: South Carolina, 1994

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Abstract

In 1995, 2,434 ornamental horticulture and turfgrass businesses in South Carolina were surveyed to determine the employment, sales and expenditures generated by the state's ornamental horticulture and turfgrass industry. Questionnaires were returned by 480 businesses (19.9 %); 431 (17.7 %) responses provided complete employment data and 397 (16.3 %) provided complete sales and expenditure information. Survey results indicate that industry sales vary significantly depending on the business type, market outlet and product lines carried. Total sales in 1994 were \$726 million. Landscapers generated \$224 million, Building Supply/Garden Centers \$191 million, Growers \$167 million, General Merchandise Stores \$85 million, Grocery Stores \$33 million, and Florists \$27 million. Although South Carolina firms sold to retail and wholesale customers inside and outside of the state, over 50 percent of total sales were to state businesses and residents. The sale of trees, shrubs, plants and turf (\$205 million) contributed the largest share to total industry sales. This was followed by landscaping services (\$156 million) and sale of tools (\$105 million) and chemicals (\$88 million). The initial contribution of the state's ornamental horticulture and turfgrass industry was estimated to be 18,478 full-time equivalent (FTE) jobs and \$255,134,300 in income. Using the IMPLAN input-output model for South Carolina, the total (initial plus indirect and induced) employment and income were estimated to be 28,727 FTE jobs and \$537,280,000 in income. Income and employment multipliers for the ornamental horticulture and turfgrass firms were estimated to be 2.10 for income and 1.59 for employment. Thus, for every dollar of income generated and every job created by South Carolina firms, an additional \$1.10 and .59 jobs are created throughout the state's economy.

Acknowledgments

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Contributions of the Ornamental Horticulture and Turfgrass Industries to the State Economy: South Carolina, 1994

I. Introduction

The ornamental horticulture and turfgrass industries have evolved into major contributors to the South Carolina economy and the growth rate of these industries in the state has been impressive. According to the 1986 Clemson University study, the South Carolina ornamental and turfgrass industries generated gross sales of \$178.5 million.¹ The *1990 South Carolina Ornamental Horticulture Survey* reported combined sales of nurseries and dealers at \$303 million.² The *U.S. Bureau of the Census, Census of Retail Trade South Carolina* verifies the growth pattern of the ornamental and turfgrass industries.³ For example, South Carolina's General Merchandise stores reported dollar sales of nursery products to be \$51 million in 1987 and \$80 million in 1992. And, Hardware stores reported sales of \$8 million and \$15 million in 1987 and 1992, respectively.

These industries provide a continuing stream of job opportunities and incomes to the local economies. In addition, the industries provide and support recreational opportunities for these communities and the state at large. Home gardening, community beautification, and maintenance of the state's natural resources not only add economic benefits to the state but also greatly enhance the quality of life in our towns and cities.

The purpose of this study is to determine the contribution of the ornamental horticulture and turfgrass industries to the economy of South Carolina in 1994. Estimates of expenditures on ornamental and turfgrass products and the resulting employment and

income are provided by selected business classes: Growers, Florists, Landscapers, Grocery Stores, General Merchandise Stores, and Building Supply Stores and Garden Centers.

The analysis of the economic contribution of the ornamental and turf industry includes first, a discussion of survey and data collection methodology. Next, employment, sales, and purchases data are provided for each business class and specified product categories. Finally, the secondary economic impacts associated with the ornamental and turfgrass businesses are estimated using a state-level input-output model (IMPLAN).

II. Survey Procedure

Ornamental Horticulture and Turfgrass Survey. The firms in South Carolina which produce and sell ornamental and turfgrass products were identified from several sources: the South Carolina Nursery Association, South Carolina Greenhouse Growers Association and South Carolina Turfgrass Foundation membership lists. In addition, all phone book entries in South Carolina listed under headings such as nursery, greenhouse, turf, sod, garden center, hardware, general merchandise, building supply and landscape design and maintenance were incorporated into the industry mailing lists.

In the spring of 1995, 2,434 questionnaires were mailed to the identified businesses requesting information on business characteristics and employment (full-time, part - time, year round and seasonal).

Respondents also were requested to list their sales and purchases by type of product and location of sales or input purchase either within or outside the state of South Carolina. Mail and phone follow-up surveys were conducted for those businesses which did not respond to the initial mail questionnaire.⁴

Questionnaires were returned by 480 (19.9%) firms involved in the sale of ornamental and turf products in South Carolina. Of these 480 firms, 431 (89.8%) provided complete employment information, and 397 (82.7%) provided complete sales and purchase responses. In sum, the overall response to the survey is sufficient for the estimation of the total employment and income impacts associated with the ornamental horticulture and turfgrass industries.

Summary of Firm Characteristics. Businesses in these industries differ significantly by types of products sold and services provided. It is not uncommon to find a specific business handling a wide variety of products and/or providing a multitude of services. This diversity in the state's ornamental horticulture and turfgrass industries dictated that we classify the firms into relatively homogeneous subgroups to insure a representative sample. Firms were classified and grouped according to the types of products and services they handled and their principal areas of business (e.g., Florist, Landscaper, etc.). Six ornamental horticulture and turfgrass business classes and seven product categories were developed for study (table 1).

All business classes were represented among the returned surveys, though the proportion responding (based on the *U.S. Bureau of the Census, County Business Patterns South Carolina 1993* totals) varied greatly by business class (table 2). Growers responding to the survey accounted for 143 or 19.5 percent of the 733 firms listed in the

County Business Patterns. Florists represented about seven percent of the state's total florists. Grocery stores with 20 or more employees made up five percent of the state total, Landscapers responding represented about 17 percent and finally, General Merchandise Stores and Building Supply/Garden Centers represent two and 12 percent, respectively.⁵

III. Impacts of Ornamental Horticulture and Turfgrass Operations on Local and State Economies

Ornamental and turfgrass firms benefit local and state economies by providing employment opportunities and expenditures for goods and services at area businesses. The magnitude of this economic impact is determined by the level of business activity achieved by these firms. That is, the greater the sales, the greater the amount of economic influence the firm will have on the local economy. The purchase of a plant, product or service from one of these firms injects new monies into local economies and thus stimulates additional spending by local business and households.

During 1994, South Carolina ornamental horticulture and turfgrass businesses generated total revenues of \$726 million. The impact of these dollars was widely distributed across the economy of the state with the majority of this impact going to the more heavily populated areas (figure 1). Most of the firms in these industries are located in three distinct sections of the state: the uplands area consisting of the counties proximate to interstate I-85 (24.2%), the midlands consisting of the counties near interstate I-20 (43.7%), and the coastal counties of Beaufort, Charleston and Horry (13.9%). These three areas represent over 81.8 percent of the survey respondents.

Table 1. Classification Characteristics for the South Carolina Ornamental Horticulture and Turfgrass Industry, 1994

Business Class	Description
Grower	Businesses growing horticulture products including plant material and sod; may own retail outlet selling horticultural products
Grower	
Grower who owns retail outlet for plants	
Florist	Wholesale and retail florists
Grocery Store	Grocery Stores employing 20 or more
General Merchandise Store	Stores selling general merchandise such as Wal-Mart or Kmart
Building Supply Store/Garden Center	Building supply stores such as Lowes; all hardware stores; farmers' markets; garden centers
Home Improvement or Hardware Store	
Farmers' Market	
Landscaper	Businesses involved with landscape design, installation, and maintenance; includes delivery of horticulture products such as hardwood mulch

Product Category	Description
Trees	Trees
Shrubs	Shrubs
Plants	Greenhouse plants; bedding plants, perennials, hanging plants, flowers, etc.
Turf	Grass seed, sod, plugs, sprigs
Chemicals	Chemicals, soil conditioners, fertilizers
Tools	Tools and equipment
Landscaping	Landscaping, maintenance and service; excluding plant matter and turf

Table 2. Distribution of Ornamental Horticulture and Turfgrass Industry Business Respondents, 1994

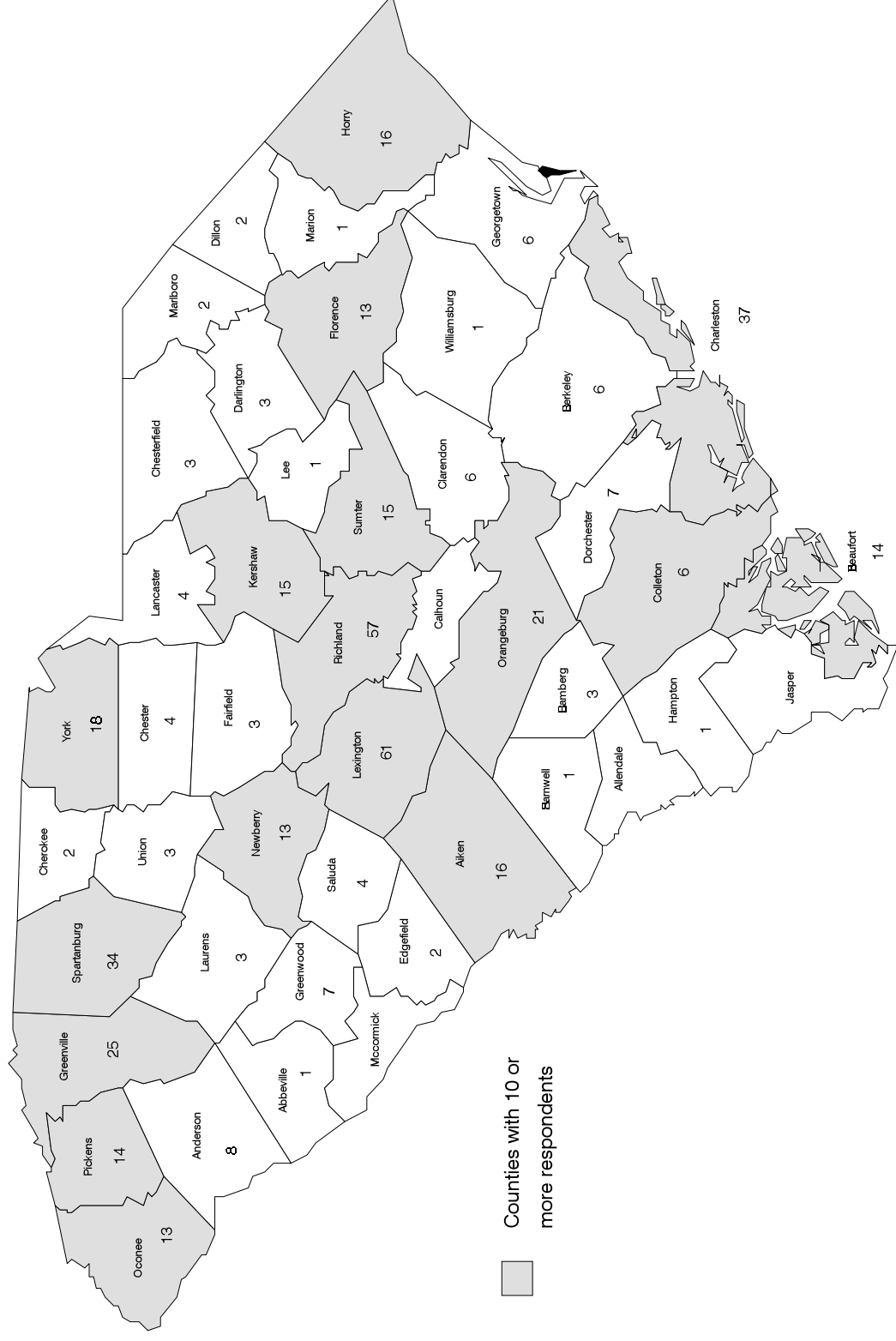
Business Class	Number Responding to Survey	Number of Businesses in State^a	Percentage of Businesses Responding^b
Grower	143	733	19.5%
Florist	31	477	6.5%
Grocery Store	29	603 ^c	4.8%
General Merchandise Store	13	618	2.1%
Building Supply Store/Garden Center	111	894	12.4%
Landscaper	153	910	16.8%

^aNumber of businesses from *U.S. Bureau of the Census, County Business Patterns 1993 South Carolina*.

^bPercentage of firms responding in each business class.

^cNumber of businesses based on grocery stores with 20 or more employees.

Figure 1. Distribution of Ornamental Horticulture and Turfgrass Business Respondents by County, 1994



Employment. South Carolina's ornamental horticulture and turf industry provides employment opportunities for individuals in retail and wholesale merchandizing, plant growth and propagation, and landscape design and maintenance. In 1994, over 18,000 full-time equivalents (FTE) jobs were attributed to these industries in South Carolina (table 3).

Eighty percent of these jobs were full-time with the remaining classified as seasonal or part-time employment. Over 30 percent of the total labor force (6,197 FTE) was employed by the Landscaper business class. Twenty-one percent of the total labor force was employed at the Grower level (4,039 FTE) with 12 and 17 percent of the overall industry's employees working in the General Merchandise Store (2,224 FTE) and Building Supply /Garden Center classes (3,144 FTE), respectively. Grocery Stores employed about five percent (905 FTE) of the total labor force and, Florists employed 10.7 percent (1,970 FTE).

Full-time employment opportunities were the primary employment scheme in South Carolina's ornamental horticulture and turfgrass industry. On average most businesses appeared to maintain a full-time labor force with seasonal and part-time employees used as the need arises (table 4). The Grocery Store (1.0 FT to 0.5 PT), General Merchandise Store (2.2 FT to 1.6 PT) and Building Supply/Garden Center (3.1 FT to 0.8 PT) firms indicated both full-time and part-time employees were employed but these sectors were not important sources of part-time jobs. In contrast the Landscaper, Grower, and Florist business firms had the largest number of full-time employees (5.6, 3.8, and 3.2 FT, respectively) and also hired the greatest number of seasonal or part-time labor (2.8, 3.9, and 2.3 FT, respectively). These findings are consistent with the type of job related responsibilities generally found in

these firms. This group of business classes are noted for their heavy seasonal labor component hiring additional employees for peak production and maintenance time periods and holidays.

Revenue. Sales levels generated by firms in the overall industry varied significantly. Differences in sales levels occurred between business classes, product lines carried, and market outlets used by these firms. The differences in sales levels indicate the relative contribution each segment provides to the overall industry's economic impact on the economy of South Carolina.

South Carolina's ornamental horticulture and turfgrass industries had total estimated sales of \$726 million in 1994 (table 5). The largest sales volume was reported by the Landscaper class (\$224 million). The Building Supply/Garden Center classes had the second largest sales volume (\$191 million) followed closely by the Grower segment (\$167 million) of the industry. General Merchandise (\$85 million) was fourth in sales with Florist and Grocery Stores accounting for \$27 million and \$33 million of total sales, respectively.

The Landscaper segment's sales of \$224 million were concentrated within the categories of landscape design, installation, and maintenance (\$144 million). Building Supply/Garden Center sales (\$191 million in 1994) were concentrated in trees, shrubs, plants, and turfgrass (\$60 million), and complementary products like chemicals and tools (\$124 million) (figure 2A). Grower sales of \$166 million came from the sale of plants (\$78 million), shrubs (\$39 million), trees (\$24 million) and turf (\$20 million). These four product lines accounted for over 90 percent of total sales. Chemicals, tools, and landscaping sales were not significant for Growers (figure 2B). The sales at General Merchandise Stores (\$84 million) like the Building Supply/Garden Center sector are not concentrated in

Table 3. Estimated Full-Time Equivalent Employment at South Carolina Ornamental Horticulture and Turfgrass Businesses, 1994 ^a

Business Class	Employment (FTE)
Grower	4,038.8
Florist	1,970.0
Grocery Store	904.5
General Merchandise Store	2,224.0
Building Supply Store/Garden Center	3,143.5
Landscaper	6,197.1
Total	18,477.9

^aEmployment estimates are for the state's total businesses in each class from *U.S. Bureau of the Census, County Business Patterns 1993* based on figures from the businesses providing complete employment information.

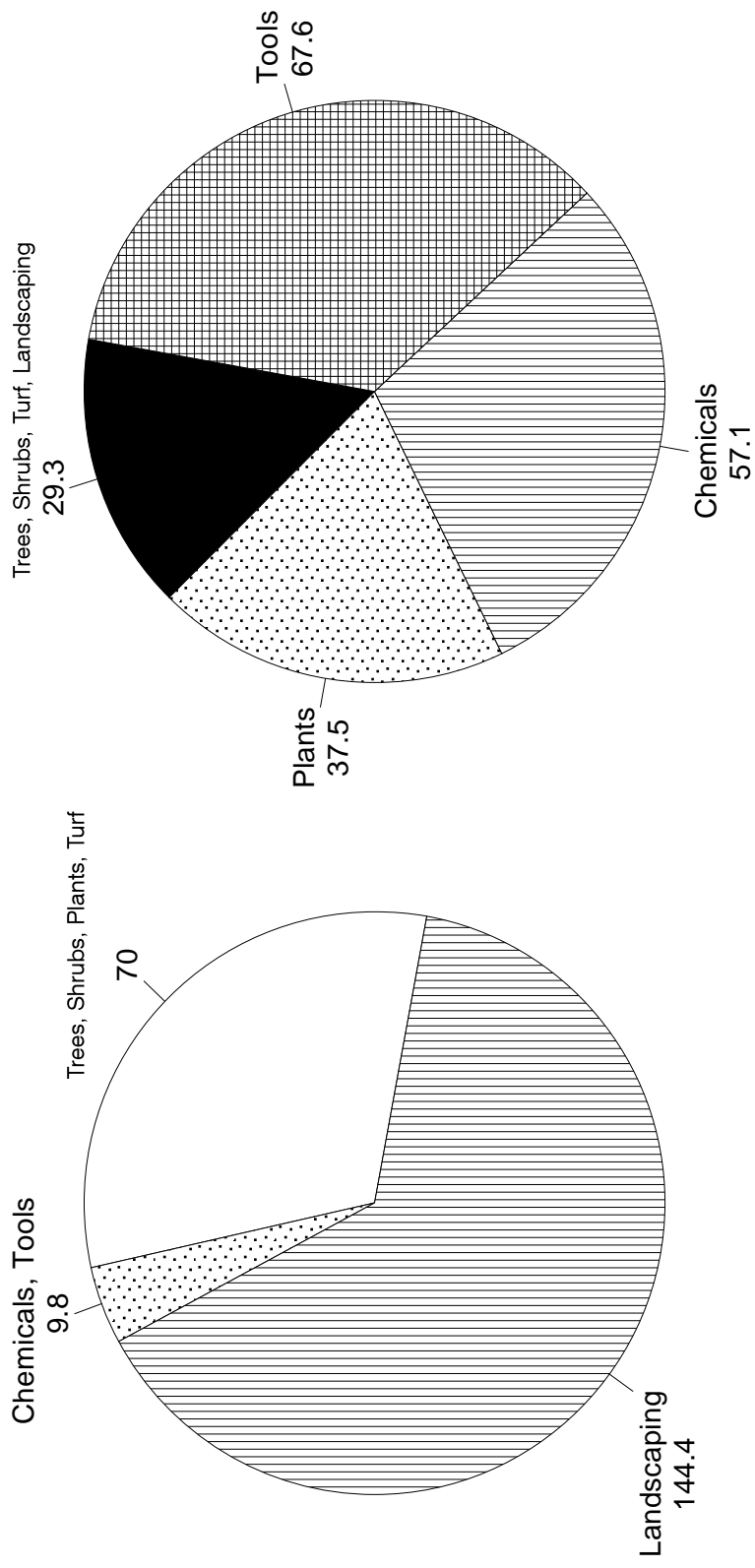
Table 4. Average Employment at South Carolina Ornamental and Turfgrass Businesses by Business Class, 1994 ^a

Business Class	Average Full-time Employment ^a	Average Seasonal & Part-time Employment ^b	Average Full-time Equivalent (FTE)
Grower	3.8	3.9	5.5
Florist	3.2	2.3	4.1
Grocery Store	1.0	0.5	1.5
General Merchandise Store	2.2	1.6	3.0
Building Supply Store/Garden Center	3.1	0.8	3.5
Landscaper	5.6	2.8	6.8

^aAverage employment from the businesses providing complete employment information.

^bAverage seasonal and part-time employment from businesses providing complete employment information not adjusted for the forty hour workweek or twelve month year.

Figure 2A. Landscaper and Building Supply Store/Garden Center Sales by Product Categories, 1994 (\$ Millions)



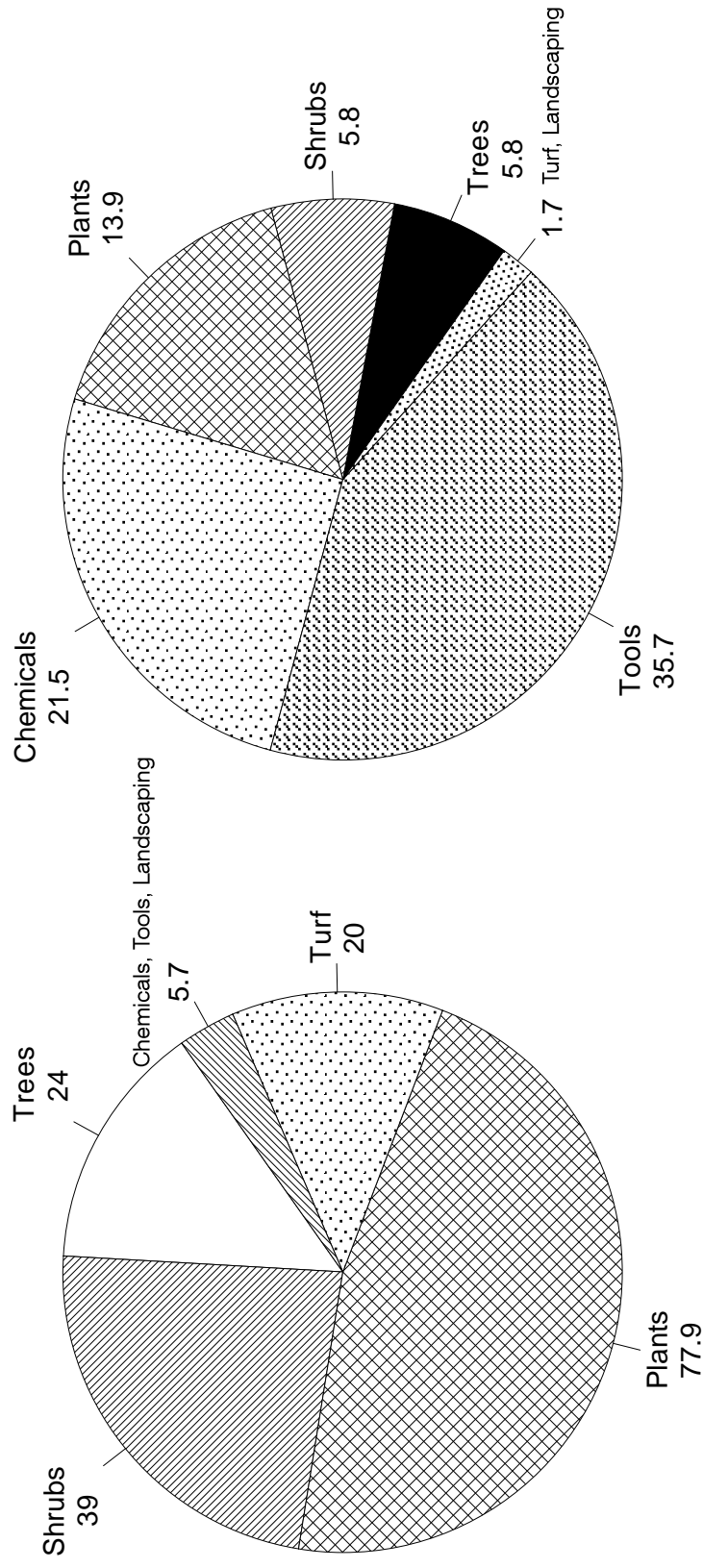
Landscaper

Total Sales \$224,264,950

Building Supply Store/Garden Center

Total Sales \$191,475,467

Figure 2B. Grower and General Merchandise Store Sales
by Product Categories, 1994 (\$ Millions)



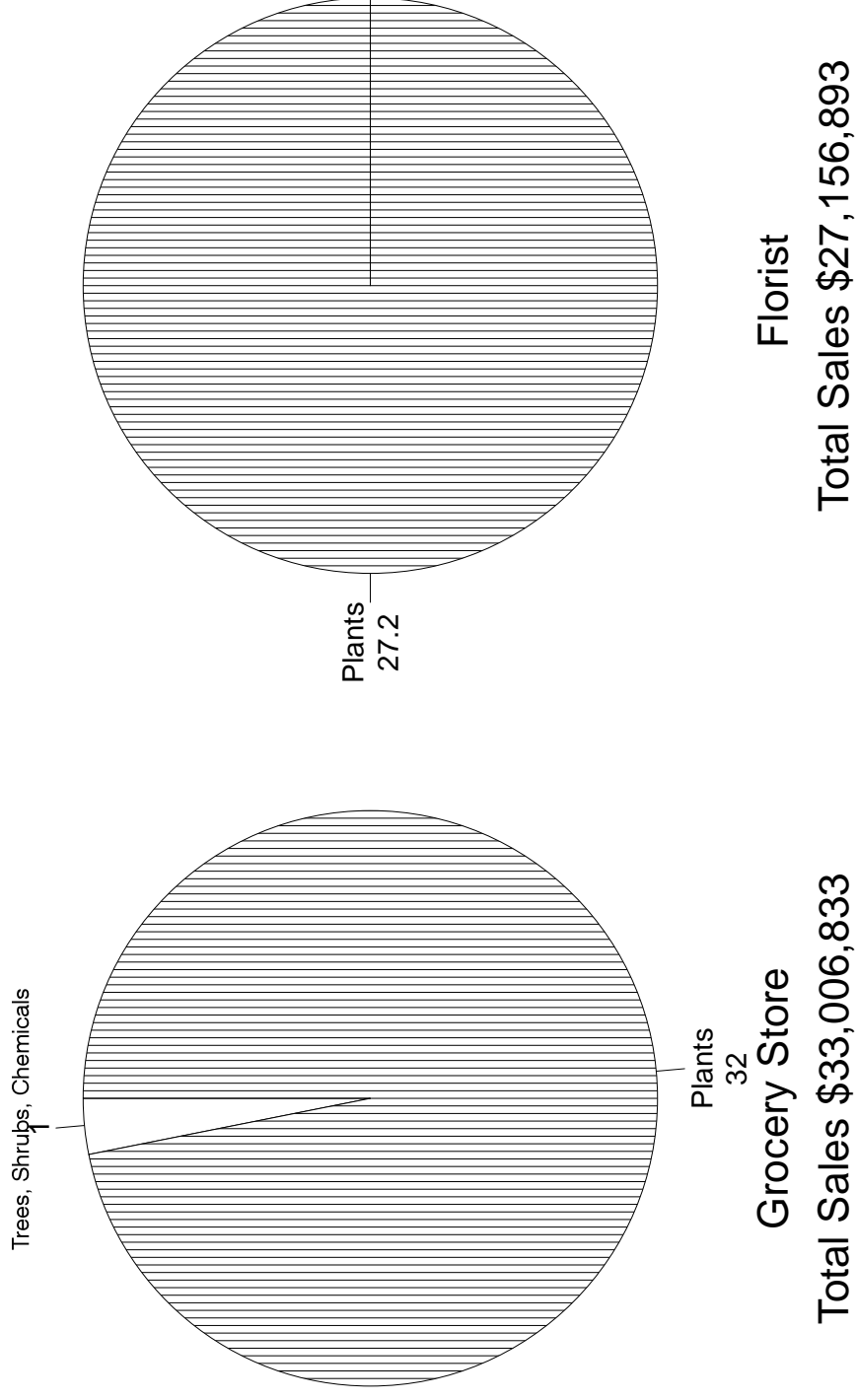
Grower

Total Sales \$166,542,732

General Merchandise Store

Total Sales \$84,509,825

Figure 2C. Grocery Store and Florist Sales
by Product Categories, 1994 (\$ Millions)



one area. Significant sales occurred in trees, shrubs and plants (\$25 million), tools (\$36 million), and chemicals (\$22 million). It is apparent that these two industry segments are a significant source of non-plant material supplies for the industry. Florist sales (\$27 million) were in plants only. Similarly, Grocery Store sales (\$33 million) were 99 percent plants with only one percent the sale of trees, shrubs, and chemicals (figure 2C).

Marketing Outlets. South Carolina ornamental horticulture and turf firms also indicated that they used a number of different marketing outlets to generate these sales. In general, firms relied upon retail and wholesale market outlets both within and outside of the state to sell their products. The notable exceptions were the Florist and Grocery Store segments who sold primarily to in-state retail customers (figures 3A, 3B, and 3C).

All business classes relied very heavily upon retail sales to generate revenues. Grocery Store (100%) and Florist sales (95%) were almost totally at the retail level. Landscaper and Building Supply/Garden Center revenues were also very dependent upon retail sales, 81 and 72 percent, respectively. General Merchandise Stores and Growers also utilized retail outlets to generate a substantial portion of their revenues, 41 and 27 percent, respectively; but they were also quite dependent upon wholesale customers for their sales.

Landscapers sold 81 and 16 percent, respectively, of their services to in-state retail and wholesale customers (figure 3A). Out-of-state sales comprised an insignificant proportion of total sales. Building Supply and Garden Center businesses relied heavily upon in-state customers as well. Seventy-two percent of Building Supply and Garden Center sales were at the retail level while 16 percent were at the wholesale level. Customers outside South Carolina accounted for only 12

percent of total sales (3% retail and 9% wholesale).

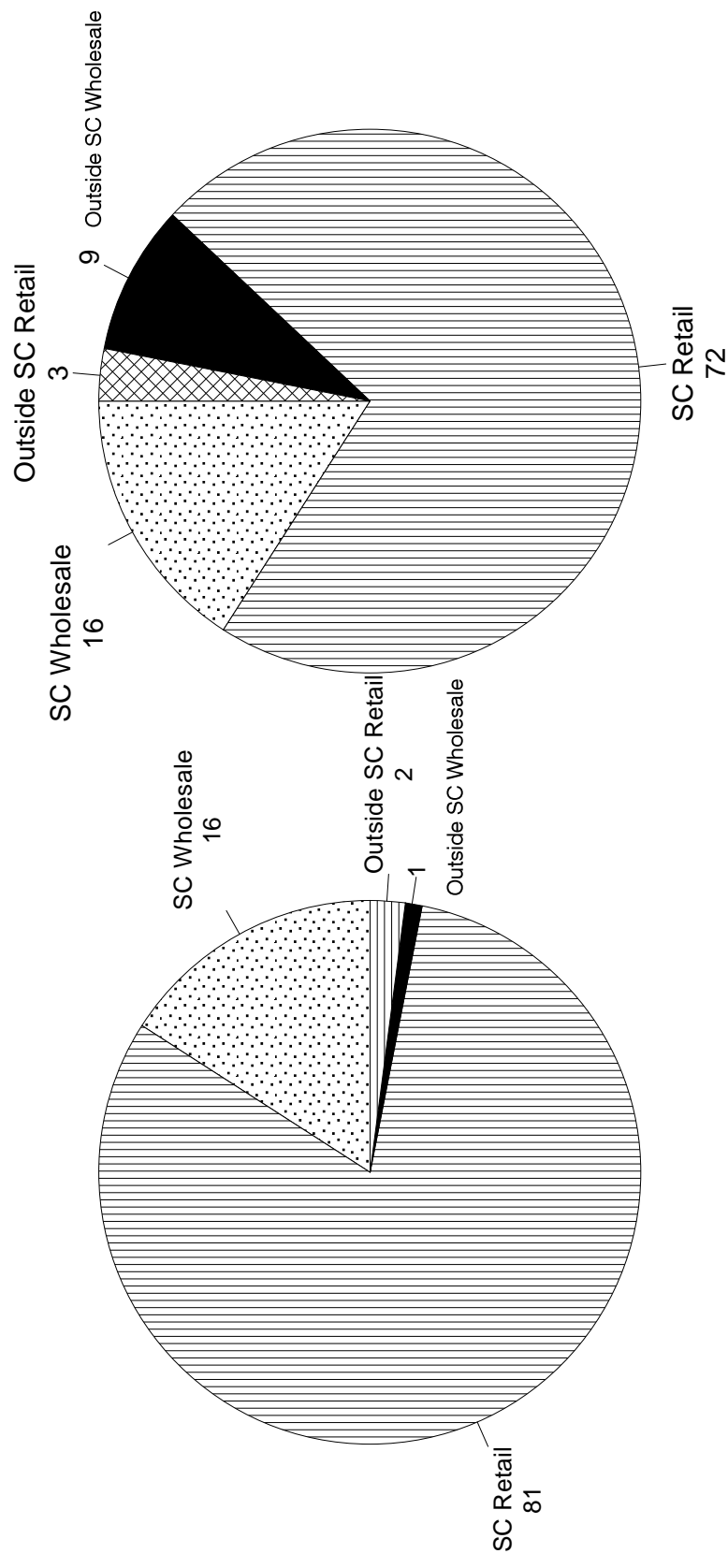
General Merchandise Store sales were mostly at the retail level. Revenues generated from in-state retail sales by General Merchandise Stores were 41 percent of their total, and out-of-state retail sales were 46 percent. Wholesale in-state and out-of-state sales represented five and eight percent, respectively (figure 3B).

Growers received more of their revenues from wholesale market outlets than from retail markets. Grower wholesale sales were 70 percent of total sales in 1994, and retail sales were 30 percent of total. Twenty-seven percent of the retail sales were to in-state customers. Wholesale sales were evenly split between in-state (34%) and out-of-state (36%). Finally, Grocery Store and Florist revenues were almost entirely from in-state retail sales. Florist respondents did indicate a small amount of sales to other florists, greenhouses, and interior plantscape and maintenance firms. However, the majority of these sales were cut flowers and potted flowering plants (figure 3C).

Product Lines. Product lines handled by the ornamental horticulture and turfgrass firms also provided an insight into the revenue generating ability of this South Carolina industry as a whole. Sales are generated primarily from the production and sale of plant material and landscaping services. Plant sales (\$205 million), shrubs (\$80 million), trees (\$56 million) and turf (\$37 million) make up over fifty percent of the total revenue generating potential on a product basis. The largest product group, landscaping, added \$156 million of design, installation and maintenance services to total sales in 1994. The sale of chemicals and tools accounted for 27 percent of total sales (table 5).

The second largest business revenue generating class was Building Supply/Garden

Figure 3A. Landscaper and Building Supply Store/Garden Center Sales by Market Classification, 1994 (Percent)



Landscaper

Building Supply Store/Garden Center

Figure 3B. Grower and General Merchandise Store Sales
by Market Classification, 1994 (Percent)

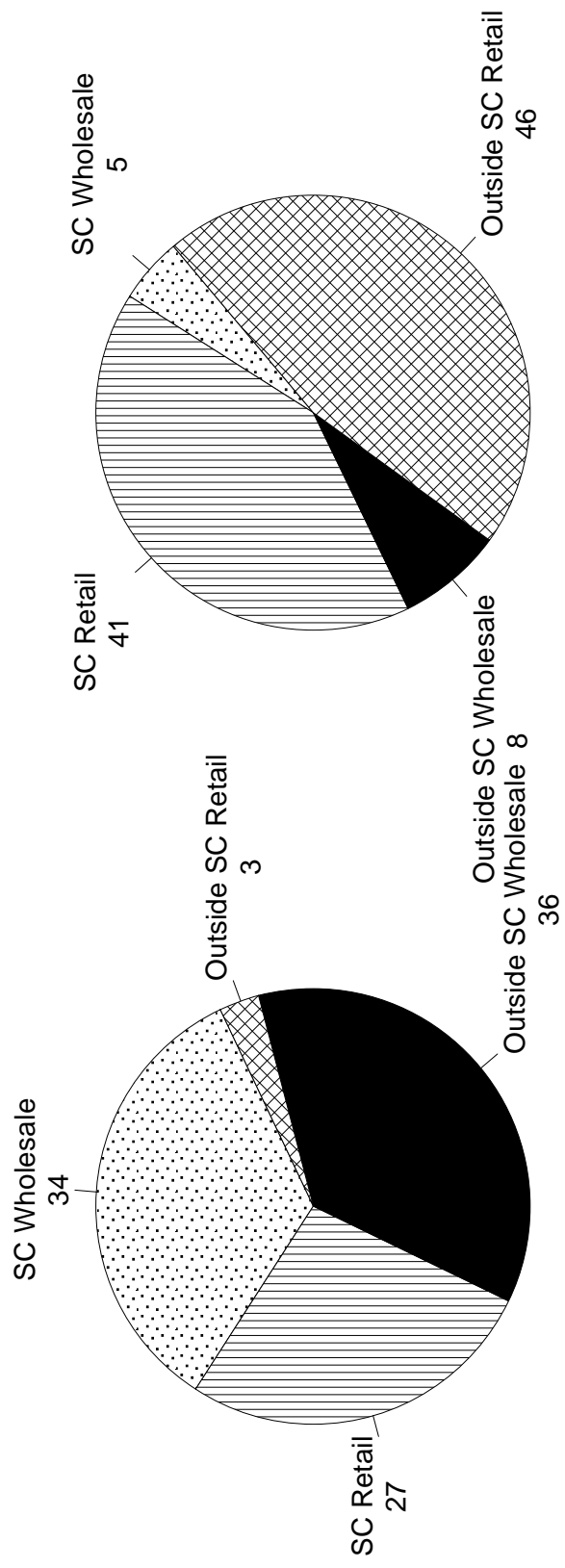


Figure 3C. Grocery Store and Florist Sales
by Market Classification, 1994 (Percent)

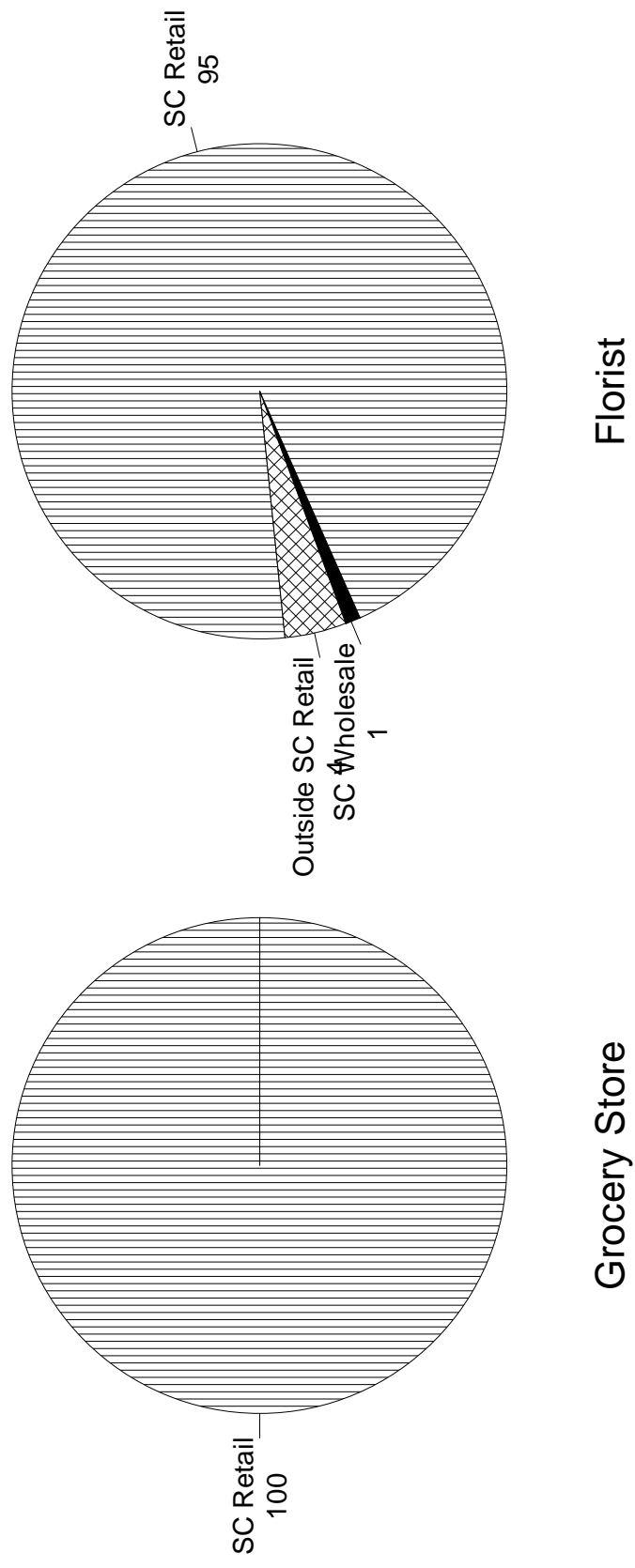


Table 5. Annual Sales by Business Class and Product Category, 1994 (Million Dollars)

Product Category	Business Class						Totals
	Grower	Florist	Grocery Store	General Merchandise Store	Building Supply Store/ Garden Center	Landscaper	
Trees	\$23.99		\$0.09	\$5.82	\$7.49	\$18.51	\$55.90
Shrubs	38.97		0.75	5.82	9.91	24.46	79.91
Plants	77.86	\$27.16	32.01	13.90	37.52	16.57	205.02
Turf	19.99			1.26	5.17	10.45	36.87
Chemicals	1.06		0.16	21.54	57.08	7.89	87.73
Tools	0.17			35.73	67.57	1.95	105.42
Landscaping	4.50			0.45	6.73	144.43	156.11
Total	\$166.54	\$27.16	\$33.01	\$84.51	\$191.48	\$224.26	\$726.96

Center. It had revenues of over \$191 million in 1994. These revenues were widely distributed across products lines with the largest concentration of sales in the tools (\$67.6 million), chemicals (\$57.1 million) and plants (\$37.5 million) categories. Revenues from the sale of trees and shrubs were significantly lower (\$17.4 million). Sales of landscaping services and turfgrass made up only a small part of the 1994 revenues (\$11.9 million) for the Building Supply/Garden Center business class.

The Grower sector of the industry was the third largest contributor to annual revenues in 1994. The Grower class contributed over \$166 million to the total 1994 revenues of the industry. As would be expected, the majority of this segment's revenue came from the sale of plants (\$78 million), shrubs (\$39 million) and trees (\$24 million). These three product lines accounted for over 80 percent of its total revenue in 1994. Turfgrass sales added nearly 20 million additional dollars to total Grower revenues. Chemicals, tools and landscaping services accounted for less than five percent of annual revenue in the Grower sector.

General Merchandise was the fourth largest revenue producing sector in the study

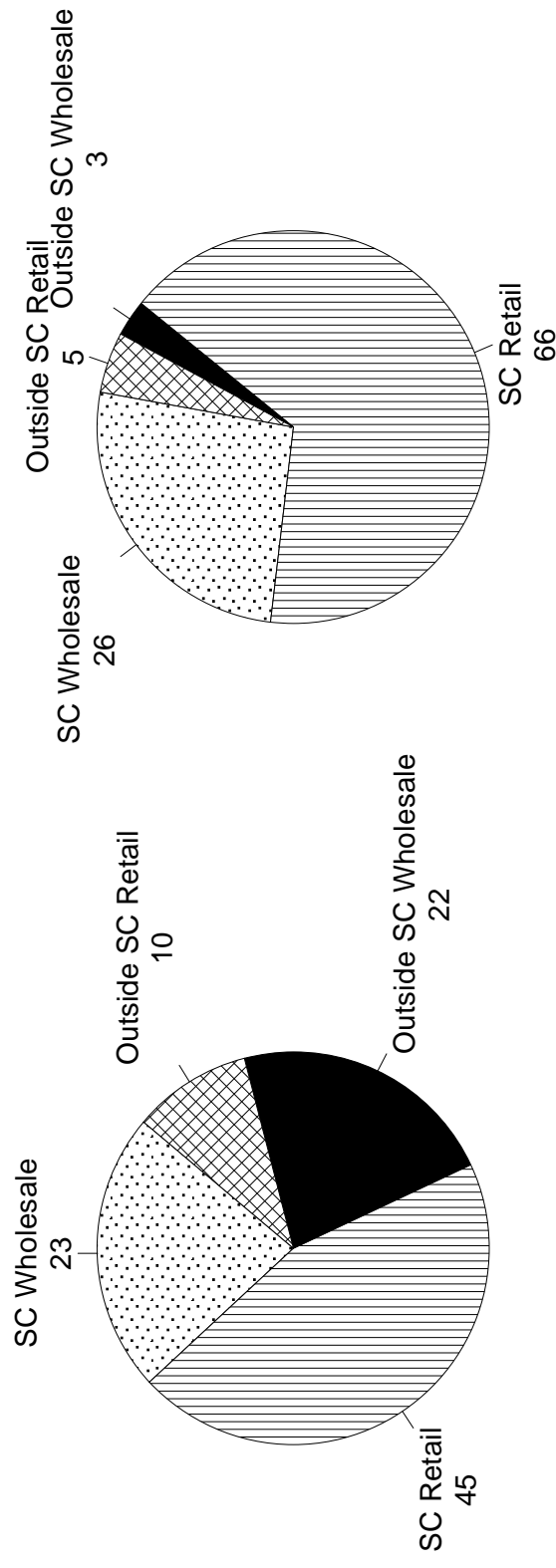
with revenues in 1994 of approximately \$84.5 million. The General Merchandise business class's revenue is heavily dependent upon the sale of non-plant products. It not only supplies plants, trees and shrubs but, supplies the plant users with support products such as fertilizer, lime, pesticides and seeds. The sale of chemicals (\$21.5 million) and tools (\$35.7 million) accounted for 68 percent of total sales. Plants, trees and shrubs contributed about 30 percent with turf and landscaping activities accounting for less than five percent of total annual revenue.

Sales of products by South Carolina ornamental horticulture and turfgrass firms were divided between retail and wholesale customers within and outside the state. However, retail sales to South Carolina customers appeared to be the dominate method of merchandizing industry products.

Tree sales (\$56 million) were primarily within South Carolina (68%). About one-half of the tree sales were at the retail level with the other half split evenly between in-state and out-of-state wholesale transactions (figure 4A).

Sales of shrubs by South Carolina firms were primarily to in-state customers (66% retail and 26% wholesale). Shrubs sales to

Figure 4A. Trees and Shrubs Sales by Sales Market, 1994
(Percent)



Trees

Shrubs

Figure 4B. Plants and Turf Sales by Sales Market, 1994
(Percent)

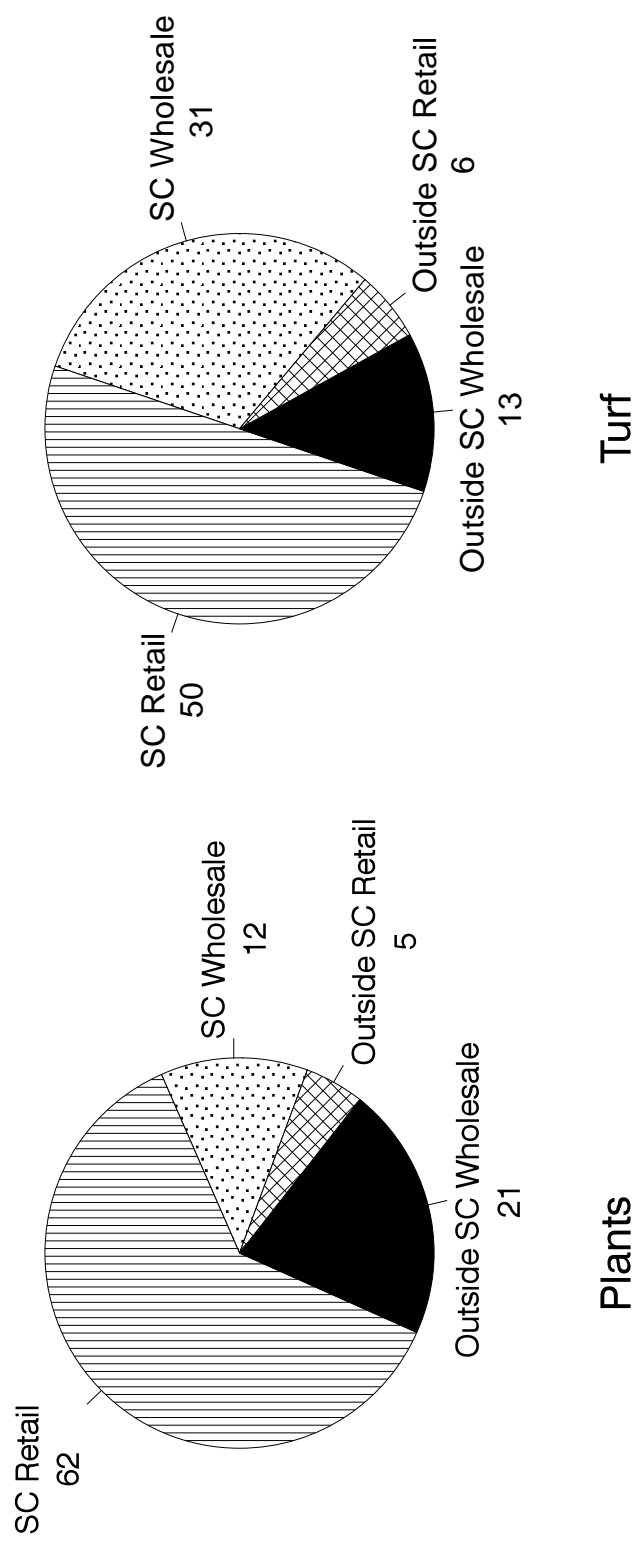


Figure 4C. Chemicals and Tools Sales by Sales Market, 1994
(Percent)

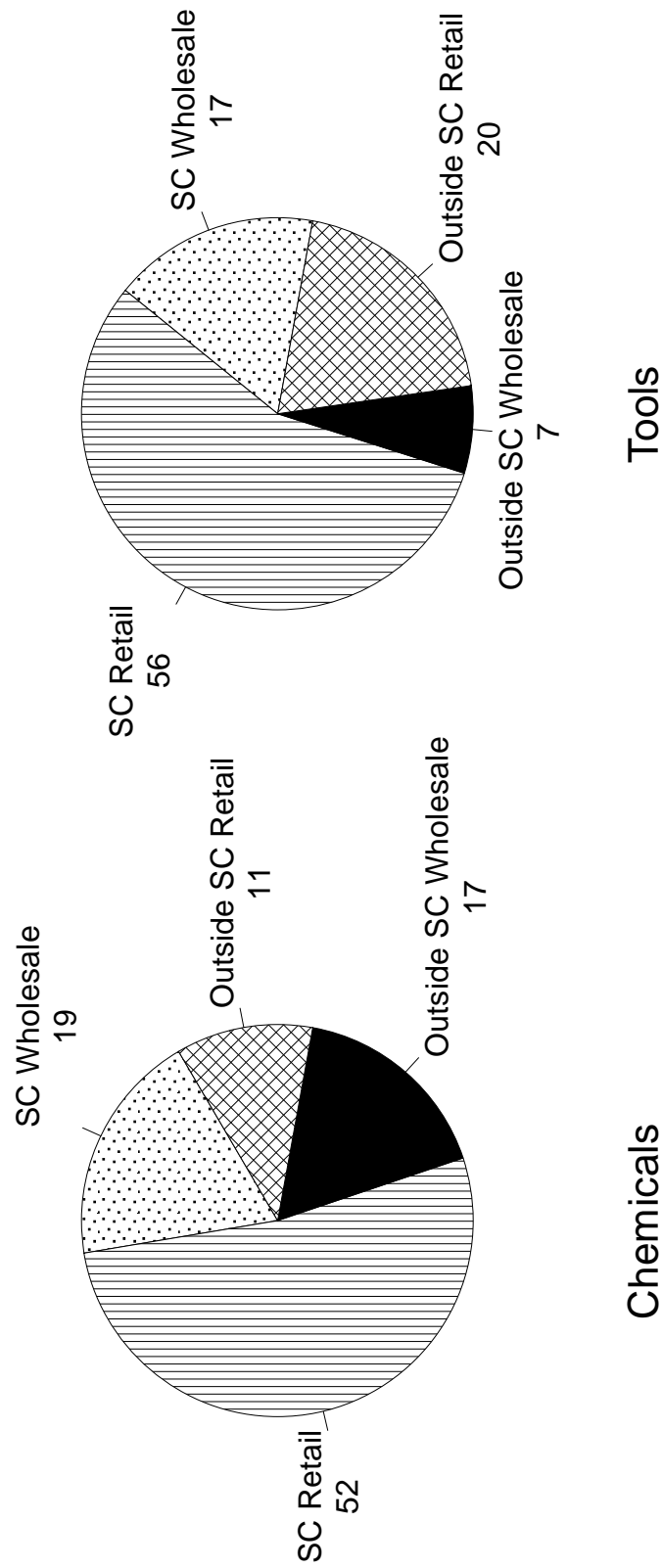
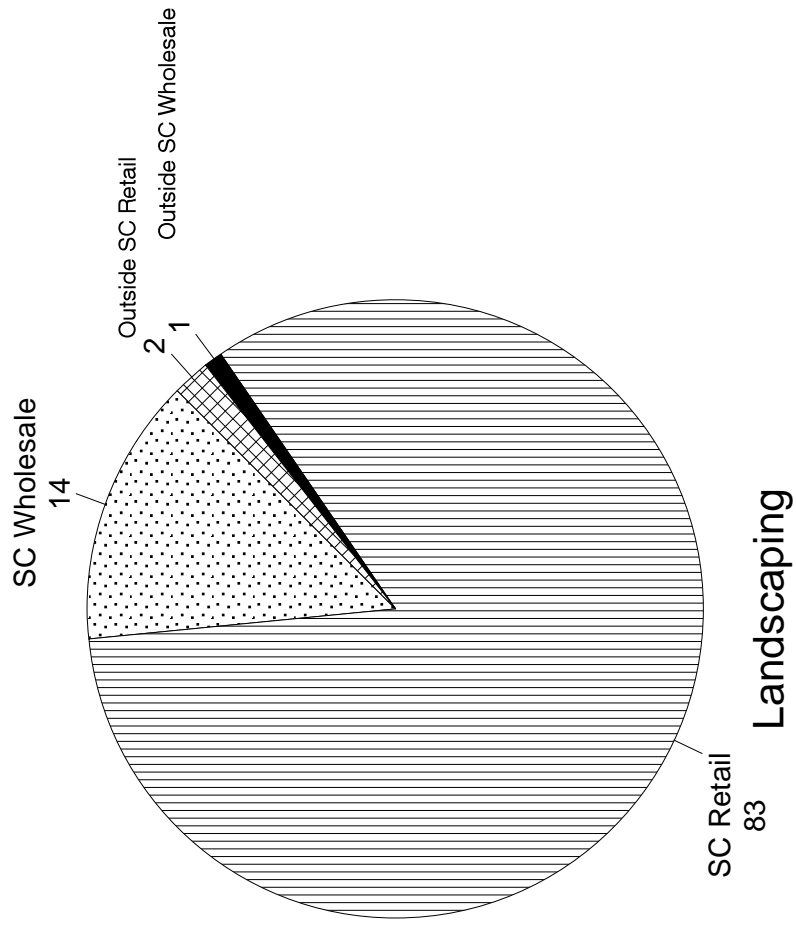


Figure 4D. Landscaping Sales by Sales Market, 1994
(Percent)



customers outside of South Carolina accounted for less than 10 percent of total shrubs sales (5% retail and 3% wholesale).

The sale of plants and turf were again primarily to South Carolina customers (figure 4B). Sixty-two and five percent of plant sales were to in-state and out-of-state retail customers, respectively. Wholesale plant sales accounted for 33 percent of total plant sales. Likewise, 50 percent and six percent of turf sales were in-state and out-of-state retail sales. Forty-four percent of turf sales occurred at the wholesale level (figure 4B).

Chemical and tool sales were primarily at the retail level. South Carolina firms sold 52 percent of their chemicals and 56 percent of their tools to in-state retail customers with an additional 11 and 20 percent to out-of-state retail chemical and tool customers, respectively. Sales to wholesale customers were 19 and 17 percent in-state to chemical and tool customers, respectively and 17 and seven percent to these customers outside of the state (figure 4C).

Landscaping services were dominated by in-state retail customers (figure 4D). Eighty-three percent of their sales went to this group in 1994. Fourteen percent went to in-state wholesale customers. Sales of landscaping services to customers outside of South Carolina accounted for only three percent.

Expenditures. The revenues generated by these firms through the sale of plant material, chemicals, tools and services are in turn allocated to: salaries, wages, payroll taxes, and benefits for the firm's employees; cost of goods sold; non-labor expenditures for repairs, and maintenance (e.g., water, equipment, greenhouses, etc.); non-labor expenditures associated with administrative and management functions (e.g., energy, insurance, maintenance, marketing, entertainment, taxes); and capital expenditures (e.g., building and growing area

expansion/renovation, equipment purchases and interest expenses). This study did not estimate all of these expenses paid by the ornamental horticulture and turfgrass industry. Rather, it concentrated only on the expenditures for plants, trees, shrubs, turf, chemicals, tools, and landscaping services.

Summary data for each business class's expenditures on these items are provided in table 6. Only annual expenditures for specific product lines purchased in 1994 are provided. This is, as stated above, a very conservative estimate of the current flow of monies associated with operating and maintaining the ornamental horticulture and turf industries in South Carolina. Also, current expenses resulting from past purchase of land, buildings and capital equipment (interest and principal) are omitted. In addition, current annual expenditures outside these specific product categories were not estimated. As a result, the difference between the sales and expenditure data does not reflect profits but instead net revenue before expenses associated with capital purchases, maintenance, and operating expenses.

Purchases by the Landscaper class of the ornamental horticulture and turf industry were widely distributed among all classes of products (figure 5A). This sector's expenditures amounted to \$77 million in 1994 (table 6). The expenditures were distributed among landscaping services (\$17 million), plants, trees, shrubs and turfgrass (\$43 million), and chemicals and tools amounted to \$17 million.

The Building Supply/Garden Center business class indicated expenditures amounting to approximately \$97 million in 1994. The largest expenditure categories were tools (\$54 million), chemicals (\$17 million) and plants (\$12 million). Trees, shrubs, and turfgrass purchases amounted to about \$13 million. General Merchandise Store's

Table 6. Annual Purchases by Business Class and Product Category, 1994 (Million Dollars)

Product Category	Business Class					
	Grower	Florist	Grocery Store	General Merchandise Store	Building Supply Store/ Garden Center	Landscaper
Trees	\$3.99		\$0.37	\$2.64	\$3.22	\$13.58
Shrubs	5.99		0.32	5.50	5.32	15.52
Plants	21.70	\$10.22	12.48	6.26	12.13	5.96
Turf	6.64	.04		0.19	3.83	8.18
Chemicals	3.21	0.01	0.02	8.68	17.72	5.29
Tools	1.58			16.99	53.86	11.77
Landscaping	0.30			0.30	0.84	16.65
Total	\$43.41	\$10.27	\$13.19	\$40.56	\$96.92	\$76.95

purchases were \$41 million in 1994. The largest categories of expenditures were similar to that of the Building Supply/Garden Center class. Chemicals and tools accounted for \$9 million and \$17 million, respectively. Plant and shrub expenditures were \$6 million each with tree purchases near \$3 million. The purchase of landscaping services by General Merchandise Stores was insignificant. (figure 5B).

Grower expenditures in 1994 were \$43 million. About one-half of total Grower expenditures were for plant material (\$22 million). Expenditures on turfgrass were \$7 million, shrubs were \$6 million, trees were \$4 million, and chemicals, tools and landscaping services were \$5 million.

The Grocery Store and Florist firms indicated total expenditures in 1994 of about \$13 and \$10 million, respectively. As expected, the plant material category comprised almost the entire amount of the expenditures for both business classes.

Sources of Input Supplies. South Carolina firms are heavily dependent upon out-of-state suppliers for the products that they in turn sell to their customers. This dependence on out-of-state versus in-state suppliers varied

significantly by product type. For example, trees and shrubs are primarily obtained from local in-state suppliers. Fifty-two percent of the trees and 60 percent of the shrubs purchased by the state's ornamental horticulture and turfgrass firms came from South Carolina suppliers in 1994 (figure 6A). Purchases of turfgrass also came primarily from suppliers inside the state (72 %). Plant supplies were about evenly split between in-state and out-of-state suppliers. In-state suppliers accounted for 45 percent of plant supplies to state firms while 55 percent of the supplies came from sources outside of the state (figure 6B). Forty-seven percent of the chemical supplies purchased by South Carolina's ornamental horticulture and turfgrass firms came from sources outside of the state. The purchase of tools from out-of-state sources was even greater at 63 percent (figure 6C). Landscaping services were provided primarily by in-state suppliers. Eighty-nine percent of all landscaping design, installation and maintenance services were provided by South Carolina suppliers while only eleven percent came from sources outside of the state (figure 6D).

The supply of plants, trees, shrubs and

Figure 5A. Landscaper and Building Supply Store/Garden Center Purchases, 1994 (\$ Millions)

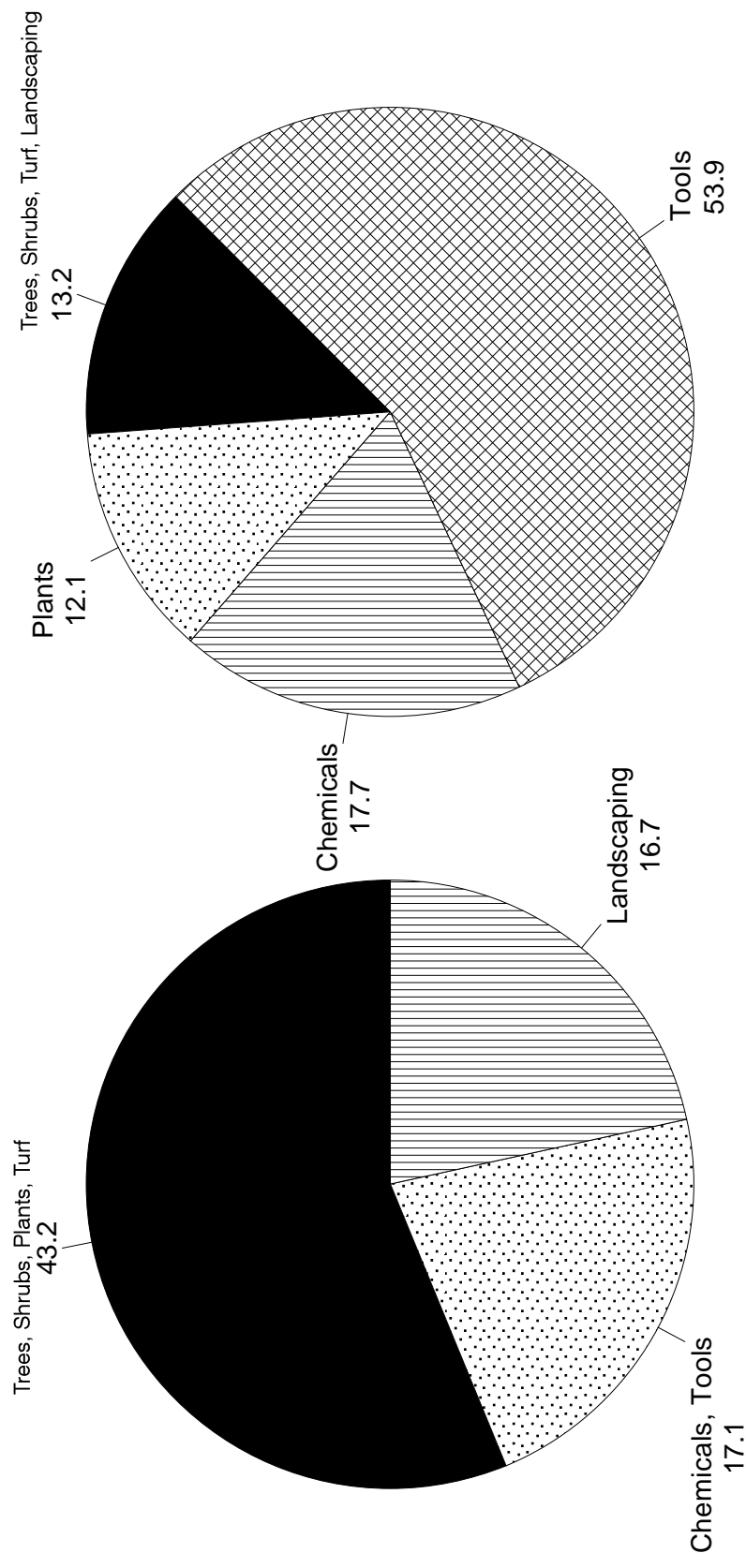


Figure 5B. Grower and General Merchandise Store Purchases, 1994 (\$ Millions)

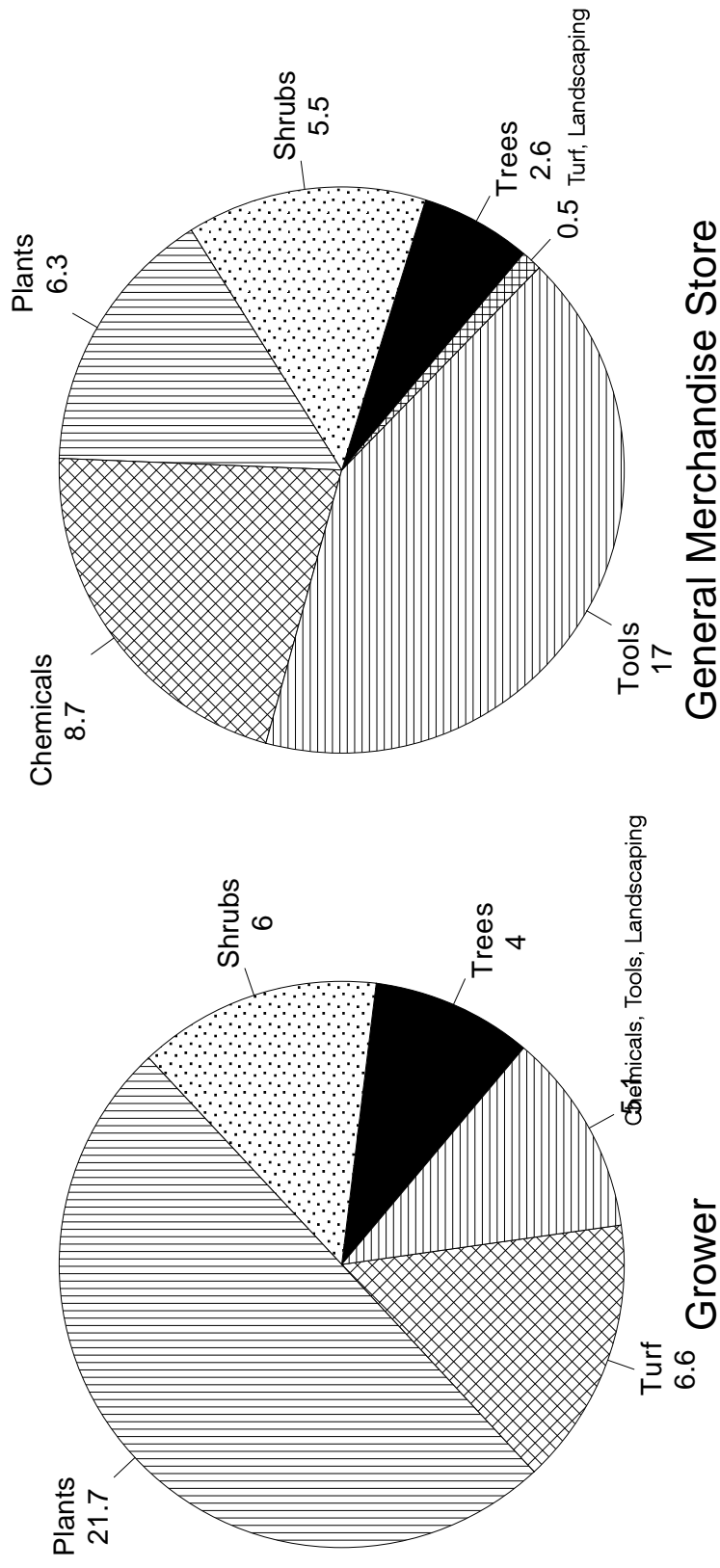
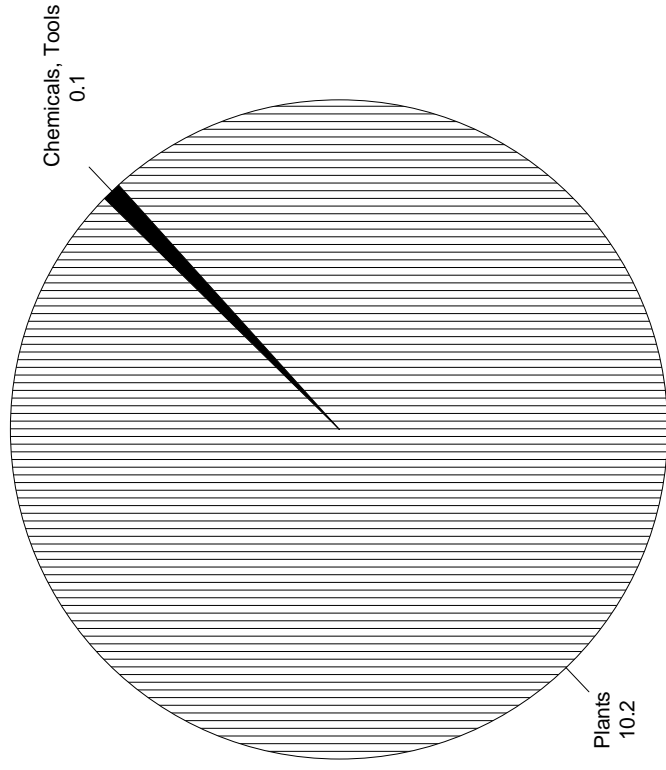
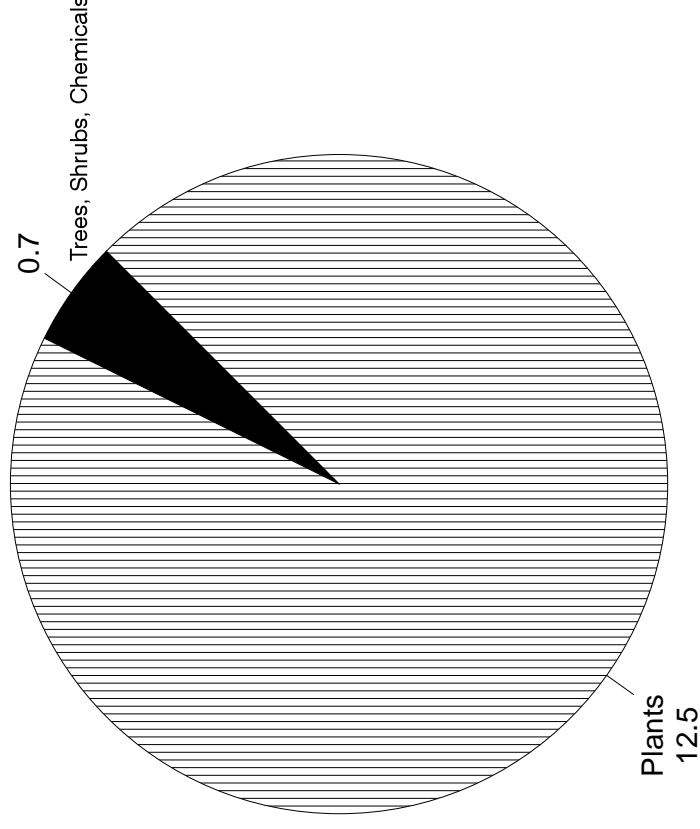


Figure 5C. Florist and Grocery Store
Purchases, 1994 (\$ Millions)



Florist

Total Purchases \$10,261,959



Grocery Store

Total Purchases \$13,192,097

Figure 6A. Trees and Shrubs Purchases
by Market Origin, 1994 (Percent)

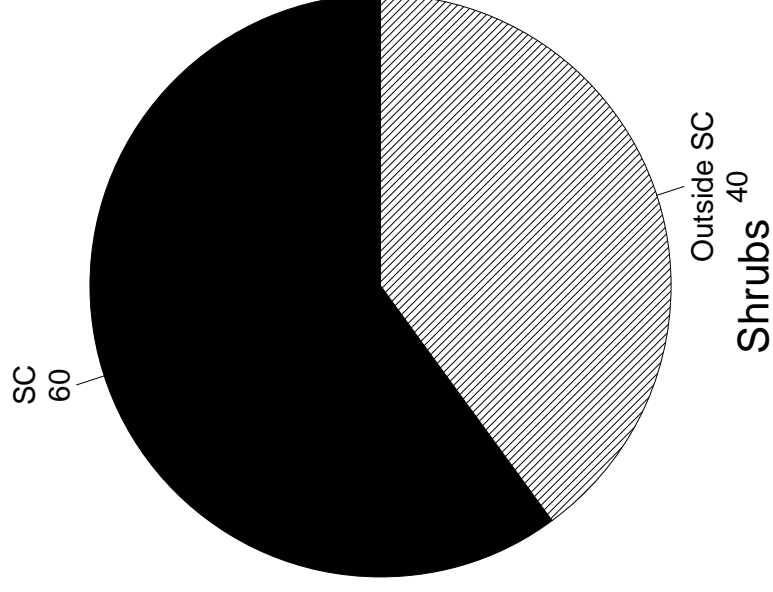
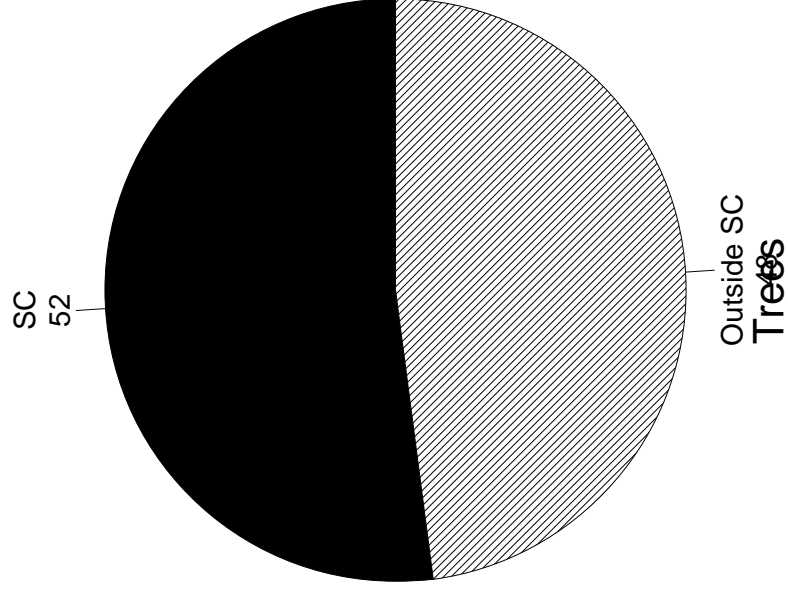


Figure 6B. Plants and Turf Purchases by Market Origin, 1994
(Percent)

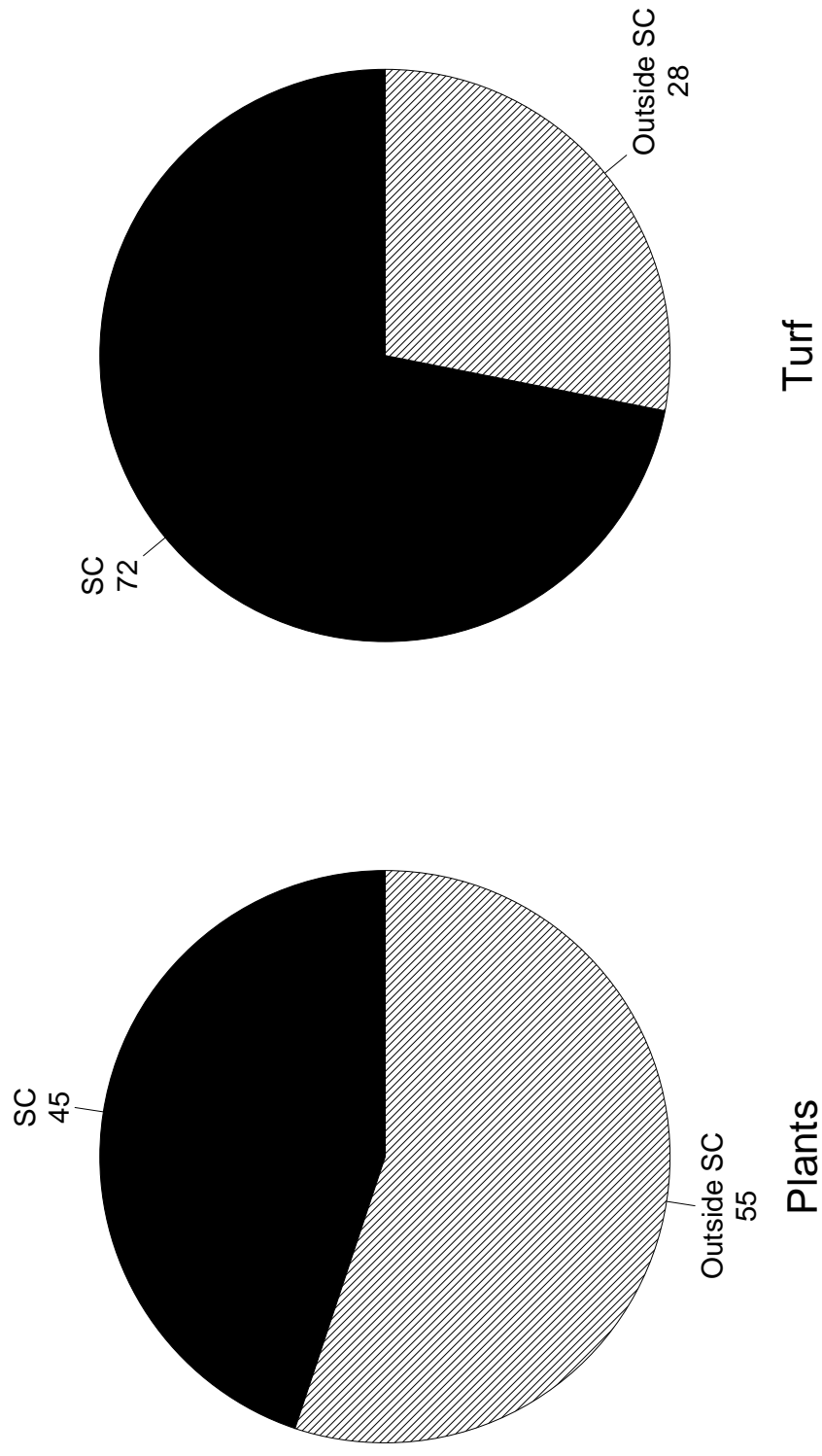


Figure 6C. Chemicals and Tools Purchases
by Market Origin, 1994 (Percent)

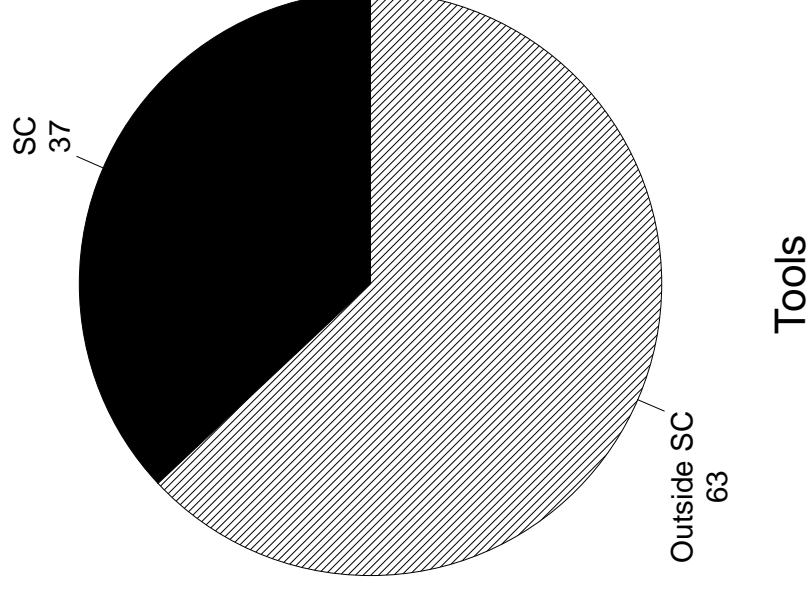
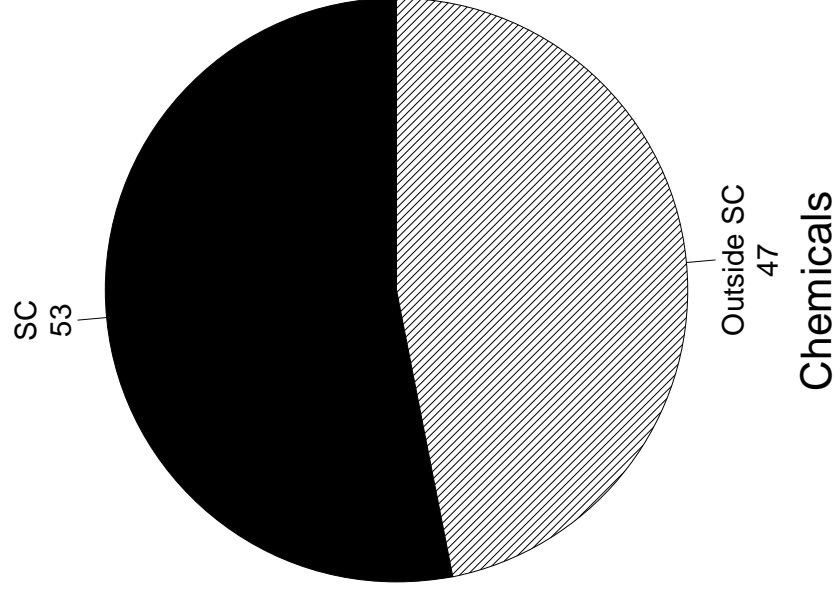
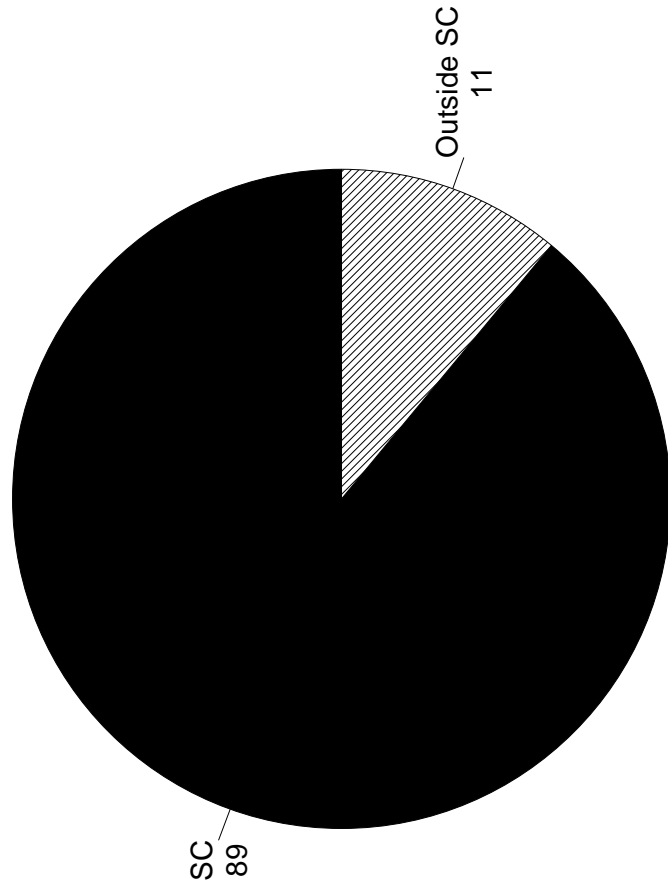


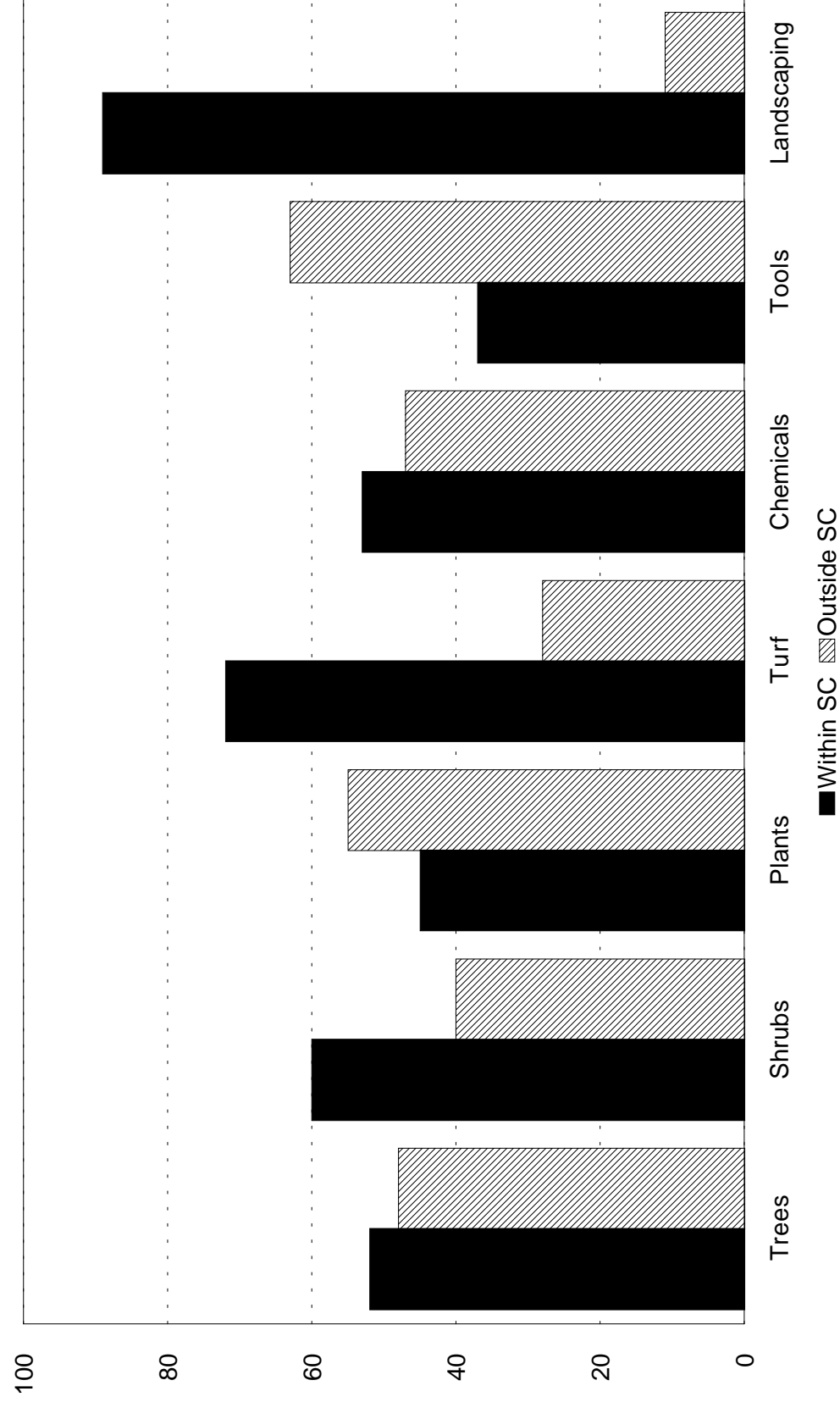
Figure 6D. Landscaping Purchases
by Market Origin, 1994 (Percent)



Landscaping

Landscaping

Figure 7. Total Purchases by Product, 1994 (Percent)



turfgrass from outside sources came primarily from Florida, Georgia, North Carolina and Tennessee. The top three supplying states by product category are shown in table 7. The leading suppliers of trees to South Carolina firms were North Carolina (35.8%), Tennessee (30.2%) and Florida (28.3%). The leading shrub suppliers were Florida (43.2%), Georgia (33.7%) and North Carolina (27.4%). Turf suppliers were also from these three states. About 57 percent of firms purchased from Georgia, 34 percent from North Carolina and 17 percent from Florida.

Plant suppliers were located all across North America. Plants were purchased from suppliers located in twenty-four states and one province of Canada. However, the three leading states were again Florida (40.3%), North Carolina (35.6%) and Georgia (30.2%). Chemicals and tools supplies also came from many different states and again the majority of their purchases came from neighboring states. Sixty-three percent of the businesses purchased chemicals and tools from North Carolina, 20 percent from Georgia and 62 percent from North Carolina.

Landscaping supplies came exclusively from three states. The 11 respondents to the survey indicated that they utilized North Carolina (54.5 %), Georgia (36.4 %) and Florida (9%).

IV. Total Income and Employment Effects

The sales figures generated annually by South Carolina's ornamental horticulture and turfgrass industry do not measure the true economic impact of these sales transactions to the state's economy. Many of these transactions contribute only a proportion of the sales revenue generated to the our state's economy. Part of these sales dollars go out-of-state. Only the portion that the firm

contributes to the sale of the product is a direct contribution to the state's economy. For example, if a retail garden center purchases a plant from a supplier in Georgia for five dollars and then at a later date sells the same plant to a South Carolina customer for fifteen dollars, the contribution of the sale of this plant to the state's economy is ten dollars not fifteen. Five dollars went to the plant supplier in Georgia.

The employment and income effects resulting from product sales constitute only the initial round of the economic impact. Additional employment, income, and expenditures are generated as employees of these firms purchase goods and services and suppliers of ornamental firms acquire inputs and pay their employees.

A conceptual illustration of the multiplier process for the ornamental industry is provided in figure 8. Ornamental firms accrue revenues as a result of the sales of plants, goods and services (represented by the bold arrows in figure 8). The ornamental horticulture and turfgrass firms then distribute these revenues to their employees (represented by the household sector), to the suppliers of goods and services (represented by in-state and out-of-state business sectors), and to the government sectors in the form of taxes and fees. These "direct" expenditures (represented by the solid arrows) stimulate additional rounds of "indirect" and "induced" expenditures as other businesses and local households make purchases with sales revenue or wage income acquired from the industry. This multiplier process continues with each additional round of income/spending generating smaller effects because monies leak out of the state economy via import purchases, taxes, savings, and profits (dotted lines in figure 8). In the case of state-level economies, these leakages are significant and the secondary effects may not

Table 7. Leading Out-of-State Suppliers of Products, 1994

Product	Respondents Purchasing Out-of-State	Respondents Not Purchasing Out-of-State	Leading State Suppliers ^a
Trees	106	375	North Carolina (35.8%) Tennessee (30.2%) Florida (28.3%)
Shrubs	95	386	Florida (43.2%) Georgia (33.7%) North Carolina (27.4%)
Plants	149	332	Florida (40.3%) North Carolina (35.6%) Georgia (30.2%)
Turf	35	446	Georgia (57.1%) North Carolina (34.3%) Florida (17.1%)
Chemicals	74	407	North Carolina (63.5%) Georgia (29.7%) Ohio (5.4%)
Tools	69	412	North Carolina (62.3%) Georgia (20.3%) Tennessee (5.8%)
Landscaping	11	470	North Carolina (54.5%) Georgia (36.4%) Florida (9.0%)

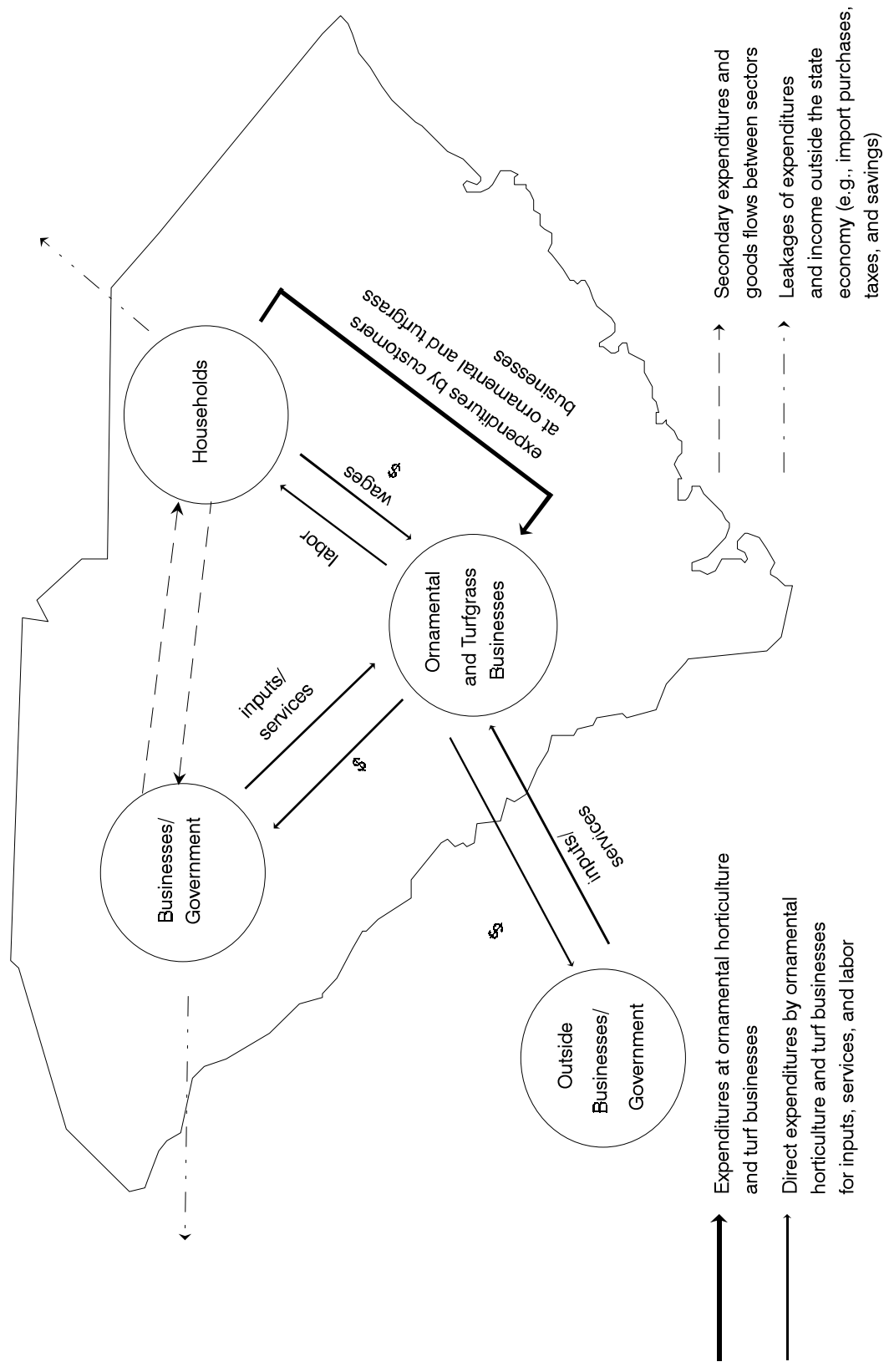
^aPercentage is percent of respondents purchasing out-of-state that identified purchases from that state.

exceed the initial expenditures, income, and employment effect at the ornamental horticulture and turf businesses.

The indirect and induced effects of the ornamental horticulture and turf industry on the state economy were estimated by entering wages and salaries and non-labor expenditure data into the IMPLAN input-output model for South Carolina.⁶ The IMPLAN model does not have a ornamental sector; therefore, the ornamental industry's expenditures were desegregated and allocated to the sectors provided by IMPLAN that most closely resemble the specific ornamental activity. Specifically, the industry's expenditures were allocated to the IMPLAN sectors greenhouse and nursery products (for grower businesses), landscape and horticulture (for landscaping businesses), florists (for flower shops),

building materials and garden centers (for building supply/garden center), general merchandise store (for general merchandise stores), and food stores and miscellaneous retail (for grocery stores). For each of the above sectors, the indirect and induced impacts associated with wage and salary expenditures were estimated by designating in-state personal consumption expenditures and allocating these expenditures according to the IMPLAN household consumption pattern or menu. The indirect and induced effects of non-labor expenditures were estimated by allocating these materials and services expenditures according to the expenditure menus for each relevant sector. Based on these industry labor and non-labor expenditure patterns, the IMPLAN model estimates the indirect and induced changes in the state's

Figure 8. Economic Impact of Ornamental Horticulture and Turfgrass Industries on the South Carolina Economy



output, income, and employment attributed to the initial expenditures in the ornamental industry.⁷

Results of the input-output analysis are presented in tables 8 and 9. These tables provide the initial, secondary (indirect plus induced), and total changes in economic activity (income, and employment) allocated to the affected economic sectors. The state totals are provided at the end of each column. IMPLAN estimates indicate that expenditures by ornamental firms for materials and services and personal consumption expenditures by firm employees resulted in 10,692 additional FTE jobs and \$282,118,700 in additional income in the state. The economic sectors that experienced the largest gains in employment were services, growers, and wholesale and retail trade. The finance, insurance, and real estate sector experienced large income gains but relatively small employment gains due to the relatively high income per job in the sector.

Of principal interest to this study is the total (initial plus indirect and induced) employment and income effects associated with ornamental horticulture and turf firms in South Carolina. Results of our analysis indicate that 28,727 FTE jobs were attributable to these firms, 18,035 at ornamental, horticulture and turf firms and 10,692 in other sectors of the state economy (table 8). The total 1994 state income resulting from ornamental horticulture and turfgrass operations was \$537,253,000, \$255,134,300 at ornamental, horticulture and turf firms and \$282,118,700 in other sectors of the economy (table 9). Thus, for every job created at an ornamental firm, 0.59 additional jobs were generated through indirect and induced effects ($10,692 \div 18,035$). And for every dollar of income earned at the state's ornamental horticulture and turfgrass businesses, \$1.10 of additional income resulted from the secondary effects ($\$282,118,700 \div \$255,134,300$).

Employment and income multipliers for an economic activity are estimated by dividing the total effects of the sector (total = initial + indirect + induced) by the initial employment or income attributable to the activity. The estimated 1994 employment multiplier for ornamental firms was 1.59 ($28,727 \div 18,035$), and the estimated income multiplier was 2.10 ($\$537,253,000 \div \$255,134,300$). The estimated income and employment multipliers are state averages and the multipliers applicable to an individual firm will vary depending on the firm's propensity for purchasing goods and services from outside the state. Also, the local multiplier for an individual firm, such as a Greenville or Columbia area multiplier, will be less than the state average due to significant expenditure leakages at the local level.⁸ The employment, output, and income data provided by the IMPLAN input-output model are conservative estimates of the contribution of ornamental horticulture and turfgrass industry to the South Carolina economy. Missing from these estimates are the dollars spent by South Carolina residents on out-of-state ornamental horticulture and turfgrass products. For example, sod for a golf course or lawn could be supplied and installed by an out-of-state firm. We previously estimated that the landscaping sector of the industry contributed \$224 million to the state's revenue. Thus, a significant amount of additional spending would be attributable to the state's landscaping businesses if only a small proportion of this revenue was generated by in-state firms and not their out-of-state counterparts. A second missing economic contribution of the industry is the purchases of plant materials and supplies by South Carolina residents from mail order business located outside of the state. Businesses that attract sales away from South Carolina firms reduce spending within the state and consequently reduce the direct, indirect and induced affects of that revenue on the South Carolina economy.⁹

Table 8. Effect of South Carolina Ornamental Industry's Employment on State's Economy, 1994

IMPLAN INDUSTRY SECTOR (IMPLAN Industry Number)	Initial Employment	Indirect and Induced Employment	Total Employment (A+B)
Forest and Forestry Products (22,24)	0	0.83	0.83
Greenhouse and Nursery (23)	7,536.25	1,789.02	9,325.27
Landscape and Horticulture (27)	7,140.95	17.77	7,158.72
Agriculture, Forestry & Fisheries (except 22, 23, 24,27)	0	98.08	98.08
Mining (31)	0	0.65	0.65
Construction (48)	0	197.44	197.44
Manufacturing (58)	0	489.49	489.49
Trans., Comm. & Public Utilities (433)	0	312.67	312.67
Wholesale Trade (447)	243.04	427.67	670.71
Building Materials & Garden Supplies (448)	2,096.16	140.51	2,236.67
General Merchandise (449)	266.21	472.99	739.20
Food Stores (450)	414.20	706.94	1,121.14
Eating and Drinking (454)	0	874.38	874.38
Miscellaneous Retail (455)	338.07	629.06	967.13
Trade (except 447, 448, 449, 450, 454, 455)	0	773.20	773.20
Hotel and Lodging (463)	0	103.55	103.55
Commercial Sports exc. Racing (486)	0	6.30	6.30
Amusement and Recreation (488)	0	80.85	80.85
Membership Sports & Recreational Clubs (489)	0	36.93	36.93
Services (except 463, 486, 488, 489)	0	2,443.67	2,443.67
Finance, Insurance & Real Estate (456)	0	800.17	800.17
Government (510)	0	290.37	290.37
Inventory Value Adjustment (528)	0	0	0
Total	18,034.87	10,692.55	28,727.42

Table 9. Effect of South Carolina Ornamental Industry's Income on State's Economy, 1994

IMPLAN INDUSTRY SECTOR (IMPLAN Industry Number)	Initial Income	Indirect and Induced Income	Total Income (A+B)
Forest and Forestry Products (22,24)	\$0	\$0.03	\$0.03
Greenhouse and Nursery (23)	96.18	22.84	119.02
Landscape and Horticulture (27)	84.26	0.21	84.47
Agriculture, Forestry & Fisheries (except 22, 23, 24, 27)	0	1.87	1.87
Mining (31)	0	0.04	0.04
Construction (48)	0	6.49	6.49
Manufacturing (58)	0	23.11	23.11
Trans., Comm. & Public Utilities (433)	0	20.56	20.56
Wholesale Trade (447)	7.61	13.40	21.01
Building Materials & Garden Supplies (448)	51.09	3.43	54.52
General Merchandise (449)	4.12	7.31	11.43
Food Stores (450)	6.25	10.67	16.92
Eating and Drinking (454)	0	11.66	11.66
Miscellaneous Retail (455)	5.62	10.45	16.07
Trade (except 447, 448, 449, 450, 454, 455)	0	17.74	17.74
Hotel and Lodging (463)	0	2.17	2.17
Commercial Sports exc. Racing (486)	0	0.05	0.05
Amusement and Recreation (488)	0	1.45	1.45
Membership Sports & Recreational Clubs (489)	0	0.71	0.71
Services (except 463, 486, 488, 489)	0	61.06	61.06
Finance, Insurance & Real Estate (456)	0	58.60	58.60
Government (510)	0	8.30	8.30
Inventory Value Adjustment (528)	0	0	0
Total	\$255.13	\$282.15	\$537.28

V. Summary and Conclusions

The purpose of this study was to estimate the contribution of the ornamental horticulture and turf industries to the South Carolina economy. Our findings, based on the 1995 survey of 480 ornamental horticulture and turf firms, indicate that this industry generated sales revenue of \$726 million in 1994. The sales levels generated by business class were: Landscaper, \$244 million; Building Supply Store/Garden Center, \$191 million; Grower, \$167 million; General Merchandise Store, \$85 million; Grocery Store \$33 million; and Florist, \$27 million.

South Carolina ornamental horticulture and turfgrass firms also indicated that they used a number of different marketing outlets to generate these sales. In general, firms relied upon retail and wholesale market outlets both within and outside of the state to sell their products. The notable exceptions were the Florist and Grocery Store business classes who sold primarily to in-state retail customers.

Sales by the overall industry were primarily from the production and sale of plant material and the landscaping services of horticultural products. Plant sales (\$205 million), shrubs (\$80 million), trees (\$56 million) and turf (\$37 million) make up over fifty percent of the total revenue generating potential on a product basis. The landscaping services of design, installation, and maintenance added \$144

million or 20 percent to total sales in 1994. The sale of chemicals (\$88 million) and tools (\$105 million) accounted for 27 percent of total product sales.

The net income from the sale of these ornamental horticulture and turfgrass products was estimated at \$255,134,300. The number of employees estimated to be employed in the ornamental horticulture and turfgrass industry in South Carolina in 1994 was 18,478. These estimates represent only the direct or initial round of economic impact resulting from the generation of income from the sales of ornamental horticulture and turf firms. The total effects (initial plus indirect and induced) were estimated to be 28,727 FTE jobs and \$537,253,000 in income. This suggests an employment multiplier of 1.59 and an income multiplier of 2.10. Therefore, for every job created in this industry and for every dollar of income generated the economy of South Carolina benefits by the creation of 1.59 jobs and 2.10 dollars of total income to the state.

This study does not measure the total contribution of the ornamental horticulture and turfgrass industries to the state of South Carolina. It did not estimate sales by out-of-state suppliers of plant materials, turfgrass, and complementary supplies to customers in the state. Yet, our restricted income and employment estimates still indicate that the ornamental horticulture and turf industry is a significant contributor to the state's economy.

Endnotes

1. Data reference from the *1986 South Carolina Ornamental and Turf Survey*, July 1988, Janice Tuten, J.S. Lytle and P.J. Rathwell, Agricultural Economics and Rural Sociology Report AE 452, S.C. Agricultural Experiment Station.
2. Data reference from *1990 South Carolina Ornamental Horticulture Survey*, S.C. Department of Agriculture.
3. Data retrieved from the *U.S. Bureau of the Census, Census of Retail Trade 1987 and 1992 South Carolina*.
4. Questionnaire construction and mail and phone survey methodologies followed Dillman's total design method (see: *Mail and Telephone Surveys: A Total Design Method* by D.A. Dillman, New York: John Wiley and Sons, 1977). A copy of the questionnaire is available upon request from the authors.
5. State-level estimates of expenditures, employment, and income are based on extrapolations from the survey responses. The responses provided by the 481 firms were expanded and extrapolated to fit the number of firms indicated by the *U.S. Bureau of the Census, County Business Patterns 1993 South Carolina*. Survey respondents were classified by sales and employment levels consistent with the categories found in the County Business Patterns. Mean values were calculated for each income and employment category. These mean values were multiplied by the estimated total number of firms in each category indicated by the County Business Patterns to provide statewide totals.
6. IMPLAN (Impact analysis for PLANning) is a microcomputer program that performs regional input-output analysis. The model can be defined for any region in the United States using secondary data that are available by state and county. The program also permits the substitution of primary data to enhance program flexibility and create models for specific industries or groups of industries. For more information refer to D. Olson, S. Lindall, and W. Maki, 1993. *Micro IMPLAN User's Guide: Version 91-F*. Minnesota IMPLAN Group, St. Paul, Minnesota.
7. Multiplier effects include indirect and induced effects from added spending by employees of ornamental horticulture and turf related activities and from the direct spending by these businesses on materials and supplies needed in their business, e.g., electricity, gas, phone, rent, insurance, etc. The indirect effects are caused by increased purchases by firms that provide goods and services to the ornamental horticulture and turf industry. For example, utilities supplying natural gas to these businesses must make purchases of natural gas from firms that extract natural gas and distribute it by pipelines to the utility company.

Induced effects are the result of added spending on consumer goods by all regional employees that receive added income, directly or indirectly, from the ornamental horticulture and turf firms. For example, add wages, profits and other property income is generated in the natural gas and electricity sector as these firms

make added purchases from the utilities. This added income, in part, is again spent in the region “inducing” additional sales, employment and income in the region. Because people save part of their added income, some income is taxed away and some added income is spent outside the region, these “induced” effects eventually become very small and cause no added activity in the region.

8. These employment and income “multipliers” are simple ratios of total effect to direct effect. These are not multipliers for a single ornamental horticulture and turf firm or sector. They are the implied aggregate multipliers from a weighted average of each of the multipliers that are computed for each of the 24 sectors in the regional input-output model constructed for study. There is no single “ornamental horticulture and turf sector” given the array of business activities defined in this study. Thus, the aggregate multiplier is found by estimating the total effects from the array of final demand changes associated with consumer spending by this industry’s employees and non-labor direct purchases by the firms. Total effects are found by multiplying the Leontief inverse for the regional economy by these “final demand” changes. IMPLAN employs an interactive procedure to estimate induced effects from the open Leontief inverse. The results should be similar to those that are obtained from using the closed Leontief inverse, not available in IMPLAN -- to capture induced

effects. This multiplication yields effects on sales, income and employment in each of the 24 regional sectors from industry related activities in the region. Summing over these 24 sectors yields the total effect for the region. Dividing this total effect by the direct effect yields the implied multiplier used in the text.

For example, the employment multiplier, 1.59, is the ratio of total employment (28,000) in the 24 sectors - direct, indirect and induced - needed to support the (16,000) direct employees in the ornamental horticulture and turf industry’s activities. Or, for each 100 direct industry activity employees, another 59 employees are needed to provide inputs to firms and to provide goods and services to consumers.

- 9 The income and employment estimates provided for South Carolina ornamental horticulture and turf firms are based on the assumption that S.C. residents would take their dollars out of state if this industry was nonexistent in the state (i.e., substitute playing golf for growing a flower garden). That is, no substitutes exist for ornamental horticulture and turf activities in the eyes of the consumer and that none of these dollars would be allocated to other in-state activities. If this assumption does not hold, our income and employment estimates overstate the contribution of the ornamental horticulture and turf industry to the state’s economy.