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Ornamental Horticulture and Turfgrass Industry  
to the South Carolina Economy, 1999**

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# **Contributions of the Ornamental Horticulture and Turfgrass Industry to the South Carolina Economy, 1999**

## **Introduction**

The ornamental horticulture and turfgrass industry's contribution to the US economy has been growing at an impressive rate. The 1997 Census of Horticultural Specialties reports that in 1998 there were 23,758 firms nationwide involved in the production of floriculture products, nursery plants, unfinished plant and propagation materials, turfgrass, sod, sprigs or plugs, and other horticultural products. These firms had combined sales of \$10.6 billion.<sup>1</sup> The number of US businesses involved in the production of horticultural and turf products nearly doubled from 1970 (12,962) to 1998 and sales doubled from 1988 (\$4.8 million) to 1998 alone.

In the past ten years in the US, the fastest growing area, in number of firms and sales, was for producers of dried bulbs, corms, rhizomes, or tubers, and turfgrass, sod, sprigs or plugs. Sales by firms producing bedding/garden plants, nursery plants, unfinished plants and propagation materials, and flower seeds tripled in this ten-year period from \$2.2 billion to \$6 billion. Those producing turfgrass, sod, sprigs or plugs have come close to quadrupling their sales from 1988 (\$248 million) to 1998 (\$835 million).

According to the 1992 Economic Census, the number of establishments, sales and employees for US retail nurseries and lawn and garden supply stores was 10,857, \$6.3 billion, and 71,499, respectively.<sup>2</sup> In 1997, 16,432 establishments, \$27.6 billion in sales, and 139,137 employees were reported for the US nursery and garden center sector.

Large chain store home centers also sell a large amount of plant material and garden supplies. In 1997, home centers in the US reported \$6.8 billion sales of horticultural products. This amounts to 14.5% of their total store sales.

In SC in 1998, the Census of Horticultural Specialties reported 213 producers of horticultural products with total annual sales of \$141 million. Producers of nursery plants and turfgrass made up 95% of this total. The National Agricultural Statistics Service reported 1999 greenhouse, nursery and floriculture cash receipts from farm marketings of \$200 million - the 2<sup>nd</sup> highest cash receipt commodity in South Carolina and 14.1% of SC's total cash receipts.<sup>3</sup> Horticultural commodities ranked as SC's 2<sup>nd</sup> highest in 1998 as well as in 1999, and 3<sup>rd</sup> highest in 1997. Growth of the greenhouse, nursery & floriculture production sector in SC has been further documented: 9.9% of total cash receipts from farm marketings in 1996, 10.5% in 1997, 12% in 1998, and 14.1% in 1999.

Industry growth is again shown in the Economic Census. The 1992 Census of Retail Trade reported 218 retail nursery, lawn and garden centers, and nursery stock businesses in SC with 985 employees and \$96.7 million in sales. The 1997 Census of Retail Trade identified 249 businesses with over 1,600 employees and \$255.9 million in

sales. Sales in 1997 almost tripled 1992 levels with an increase of only 31 more businesses.

Growth in the floral area of the industry is also documented. Retail florists numbered 427 in 1992 with 1,384 employees and \$65.9 million in sales. The 1997 Census showed 395 retail florists with 1,349 employees and \$74.1 million in sales. Although the number of florists decreased slightly from 1992 to 1997 (-1%), sales volume increased by 12%.

Clemson University's 1986 study of this industry's contribution to the SC economy reported an estimated \$178.5 million in sales and 5,506 employees attributable to the total ornamental horticulture and turfgrass industry.<sup>4</sup> These figures include growers, distributors and retail outlets (garden centers, landscapers, florists). The overall impact to the SC economy in 1986 was estimated to be \$238.5 million in sales and 8,719 employees. A SC Department of Agriculture study estimated sales of nurseries and dealers to be \$303.3 million in 1989.<sup>5</sup>

The increase in economic impact is further illustrated by the 1994 Clemson University survey of the ornamental horticulture and turfgrass industry.<sup>6</sup> The results determined 18,478 full-time equivalent jobs (FTEs) and \$726 million sales for the industry that year. Using the IMPLAN input-output economic model for SC, total (direct plus indirect and induced impact) employment and income were estimated to be 28,727 and \$537 million, respectively.

The purpose of this study was to estimate the economic contribution of the ornamental horticulture and turfgrass industry to the SC economy in 1999. Estimates of total employment, expenditures and sales of ornamental horticulture and turfgrass products are provided by business class. The analysis of the economic contribution of the ornamental horticulture and turf industry includes first, a discussion of the survey and data collection procedures. Employment, sales and purchases data were estimated from survey data for the entire industry and provided for each business class and specific product categories. Finally, the secondary economic impacts associated with the businesses selling horticultural products and services were estimated using a state-level input-output model called IMPLAN.

## **Survey Procedure**

Businesses in SC which produce or sell ornamental horticulture and turfgrass products and services were identified utilizing several sources including the SC Nursery and Landscape Association, SC Greenhouse Growers Association and SC Turfgrass Foundation membership lists, the Directory of SC Licensed Nurseries and Dealers, internet phone directories, and the prior 1994 study's mail list. In March 2000, 4,089 surveys, including an introduction letter, were mailed. Reminder postcards were mailed several weeks later. The spring mailing was intended to coincide with the filing of tax returns in order to minimize business owners' and managers' completion time. Every effort was made to contact by telephone as many of the businesses that had not returned

the survey form in order to obtain adequate representation from each business class. Methods including multiple contacts, self-addressed stamped return envelopes and industry association sponsorship were also employed to improve survey response.<sup>7</sup>

The survey first requested information based on primary business class (survey form in Appendix A). The types of businesses or sectors identified as producing and/or selling ornamental horticulture and turfgrass products and services in SC were categorized into ten primary business classes: retail garden center, wholesale grower, turfgrass production/sales, florist, landscaper, landscape supplier/garden center supplier, mass merchandiser, general merchandise, hardware store and grocery store (Table 1). The survey form allowed respondents to choose a business class called “other” if none of the other business classes seemed to fit. For data analysis, general merchandise store and landscape supplier/garden center supplier were combined into the retail garden center business class to be consistent with the North American Industry Classification System (NAICS) industry classification codes used by the Bureau of the Census.

A concerted effort was made to gain a realistic representation of all business classes. For the businesses that we knew were operating in one sector of the industry, such as retail florists or home centers, every effort was made to obtain an adequate number of responses to estimate the total business class or sector population. However, many firms provided multiple business functions making this a difficult task. For example, a grower may also operate a retail garden center, or a retail garden center may also offer landscaping services. In a case such as this, the business class representing the majority of sales was assigned to the firm.

Employment data were also requested. The survey asked respondents to provide information pertaining to 1999 employment: number of full-time employees, part-time employees including average hours worked per month per employee, and seasonal employees including average hours worked per month per employee and number of months worked.

Finally, the questionnaire requested 1999 sales and purchases data by product line. Product lines include: trees; shrubs; perennials; greenhouse plants; floral; turf; chemicals/soil conditioners/fertilizers; gardening supplies – tools and equipment, and seeds and bulbs; landscaping – design, installation and/or maintenance; landscape supplies – brick, gravel, stone, etc., and topsoil, mulch, etc.; and other (Table 1). Further, respondents were asked to specify the percentage of sales and purchases that were wholesale and retail and the percentage of sales and purchases made to customers outside of SC.

**Summary of Business Characteristics.** In March 2000, 4,089 surveys were mailed. Survey forms were partially or fully completed by 1,062 businesses. The overall response rate to the questionnaire was 26%. Of the surveys mailed, 341 were returned as no longer in business or as not having sold ornamental horticulture and turf products in 1999. Of the 1,062 returned, 819 (77.1%) provided complete employment information,

545 (51.3%) provided complete sales data, and 416 (39.2%) provided complete purchases data.

**Table 1. Definition of Primary Business Classes and Product Lines**

<u>Primary Business Class</u>	<u>Description</u>
Retail garden center	retail garden center or nursery, may also grow plants but the majority of sales at retail level
Wholesale grower	produces, grows, propagates ornamental horticulture material, excludes sod farms
Turfgrass production/ sales	produces turf material
Florist	retails or re-wholesales floral material, non-grower
Landscaper	designs landscape plans (including landscape architects), installs plants and other horticultural products, and/or maintains landscapes (including landscape contractor)
Landscape/garden center supplier	sells primarily horticulture supplies such as pavers, topsoil, mulch, fertilizer, stone
Mass merchandiser	large chain store home centers (for example, Home Depot & Wal-Mart) with a garden center
General merchandise	feed and seed or farm and garden stores
Hardware store	hardware stores
Grocery store	chain supermarkets with 20 or more employees
<u>Product Lines</u>	<u>Description</u>
Trees	trees
Shrubs	shrubs
Perennials	perennials
Greenhouse Plants	bedding, indoor and hanging plants and flowers
Floral	cut flowers
Turf	grass seed, sod, plugs, sprigs
Chemicals, soil conditioners, fertilizers	wet or dry chemicals, soil conditioners, fertilizers
Gardening supplies:	
tools, equipment	garden tools and equipment
seeds, bulbs	seeds and bulbs
Landscaping – design, installation, service	excluding plant matter and turf
Landscape supplies:	
brick, gravel, stone, etc.	also pavers, for example
topsoil, mulch, etc.	also pine straw, for example
Other	other than above, i.e., gift items, lighting, irrigation parts

The response rate varied by business class. The largest response, compared to the number of businesses identified by census sources in SC, was from turf farms (Table 2). The 1998 Census of Horticultural Specialties reported 15 turf producers in SC. We received responses from 19. This can be explained either by a difference in business definition between our survey and the Census or by an addition in the number of farms from 1998 to 1999.

More than 92% of retail garden centers in SC responded. (Note that in our study if a respondent checked both grower and retail garden center as the business class and the majority of sales were in the retail garden center side of the business, then the business class was classified as retail garden center. However, the Census of Horticultural Specialties places all growers with retail operations in the grower sector).

**Table 2. Percent of Horticultural Industry Respondents by Business Class**

<u>Primary Business Class</u>	<u>Survey Respondents</u>	<u>Total SC Businesses</u>	<u>Percentage of Businesses Responding</u>
Retail garden center	230	271 <sup>a</sup>	92.3
Wholesale grower	118	208 <sup>b</sup>	56.7
Turfgrass production/sales	19	15 <sup>c</sup>	100
Florist	227	404 <sup>d</sup>	56.2
Landscaper	159	1,183 <sup>e</sup>	13.4
Mass merchandiser	22	225 <sup>f</sup>	9.7
Hardware store	61	270 <sup>g</sup>	22.6
Grocery store	226	589 <sup>h</sup>	38.4

<sup>a</sup> Nursery & Garden Centers (NAICS 444220) reported by U.S. Bureau of the Census, 1998 County Business Patterns.

<sup>b</sup> Nursery & Tree Production (NAICS 111421) and Floriculture Production (NAICS 111422) combined and reported by the 1998 Census of Horticultural Specialties. Sod farms are not included in this number.

<sup>c</sup> Sod Harvested Farms reported by the USDA, 1997 Census of Agriculture.

<sup>d</sup> Florists (NAICS 453110) reported in 1998 County Business Patterns.

<sup>e</sup> Landscape Architectural Services (NAICS 541320) & Landscaping Services (NAICS 561730) reported in 1998 County Business Patterns.

<sup>f</sup> Home Centers (NAICS 444110) & Department Stores (NAICS 452110) combined and reported in 1998 County Business Patterns.

<sup>g</sup> Hardware Stores (NAICS 444130) reported in 1998 County Business Patterns.

<sup>h</sup> Supermarkets & Other Grocery Stores (NAICS 445110) with 20 or more employees reported in 1998 County Business Patterns.

About 56% of the state's growers and florists responded. Only 13.4% of businesses primarily involved in landscape design, installation and/or maintenance responded. Less than ten percent of hardware stores responded but a significant number of these stores may not carry a lot of horticultural products other than garden supplies and a few annual or bedding plants. Most mass merchandisers maintain a corporate policy of refusing to participation in surveys. This policy produced a low response rate of 9.7%.

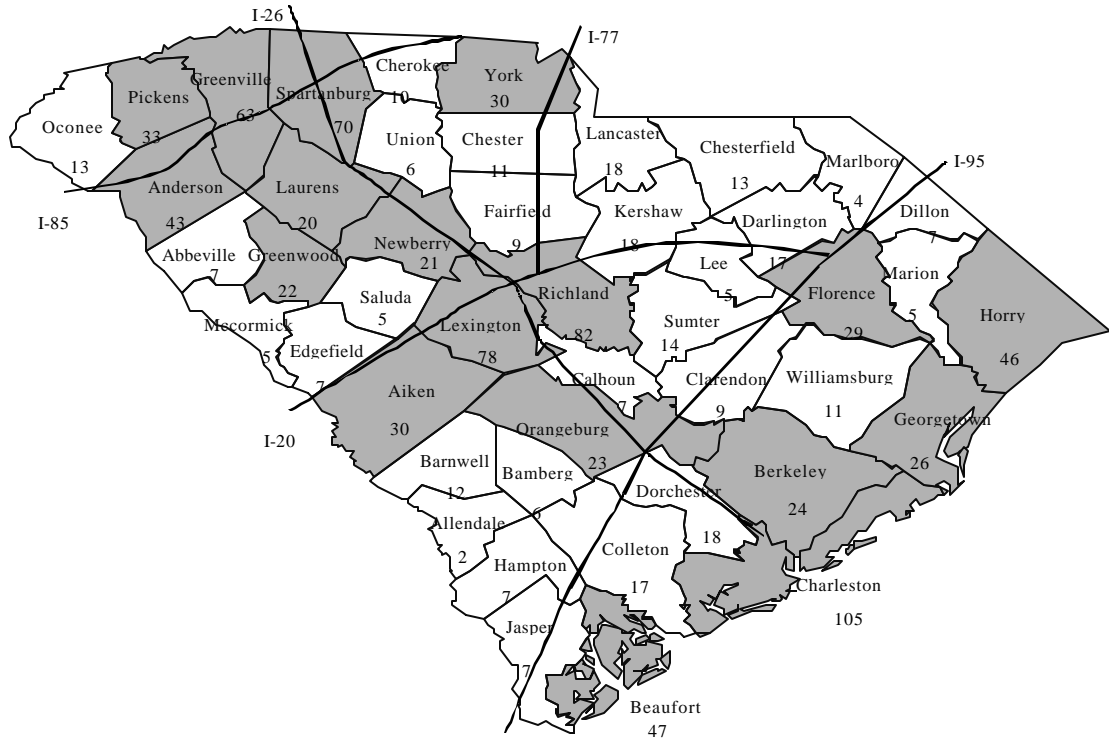
A handful of respondents identified their primary business type as 'other'. These businesses were re-classified into one of the eight categories. A plant rental company and irrigation companies were reclassified to the landscaper class. An irrigation material



supplier and wholesale seed distributor were classified as landscape/garden center suppliers and thus moved to the retail garden center class.

Ornamental horticulture and turfgrass firms were distributed across SC with the majority of impact in more populated areas (shaded areas in Figure 1). The largest number of respondents was from the more highly populated counties such as Charleston, Greenville, Lexington, and Richland Counties. Over 77% of the businesses that responded were near major interstate highways.

**Figure 1. Survey Respondents by County**



**Employment**

SC’s ornamental horticulture and turfgrass industry provides employment opportunities for persons involved in growing horticultural and turfgrass material, the retail and wholesale merchandising of plant and turf material and related products, and landscape design, installation and maintenance services. In 1999, an estimated 24,710 full-time equivalent employees (FTEs) were attributable to the ornamental horticulture and turfgrass industry (Table 3).<sup>8</sup> Jobs that were full-time represented 83% (20,549) of total FTEs with the remaining classified about equally as part-time (4,779 part-time = 2,134 FTEs) or seasonal employment (6,592 seasonal = 2,026 FTEs).

Full-time employment opportunities remain the primary employment practice in SC’s ornamental horticulture and turfgrass industry. Most businesses maintain a full-time labor force with seasonal and part-time employees hired as needed. Turf producers,

wholesale growers and retail garden centers identified the greatest average number of full-time employees in 1999 with at least 11 employees. Landscapers reported an average of nine full-time employees. Grocery stores identified that on average a full-time employee was not needed and relied on part-time and seasonal help for their horticultural sales activities.

**Table 3. Average Employment and Estimated Total Employment**

<u>Business Class</u>	<u>Average FTE<sup>a</sup></u>	<u>Average Employment</u>			<u>Estimated Total FTE<sup>b</sup></u>
		<u>Full-time</u>	<u>Part-time</u>	<u>Seasonal</u>	
Retail garden center	14.21	11.47	1.14	9.25	3,852
Wholesale grower	19.46	14.34	3.22	4.53	4,047
Turf production/sales	18.89	14.13	3.31	3.44	283
Florist	3.44	2.93	1.06	0.91	1,388
Landscaper	10.37	9.38	1.41	1.47	12,271
Mass merchandiser	4.43	2.53	2.37	2.42	997
Hardware store	5.50	4.50	2.52	0.11	1,484
Grocery store	0.66	0.31	0.75	0.69	386
<b>Total</b>	<b>8.38</b>	<b>6.72</b>	<b>1.46</b>	<b>3.09</b>	<b>24,710</b>

<sup>a</sup> Average FTEs reported from businesses providing complete employment data. FTE calculated by converting part-time and seasonal employment to full-time equivalent and added to full-time employment.

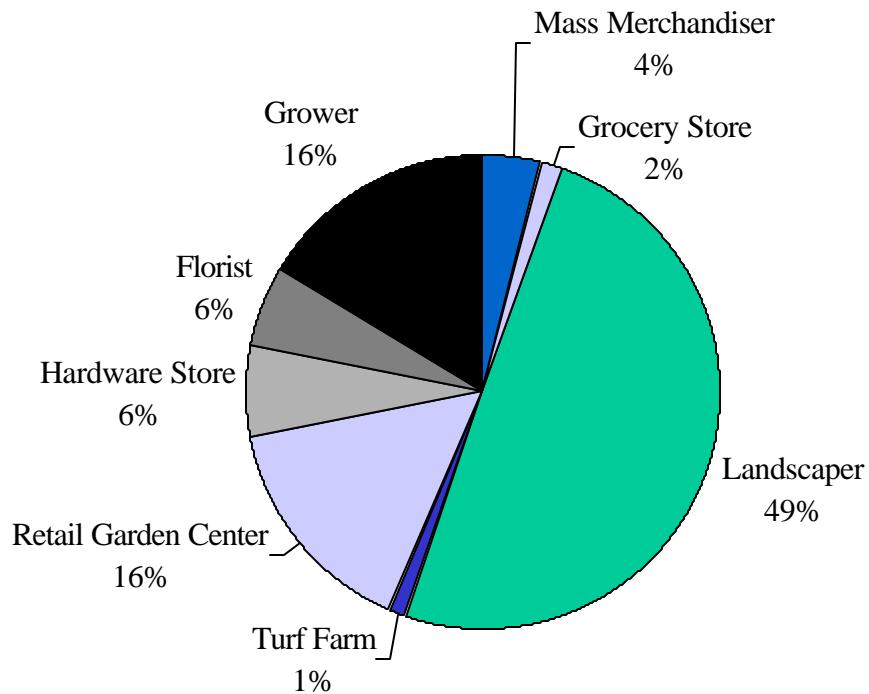
<sup>b</sup> Average survey FTE for each business class expanded to represent total businesses identified by census sources.

Florists, landscapers, hardware stores and grocery stores on average had fewer than three part-time or seasonal employees. Retail garden centers reported an average of ten, growers an average of eight, and turf producers an average of seven part-time and/or seasonal employees. Mass merchandisers reported hiring an average of five part-time and/or seasonal employees. All these findings are consistent with the type of job related responsibilities found in these businesses. Retail garden centers, wholesale growers, turf producers, landscapers and mass merchandisers commonly have peak production, maintenance and selling periods consistent with hiring more part-time and seasonal employees.

Almost 50% of FTEs (12,271) were in the landscape design, installation and maintenance business class as shown in Figure 2. The next two largest employers were retail garden centers with 3,852 FTEs (16%) and growers with 4,047 FTEs (16%). Florists, hardware stores, mass merchandisers, turf producers and grocery stores made up the remaining 4,500 FTEs. (Note: hardware store employment is likely overestimated because of the difficulty of identifying employees who were solely involved in the selling

of horticultural products. Mass merchandisers and grocery stores have garden center or floral departments with employees working only in these departments; therefore, respondents were able to identify the number of employees who sell strictly horticultural products.)

**Figure 2. Estimated Total FTE Employment by Business Class**



## Sales

**Sales by Business Class.** Ornamental horticulture and turfgrass industry sales vary by business class. The survey estimated total industry sales at \$1.4 billion in 1999. The last row in Table 4 shows the total sales by business class. Landscapers, businesses in landscape design, installation and/or maintenance, had the greatest sales, \$485 million (35%) of any business class in 1999. Retail garden centers (\$223 million), florists (\$207 million), growers (\$203 million), and mass merchandisers (\$182 million) had sales ranging from 16% to 13% of total reported sales. Grocery stores generated sales of \$45 million, and hardware stores generated sales of \$23 million. Turf producers total sales in 1999 were \$12 million. Although turf farm sales represented only one percent of industry sales, just nineteen turf farms made a significant contribution to the overall sales in 1999. Figure 3 shows the percentage each business class contributed to total industry sales.

**Table 4. 1999 Sales by Business Class and Product Line (Million Dollars)<sup>a</sup>**

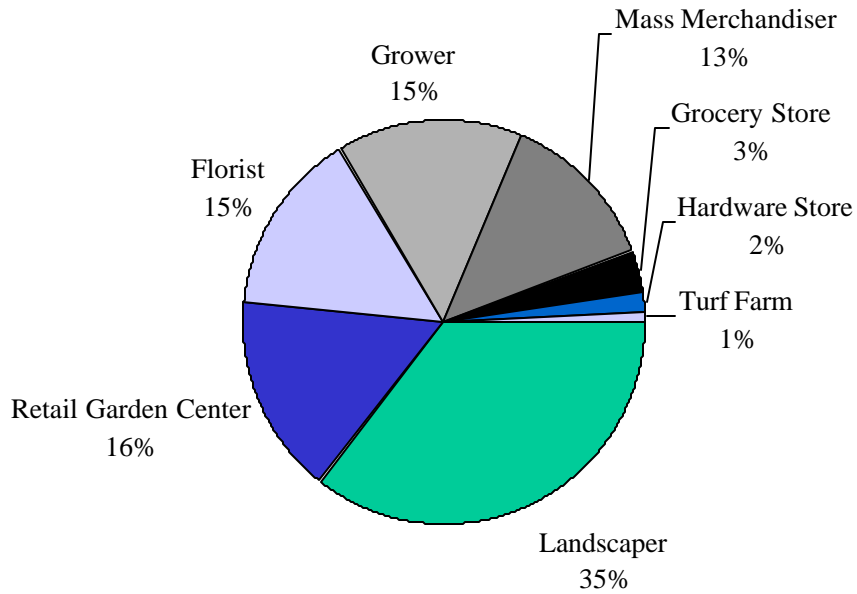
<u>Product Line</u>	<u>Business Class</u>								<u>Total</u>	
	Retail Garden Center	Wholesale Grower	Turf Prod./ Sales	Florist	Landscaper	Mass Merchandiser	Hardware Store	Grocery Store		
Trees	\$20.5	\$22.6	\$0.0		\$24.2		\$8.0	\$0.1	<b>\$75.5</b>	
Shrubs	\$11.8	\$54.4	\$0.2		\$33.7		\$24.2	\$0.0	<b>\$124.4</b>	
Perennials	\$9.7	\$64.6	\$0.0	\$0.0	\$1.8		\$14.2	\$0.1	<b>\$90.6</b>	
Greenhouse Plants	\$23.6	\$57.9	\$0.0	\$6.6	\$9.9		\$14.2	\$0.8	<b>\$127.0</b>	
Floral	\$0.1	\$0.5		\$199.7	\$0.4			\$0.1	<b>\$231.7</b>	
Turf	\$33.7		\$12.1		\$11.9			\$0.4	<b>\$58.2</b>	
Chemicals, Soil Cond. & Fertilizers	\$23.3	\$0.3			\$5.4		\$40.4	\$3.6	<b>\$73.0</b>	
Gard. Supplies:										
Tools & Eq.	\$0.9			\$0.1	\$0.5		\$80.7	\$17.1	<b>\$99.4</b>	
Seeds & Bulbs	\$1.5			\$0.0	\$0.2			\$0.1	<b>\$1.9</b>	
Landscaping	\$2.7	\$2.7			\$378.0				<b>\$383.4</b>	
Lands. Supplies:										
Brick, Gravel, & Stone, etc.	\$7.4				\$1.4			\$0.2	<b>\$9.0</b>	
Topsoil & Mulch, etc.	\$53.6	\$0.0			\$3.2			\$0.9	<b>\$57.8</b>	
Other	\$34.1	\$0.0		\$0.2	\$13.8			\$0.0	<b>\$48.2</b>	
<b>Total</b>	<b>\$222.9</b>	<b>\$203.0</b>	<b>\$12.4</b>	<b>\$206.7</b>	<b>\$484.6</b>		<b>\$181.7</b>	<b>\$23.3</b>	<b>\$45.3</b>	<b>\$1380.0</b>

<sup>a</sup> Average survey sales by income group for each business class and product line expanded to represent total businesses identified by census sources.

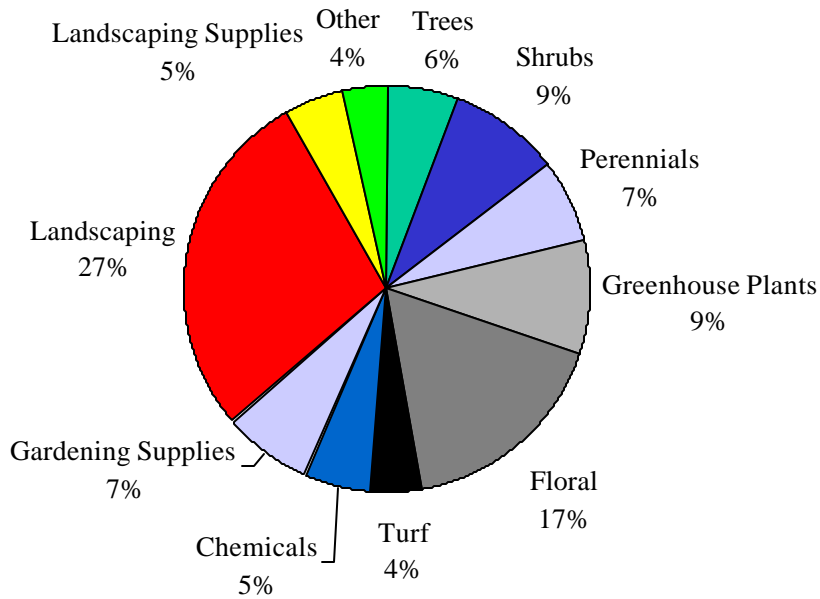
**Sales by Product Line.** Total industry sales of \$1.4 billion were also reported by product line as shown in the last column of Table 4. Sales of landscaping design, installation and maintenance services were estimated to be \$383.4 million in 1999 or almost 28% of total sales. Approximately 51% of total sales (\$707 million) were generated by the sale of plant material and turf. Floral material sales were \$231 million, greenhouse plants \$127 million, shrubs \$124 million, perennials \$90 million, trees \$75 million, and turf material \$58 million. The remaining 21% (\$241 million) of sales in 1999 were from gardening supplies (\$101.3 million), chemicals, soil conditioners, and

fertilizers (\$73 million), and landscaping supplies (\$66.8 million). Figure 4 shows the percentage each product line contributed to total industry sales.

**Figure 3. Percent Total Sales by Business Class, 1999**



**Figure 4. Percent Total Sales by Product Line, 1999**



**Sales by Business Class and Product Line.** Sales were also determined by product line within business class (Table 4). Of the \$485 million landscaper sales, the

largest concentration was in landscaping design, installation and/or maintenance services (\$378 million). The sale of trees (\$24 million), shrubs (\$33 million), turf products (\$12 million), other plants (\$12 million) and other products (\$24 million) comprised only 22% of total landscaper sales.

Grocery store and florist total sales were \$45 and \$207 million, respectively. For both business types, sales of floral material and a small amount of greenhouse plants were 99% of horticultural product sales, \$44 million and \$206 million.

Hardware store sales totaled \$23 million. Non-plant material - tools and equipment and a smaller percentage of chemicals, soil conditioners and fertilizers - made up nearly 90% (\$21 million) of these sales. Turf farms total sales were \$12 million. The sale of turf, sod and plugs totaled 98% of these sales (\$12 million).

Retail garden centers (\$223 million sales) and mass merchandisers (\$182 million sales) sold diverse product lines. Retail garden centers and mass merchandisers generally sell a large amount of trees, shrubs, perennials and greenhouse plants. Some sell turf and floral material. These businesses complement their plant material sales by also selling chemicals, soil conditioners, fertilizers, and garden tools, equipment and supplies.

Retail garden centers reported an estimated 45% of their total sales as plant and turf material, \$99 million. The largest amount of these sales was trees (\$20 million), greenhouse plants (\$23 million) and turf, sod or plugs (\$33 million). Landscape supplies such as topsoil and mulch comprised the largest single product line sales, \$53 million. Chemicals, soil conditioners and fertilizers brought as much sales as individual plant or turf product lines, \$23 million. Plant materials sold by mass merchandisers made up 33% of total estimated sales or \$60 million. Chemicals, soil conditioners and fertilizers comprised 22% (\$40 million) and garden supplies such as tools and equipment made up the largest percentage of sales, 44% (\$81 million).

For growers, the sale of plant material - trees, shrubs, perennials and greenhouse plants - was 98% (\$199 million) of the class' total sales of \$203 million. Some growers were providing landscape design, installation or maintenance services (almost \$3 million sales or 1%). The remaining less than one million in were for other product lines.

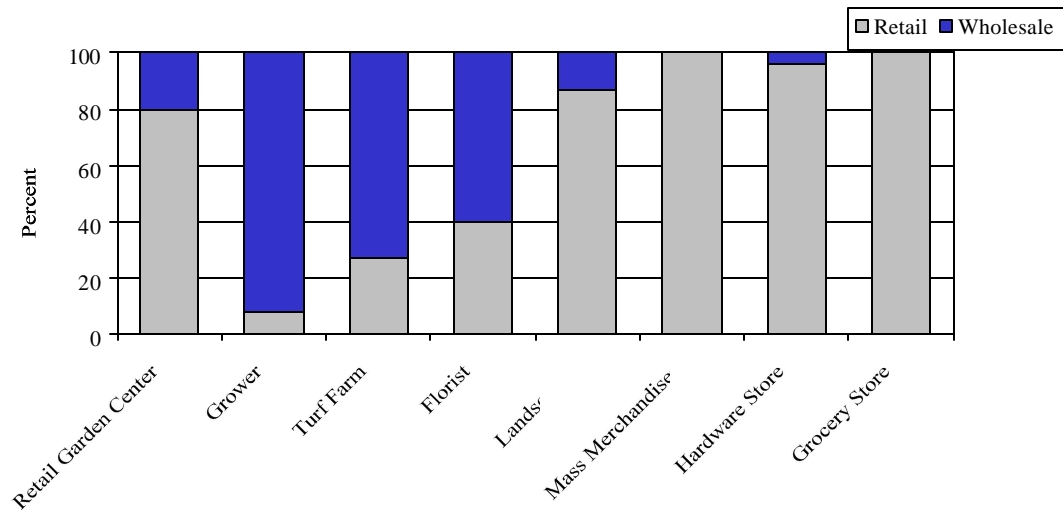
Comparing classes show the types of products sold by business class. The survey indicates that different businesses sales are concentrated in particular product lines. Retail garden centers and mass merchandisers sold similar product lines, but mass merchandisers sold a larger percentage of non-plant material, such as tools and equipment and fertilizers, soil conditioners and chemicals, and retail garden centers sold more plant material - trees and turf material - along with non-plant material like topsoil and mulch type products. Growers as a whole sold a large variety of plant material. However individual growers typically concentrated on a few plant products, such as trees and shrubs or greenhouse plants. Hardware stores and grocery stores carried a smaller number of product lines with hardware stores selling primarily non-plant material with only a few plants. Grocery store sales concentrated on plant material. Florist and turf

farm sales concentrated on a single type of plant material. Florists sold floral products and turf farms sold sod. Landscapers' primary product was a service, such as design or installation. Many landscapers were also growing and selling one or more plant products in addition to supplying design, installation or maintenance services.

**Wholesale vs. Retail Sales by Business Class.** Total sales by ornamental horticulture and turfgrass businesses were further divided between wholesale and retail customers. Just under 70% of total industry sales were retail. Mass merchandisers and grocery store sales were 100% retail (Figure 5). A small proportion of hardware stores sales (4%) were indicated to be wholesale sales. Landscaper and retail garden center sales were mostly at the retail level, 86% and 80% retail, respectively.

In contrast, the majority of grower (92%) and turf farm (74%) sales were wholesale. Florist sales were 60% at the wholesale level.

**Figure 5. Wholesale Vs. Retail Sales by Business Class, 1999**

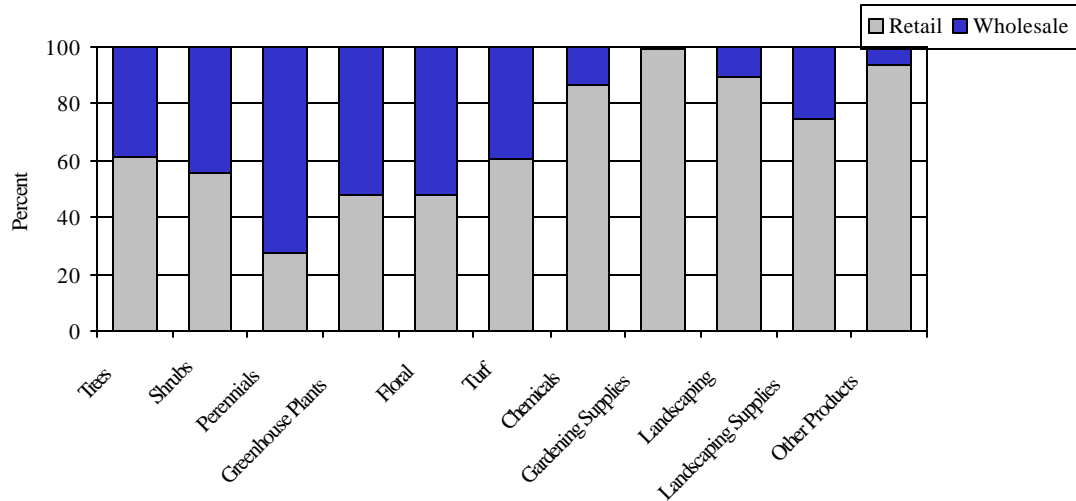


**Wholesale vs. Retail Sales by Product Line.** In general, non-plant material sales were 75% or more retail (Figure 6). These products include chemicals, soil conditioners and fertilizers (87%), gardening supplies (99%), landscaping supplies (75%), landscaping design, installation and maintenance services (89%), and other products (93%). Plant materials sales were generally 60% retail. However, a larger percent of perennials (73%), greenhouse plants (52%), and floral material (52%) sales were to wholesale customers.

**Wholesale vs. Retail Sales by Business Class and Product Line.** Survey information was also broken down into wholesale vs. retail product sales by business class. Retail garden centers sold the largest mix of product lines. Sales of non-plant material were at least 65% retail. The largest non-plant retail sales lines were gardening supplies 84%, landscaping services 100%, and other products 91% (Figure 7a). Plant material sales for retail garden centers were at least 67% retail. Trees (99%) and shrubs

(98%) retail sales were the highest.

**Figure 6. Wholesale vs. Retail Sales by Product Line, 1999**



For growers, non-plant material sales were at least 80% retail (Figure 7b). Landscaping services and other products sales were near 100% retail. In contrast, plant material sales of growers were at least 82% wholesale. Floral material, perennials and trees were sold wholesale nearly 100%.

Turf farms sold only plant material and largely at wholesale (Figure 7c). Trees and shrubs were sold about 50% wholesale and 50% retail while perennials, greenhouse plants and turf were sold between 60-80% wholesale.

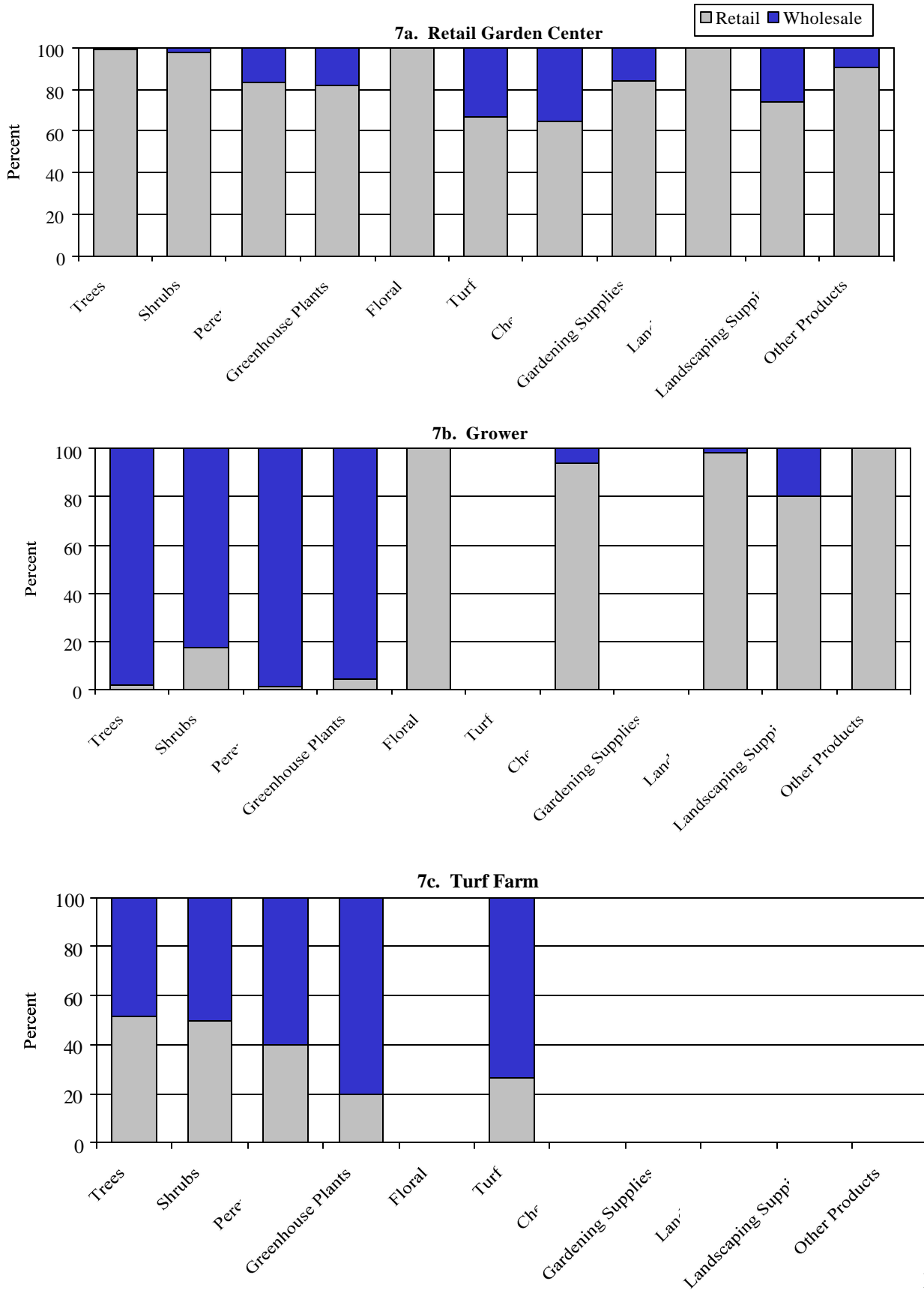
Non-plant material for florists was sold 100% retail (Figure 8a). The majority of plant material sold by florists was from 54% (greenhouse plants) to almost 61% (floral material) wholesale.

Landscapers sold an array of products and at a higher percentage retail than wholesale (Figure 8b). Non-plant material sales by landscapers were at least 73% retail. Garden supplies were sold 92% retail and other products, such as irrigation or lighting material, were sold 100% retail. Plant material sales for landscapers were between 70% and 82% retail.

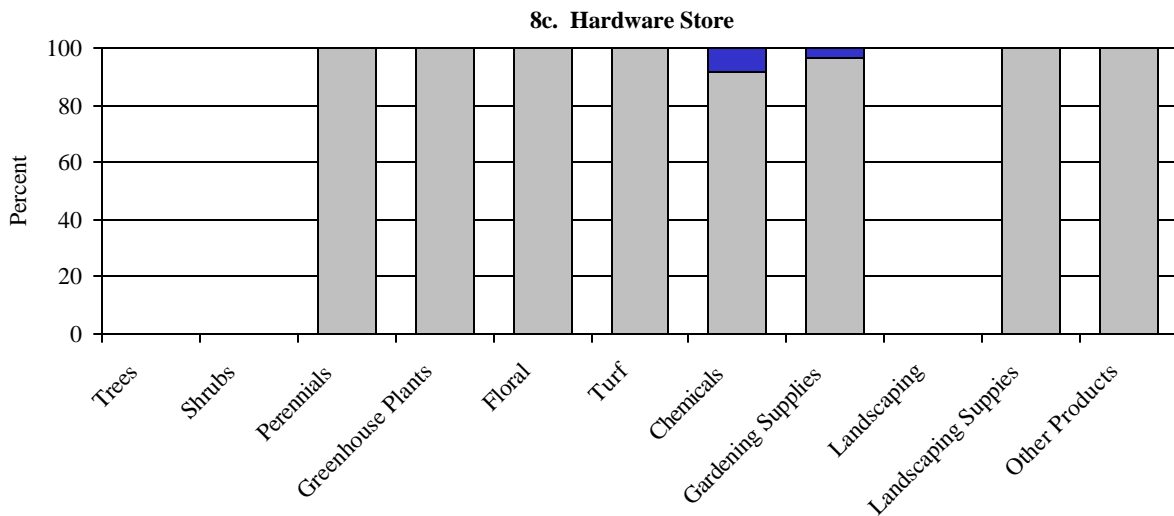
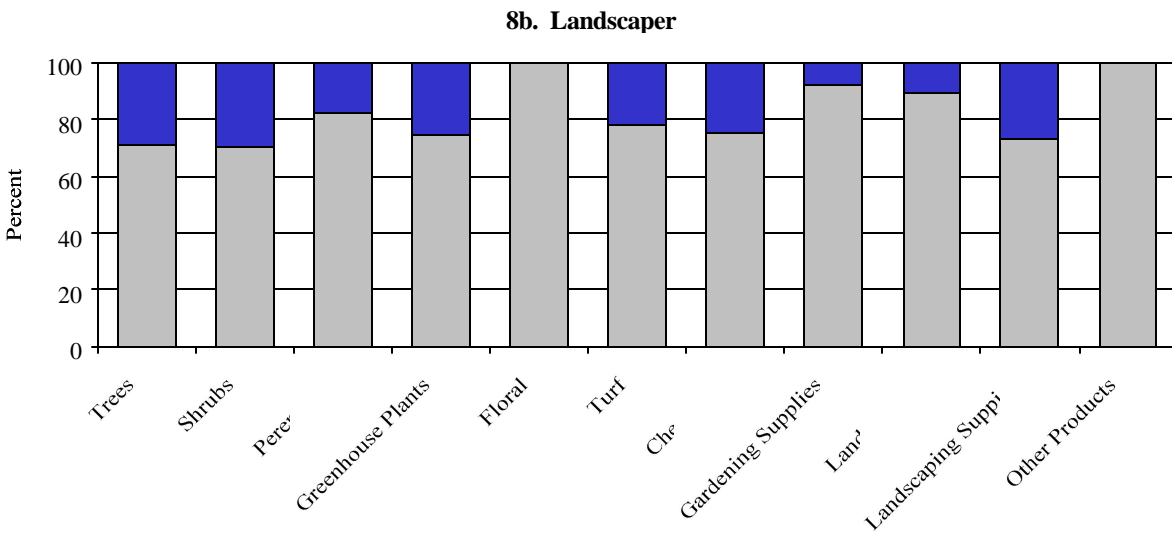
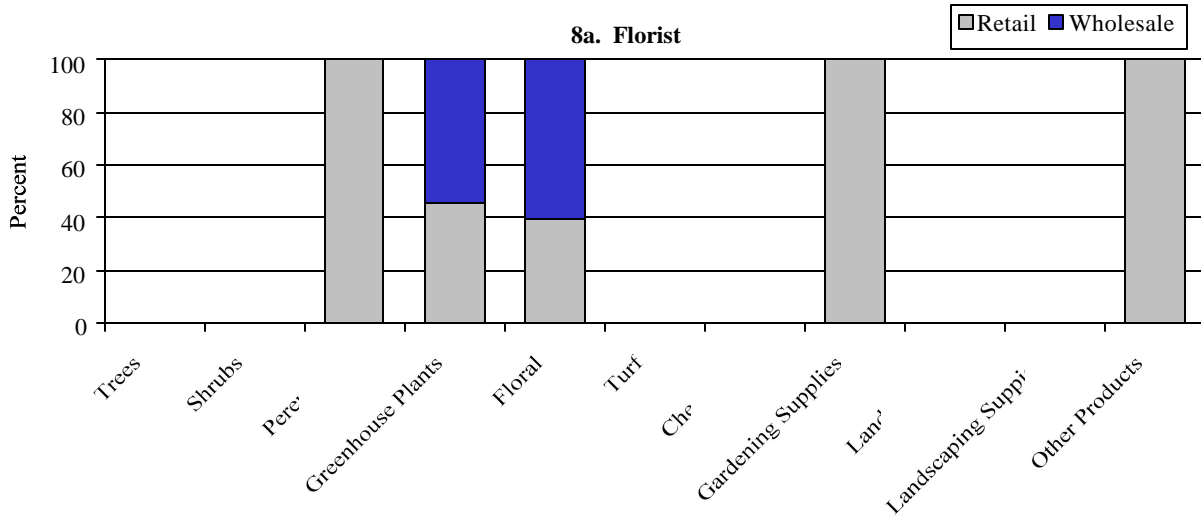
All product lines were sold almost completely at the retail level for hardware stores (Figure 8c). Chemicals, soil conditioners and fertilizers and garden supplies were sold between 92% and 97% retail. All plant products were sold 100% retail. Grocery store sales (Figure 9a) and mass merchandiser sales (Figure 9b) were 100% retail.



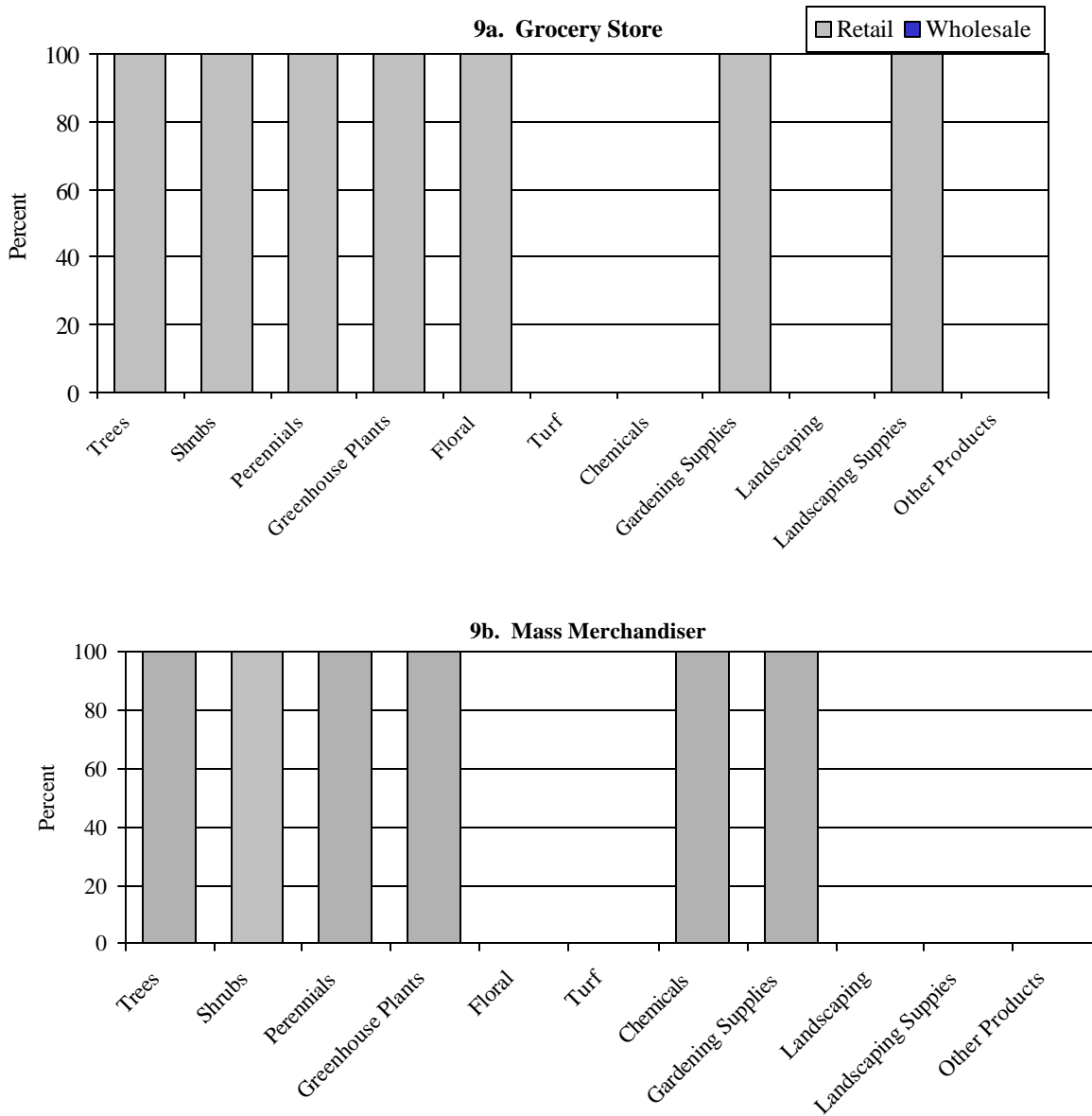
**Figure 7. Wholesale vs. Retail Sales, Retail Garden Center, Grower and Turf Farm, By Product Line, 1999**



**Figure 8. Wholesale vs. Retail Sales, Florist, Landscaper and Hardware Store, by Product Line, 1999**

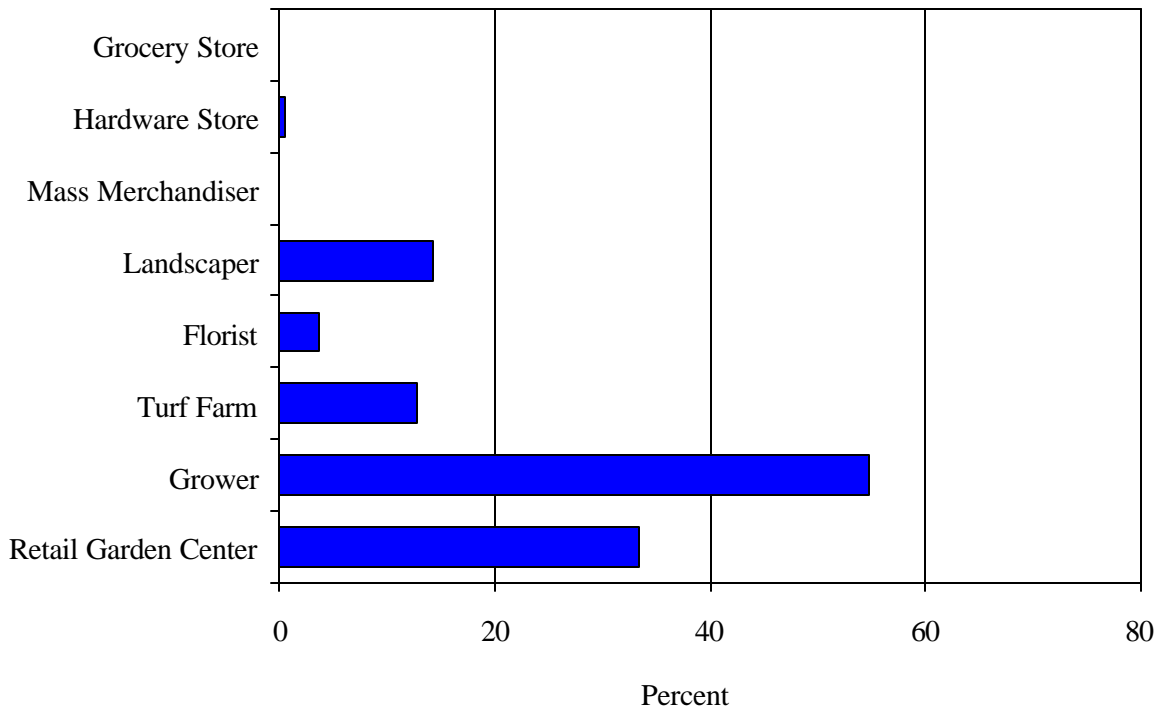


**Figure 9. Wholesale vs. Retail Sales, Grocery Store and Mass Merchandiser, by Product Line, 1999**



**In-State vs. Out-Of-State Sales.** Out-of-state sales amounted to just under 19% of the total \$1.4 billion estimated sales of ornamental horticulture and turfgrass businesses in 1999 (Figure 10). The largest percentage of sales outside of SC was by growers, 55% (\$111 million). Retail garden centers sold 33% of their total sales to out-of-state customers (\$74 million). Approximately 13% of turf farm and landscaper sales were outside of SC (\$7 and \$63 million, respectively). Less than four percent of florist and hardware store sales were out-of-state in 1999. Mass merchandisers and grocery stores reported all sales were to SC customers.

**Figure 10. Percentage Out-of-State Sales by Business Class, 1999**



**Purchases**

**Purchases by Business Class.** Total purchases of ornamental horticulture and turfgrass businesses in 1999 were estimated at \$351.2 million (Table 5). Landscaper purchases comprised the highest dollar amount, about \$144 million, making up 41% of total industry purchases. Retail garden centers purchased \$89 million in products, or 25% of total industry purchases. Grower and turf producer purchases were estimated to be \$58 million (almost 17%) and \$2 million (less than one percent) in industry related products in 1999, respectively. Florist purchases amounted to an estimated \$29 million, 8% of total industry purchases. Hardware stores purchased \$17 million and grocery stores purchased \$12 million, each five percent or less of the total industry’s ornamental horticulture and turfgrass products purchased. Mass merchandiser purchases data were unavailable. Figure 11 shows the percentage each business class contributed to total industry purchases.

**Purchases by Product Line.** Total industry purchases of \$351.2 million were also broken down by product line as shown in the last column of Table 5. The largest product line purchased by ornamental horticulture and turfgrass industry businesses was shrubs (\$40 million). Plant material - greenhouse plants (\$38 million), floral material (\$38 million), and shrubs – and landscaping (\$38 million) and other items such as irrigation materials and gift items made up 57% of total purchases. Trees, perennials, and

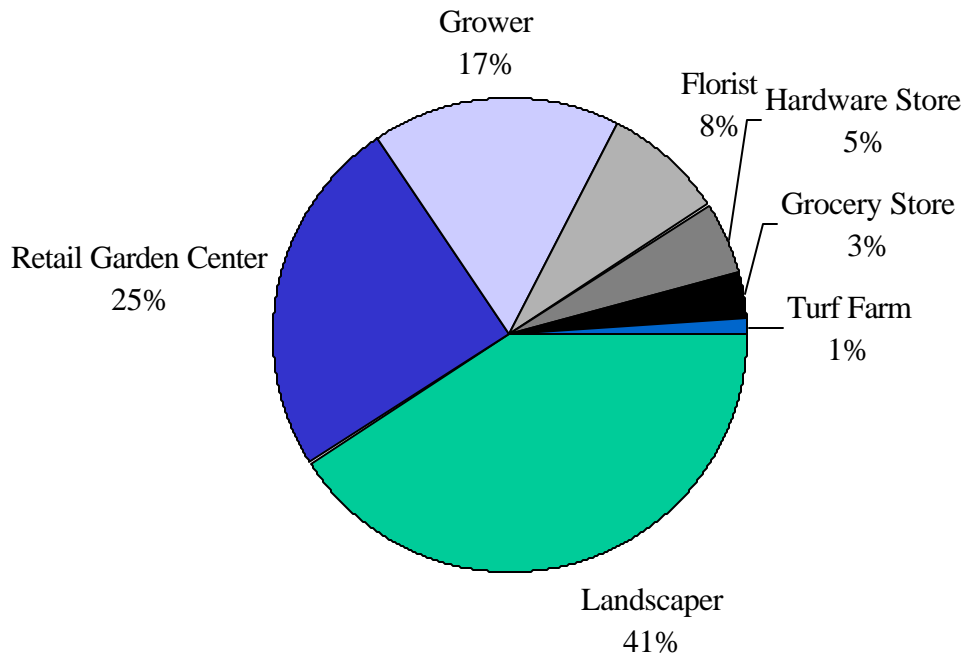
chemicals, soil conditioners and fertilizers added approximately \$27 and \$29 million each to total purchases. The remaining purchases of turf, gardening supplies and landscaping supplies made up to 20% of estimated total purchases. Figure 12 shows the percentage each product line contributed to total industry purchases.

**Table 5. 1999 Purchases by Business Class and Product Line (Million Dollars)<sup>a</sup>**

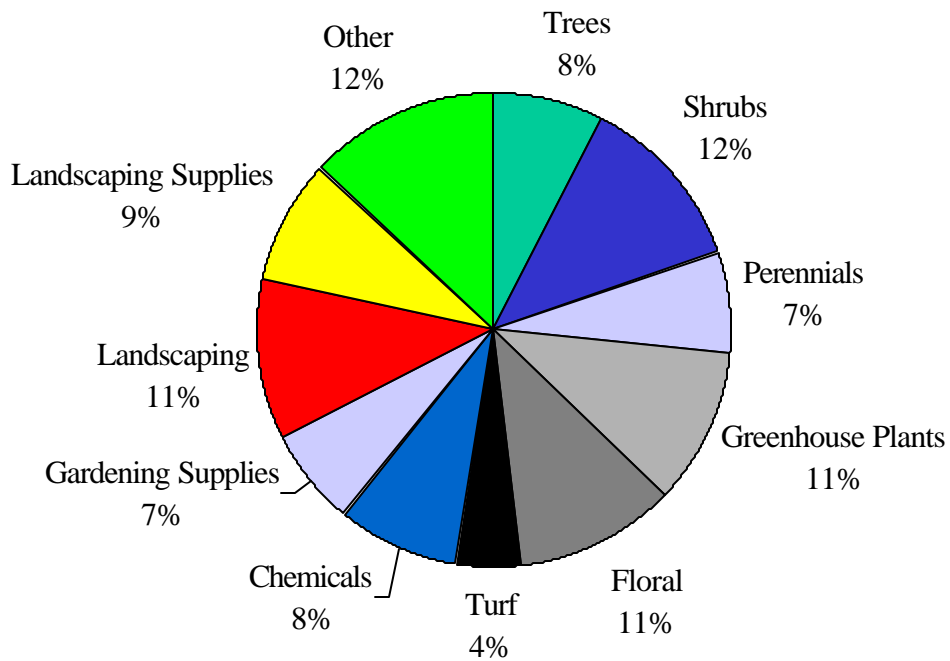
<u>Product Line</u>	<u>Business Class</u>							<u>Total</u>
	<u>Retail Garden Center</u>	<u>Wholesale Grower</u>	<u>Turf Prod./Sales</u>	<u>Florist</u>	<u>Landscaper</u>	<u>Hardware Store</u>	<u>Grocery Store</u>	
Trees	\$5.9	\$7.9	\$0.0		\$12.7		\$0.1	<b>\$26.7</b>
Shrubs	\$6.9	\$7.5	\$0.1		\$26.0		\$0.0	<b>\$40.5</b>
Perennials	\$6.9	\$17.9	\$0.0	\$0.0	\$1.5	\$0.1	\$0.1	<b>\$26.5</b>
Greenhouse Plants	\$16.1	\$15.7	\$0.0	\$2.0	\$2.2	\$0.6	\$0.9	<b>\$37.6</b>
Floral	\$0.0			\$27.1	\$0.4	\$0.1	\$10.3	<b>\$37.9</b>
Turf	\$0.6	\$0.2	\$1.0		\$13.5	\$0.2		<b>\$15.6</b>
Chemicals, Soil Cond., & Fertilizers	\$12.9	\$7.0	\$0.5		\$6.2	\$2.5		<b>\$29.2</b>
Gard. Supplies:								
Tools & Eq.	\$0.5	\$0.2	\$0.2	\$0.0	\$7.0	\$13.3		<b>\$21.2</b>
Seeds & Bulbs	\$0.5	\$0.2		\$0.0	\$1.3	\$0.1	\$0.0	<b>\$2.1</b>
Landscaping	\$0.4				\$37.9			<b>\$38.3</b>
Lands. Supplies:								
Brick, Gravel, & Stone, etc.	\$0.9	\$0.1			\$18.9	\$0.1		<b>\$19.9</b>
Topsoil & Mulch, etc.	\$3.0	\$0.2			\$6.6	\$0.5	\$0.1	<b>\$10.4</b>
Other	\$34.7	\$1.1		\$0.1	\$9.4	\$0.0		<b>\$45.3</b>
<b>Total</b>	<b>\$89.4</b>	<b>\$57.9</b>	<b>\$1.8</b>	<b>\$29.3</b>	<b>\$143.7</b>	<b>\$17.4</b>	<b>\$11.6</b>	<b>\$351.2</b>

<sup>a</sup> Average survey purchases by sales income group for each business class and product line expanded to represent the total businesses identified by census sources.

**Figure 11. Percent Total Purchases by Business Class, 1999**



**Figure 12. Percent Total Purchases by Product Line, 1999**



**Purchases by Business Class and Product Line.** Purchases were also estimated by product line by business class (Table 5). Landscaper purchases of design, installation and/or maintenance services comprised 26% or \$38 million of total landscaper purchases. The greatest amount of plant material purchased by landscapers was shrubs, \$26 million or 18%. All plant and turf material comprised an estimated 40% of this class' purchases. Non-plant material - landscape supplies (\$25 million), tools and equipment (\$7 million), chemicals, soil conditioners and fertilizers (\$6 million) and other products such as irrigation parts and lighting materials (\$9 million) - amounted to 33% of total landscaper purchases.

Retail garden centers spent \$89.4 million on horticulture products in 1999. Plant and turf material comprised 41% of their estimated total purchases or around \$36 million. The largest purchase of plant material was greenhouse plants (\$16 million). A large percentage of purchases, 40% (\$34.7 million), were for other products such as gift and garden items, and greenhouse materials and other supplies. The remaining 19% was chemical, soil conditioner and fertilizer purchases.

Wholesale growers total purchases were \$58 million. Plant and turf material made up 84% or \$49 million of this total. The majority of plant purchases were perennials and greenhouse plants. More than \$7 million each of total purchases were tree and shrub material. Twelve percent of purchases (\$7 million) were chemicals, soil conditioners and fertilizers. Less than 3% of total grower purchases were other non-plant material such as gardening and landscaping supplies, and other products.

Turf farm purchases totaled \$2 million. Turf products amounted to 84% of these purchases (\$1 million). Chemicals, soil conditioners and fertilizer purchases totaled half a million dollars (28%). Turf producers also bought other plant material, such as shrubs, trees, perennials and greenhouse plants, totaling approximately seven percent of this class' estimated purchases.

Florists' largest purchases were plant material. Floral material made up 92% or \$27 million of the total \$29 million. Many florists also bought greenhouse plants and a few perennials. Greenhouse plant purchases totaled seven percent (\$2 million). The remainder of flower purchases (less than 1%) was for tools and equipment and other products such as gift items.

Estimated ornamental horticulture and turfgrass product purchases by hardware stores were concentrated in non-plant material. Gardening supplies made up 76% or over \$13 million of the total \$17 million hardware purchases. About 14% or \$2 million included chemicals, soil conditioners and fertilizers. The remaining ten percent (almost \$2 million) was plant and turf material, and landscaping supplies such as topsoil and mulch.

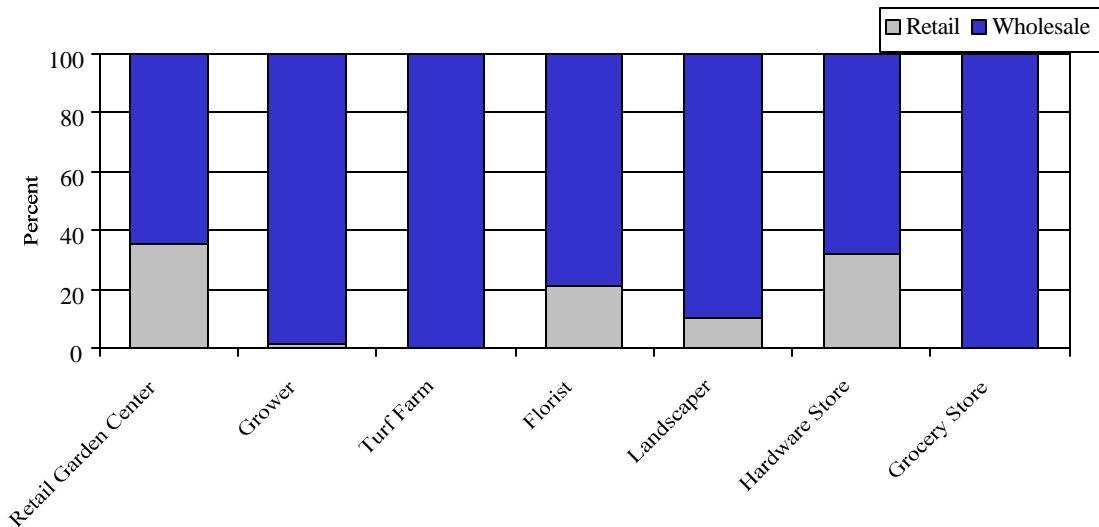
Floral material comprised 89% of grocery store purchases (\$10 million of the approximately \$12 million total). Many large grocery chains also bought greenhouse plants to sell. Almost eight percent or close to \$1 million of total grocery store purchases

were greenhouse plants. The remaining three percent or less than half a million dollars of purchases were trees, shrubs, perennials, gardening supplies such as seeds and bulbs, and landscaping supplies.

In comparing 1999 purchases between classes, the survey indicates different business classes purchase different products. Retail garden centers and wholesale growers purchased the greatest variety of products including plant material and non-plant material - chemicals, soil conditioners and fertilizers, garden and landscape supplies. Landscapers, like garden centers and growers, also purchase a wide variety of plant material and non-plant material. Hardware stores purchase primarily non-plant material and grocery stores purchase primarily plant material - floral material and some greenhouse plants. Florists purchased the smallest variety of product lines, almost totally floral material and greenhouse plants. Mass merchandiser purchases data were not available.

**Wholesale vs. Retail Purchases by Business Class.** Purchases made by ornamental horticulture and turfgrass businesses were primarily wholesale. Only 17% of the total \$351.2 million purchases were retail. Turf farms and grocery stores purchased all of their products wholesale (Figure 13). Wholesale grower purchases and landscaper purchases were 90% or more at the wholesale level. Almost 79% of florist purchases were at wholesale. Between 60% and 70% of products purchased by hardware stores and retail garden centers were wholesale.

**Figure 13. Wholesale Vs. Retail Purchases by Business Class, 1999**

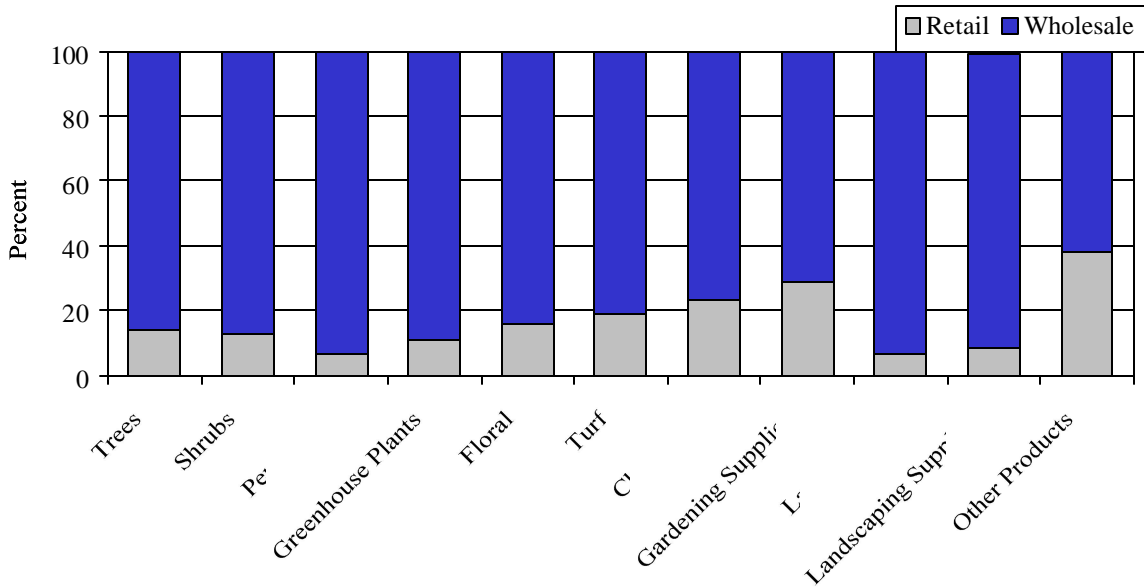


**Wholesale vs. Retail Purchases by Product Line.** Looking at the difference between wholesale and retail purchases by product line, 81% to 93% of all plant material and turf was purchased wholesale (Figure 14). Purchases of landscaping design, installation and/or maintenance services were 93% wholesale (\$36 million). Between 62% and 76% of purchases were at wholesale for the non-plant material of chemicals,



soil conditioners and fertilizers, gardening supplies, and topsoil and mulch type landscape supplies and other products. Landscape supplies purchases, such as brick, gravel and stone, were almost entirely wholesale purchases.

**Figure 14. Wholesale Vs. Retail Purchases by Product Line, 1999**



**Wholesale vs. Retail Purchases by Business Class and Product Line.**

Wholesale and retail purchases were also broken down by product line and business class. Most products were purchased at the wholesale level for all product lines across business classes. All grocery store and turf farm purchases for all products were wholesale (Figure 15a & 15b).

Grower purchases of products were almost completely wholesale (Figure 16a). Non-plant material of chemicals, soil conditioners and fertilizers were 33% retail. At least 95% of the purchase of plant and turf material and gardening supplies purchases were at the wholesale level.

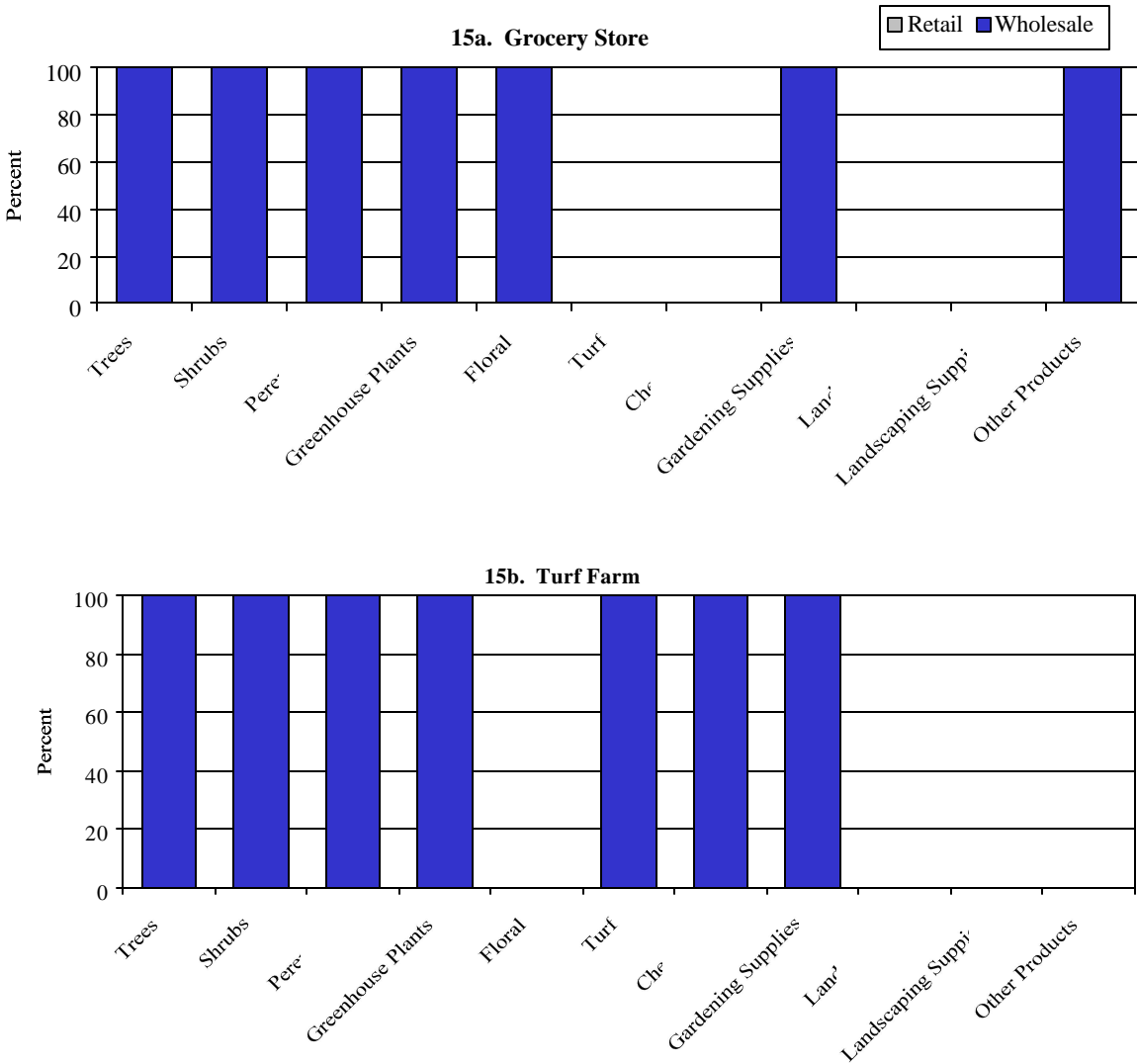
Florist purchases of gardening supplies were 100% wholesale (Figure 16b). Purchases of greenhouse plants and floral material were 86% and 72% wholesale, respectively. In contrast, the few perennials that were purchased by florists were purchased 100% retail.

Retail garden centers and hardware stores were similar in that a larger percentage of their total purchases were at retail. Garden centers bought nearly all landscaping services and 53% of turf material at retail (Figure 16c). Perennials and floral material

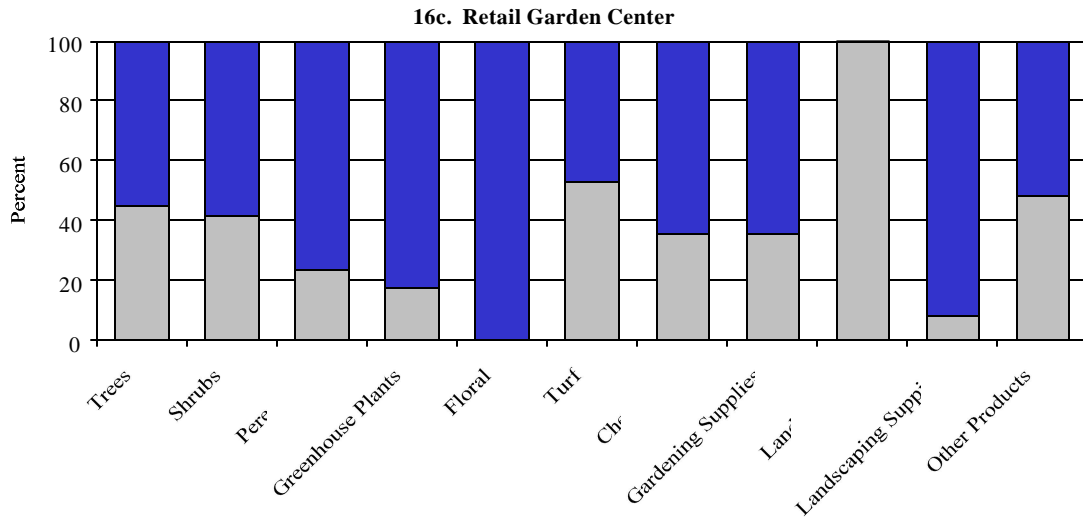
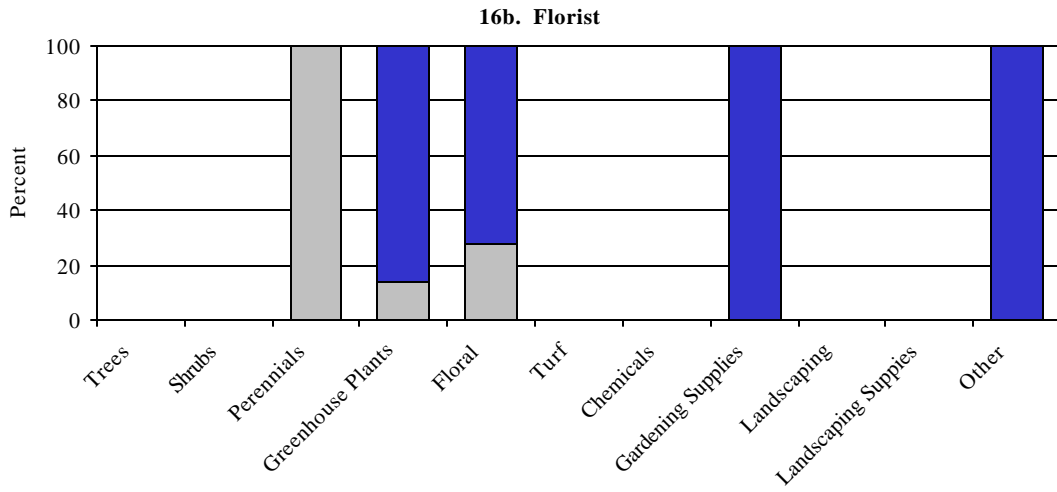
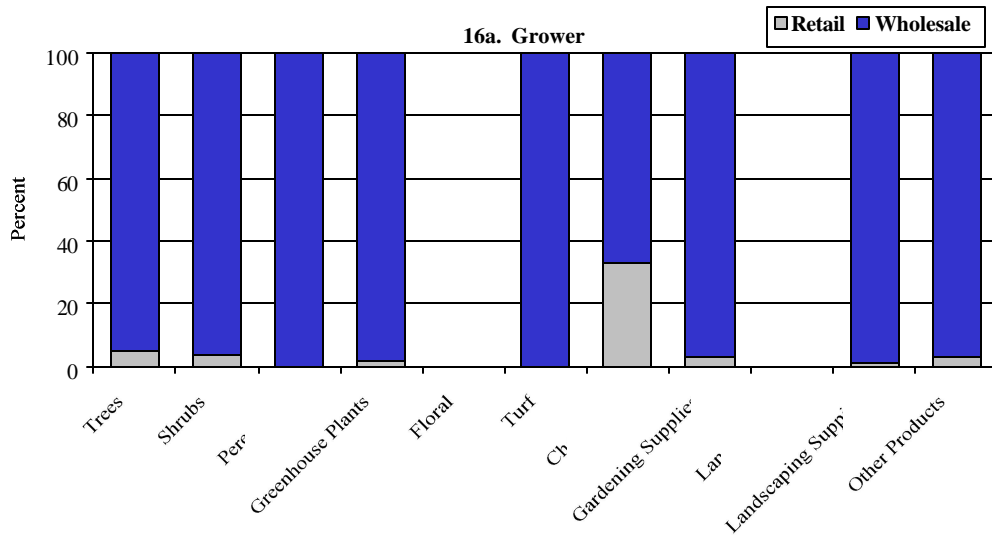
were purchased almost completely at retail by hardware stores (Figure 17a). Hardware store purchases of greenhouse plants were nearly 80% at retail.

All products that landscapers purchased were largely wholesale. Gardening supplies were the largest retail purchases category for landscapers, 31% (Figure 17b).

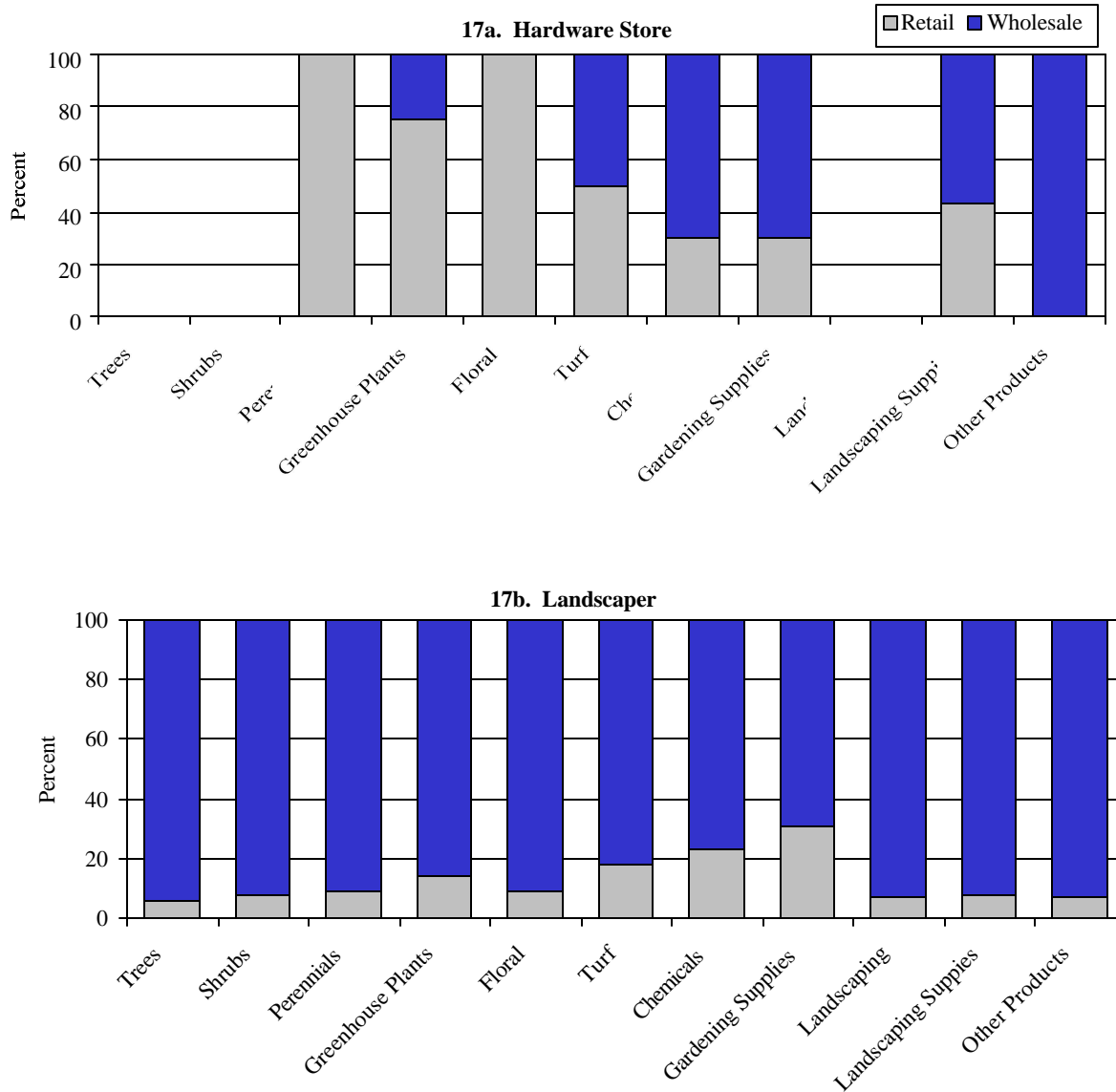
**Figure 15. Wholesale Vs. Retail Purchases, Grocery Store and Turf Farm, by Product Line, 1999**



**Figure 16. Wholesale vs. Retail Purchases, Grower, Florist and Retail Garden Center,**

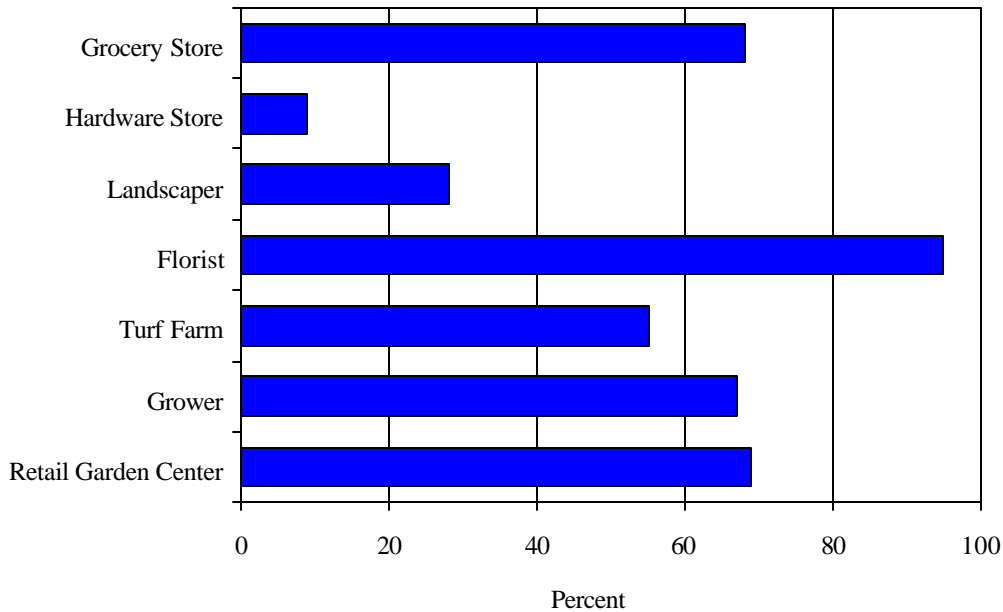


**Figure 17. Wholesale Vs. Retail Purchases, Hardware Store and Landscaper, by Product Line, 1999**



**Out-of-State Purchases.** Ornamental horticulture and turfgrass businesses purchased products both in-state and outside of SC. An estimated 51% (\$179 million) of total industry related products were purchased out-of-state in 1999. Purchases made by florists were nearly all from out-of-state suppliers, 95% (Figure 18). Retail garden centers, growers and grocery stores in SC purchased from 67% to 69% of their horticultural products out-of-state. Turf farms purchased 55% and landscapers 28% of their products from out-of-state suppliers. Hardware stores out-of-state purchases were small, 9%. Retail garden centers, growers, turf farms, florists and grocery stores all made at least 55% to 95% of their purchases out-of-state.

**Figure 18. Percentage Out-of-State Purchases by Business Class, 1999**



### **Total Income and Employment Effects**

Sales data from SC's ornamental horticulture and turfgrass industry do not measure the total economic impact on the state's economy. Some sales dollars go out-of-state to purchase inputs. Only that portion of the revenue added by SC businesses is a direct contribution to the state's economy. For example, if a retail garden center or nursery purchases a plant from a supplier in Georgia for five dollars and sells the product to a SC customer for fifteen dollars, the initial contribution of the sale of this plant to the SC economy is ten dollars not fifteen.

The employment and income effects resulting from ornamental horticulture and turfgrass product sales constitute the initial or direct round of the economic impact to the state's economy. Additional employment, income, and expenditures are generated as businesses acquire inputs from other SC businesses and employees of the industry purchase goods and services. These effects are referred to as indirect and induced. Hence a dollar of sales by one business can generate more than a dollar of impact in the state's economy as it ripples through other businesses buying additional goods and services. The impact of this one-dollar in sales is multiplied throughout the economy.

The conceptual illustration of this multiplier process for the ornamental horticulture and turfgrass industry is described as follows. Businesses accrue revenues as a result of sales of plants, goods and services (bold arrows, Figure 19). Businesses then distribute these revenues to their employees (household circle, Figure 19), to the suppliers of goods and services and to the government in the form of taxes and fees (both in-state and out-of-state businesses and government circles in Figure 19). These "direct" expenditures stimulate

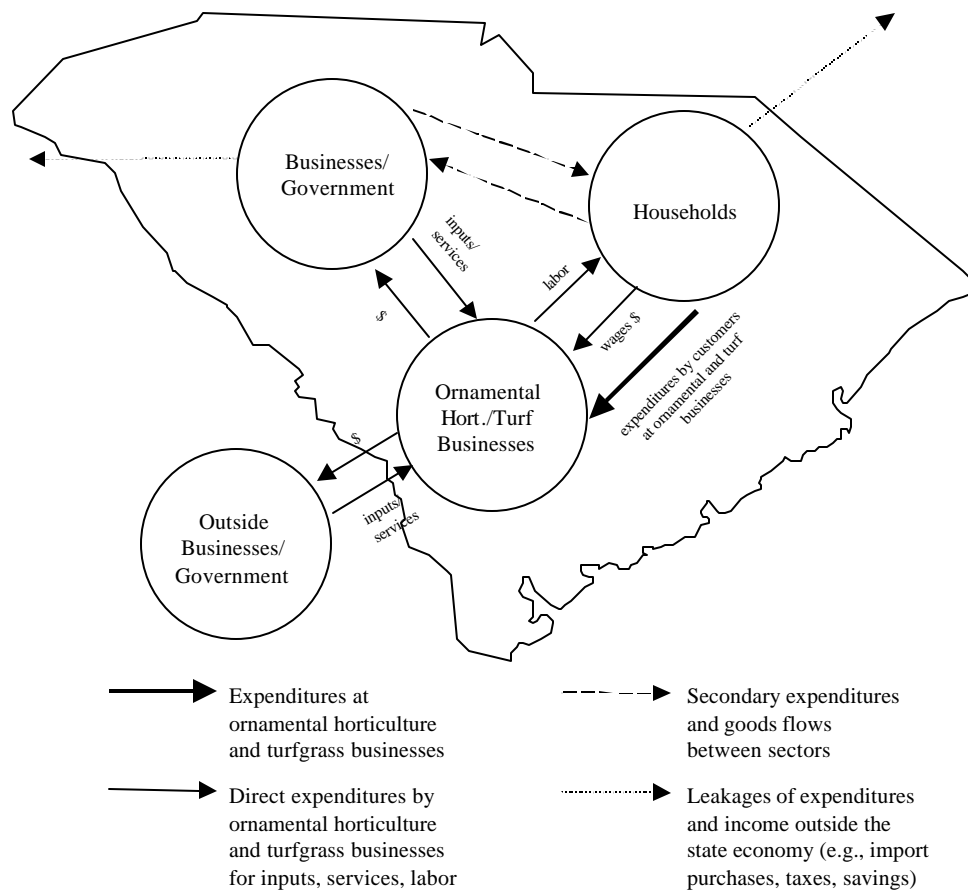
additional rounds of “indirect” or “induced” expenditures (dotted lines in Figure 19) as other businesses and local households make purchases with sales revenue or wage income acquired from the ornamental horticulture and turfgrass industry. This multiplier process continues with each additional round of income/spending and generates smaller effects because monies leak out of the state economy via import purchases, taxes and savings (dotted lines in Figure 19). In state level economies, these leakages are significant and the secondary effects may not exceed the initial expenditures, income and employment effect at the horticultural industry’s businesses.

The indirect and induced effects of the ornamental horticultural and turfgrass industry on the state economy were estimated by entering industry sales data into the IMPLAN input-output model for SC.<sup>9</sup> The IMPLAN model does not have an ornamental sector; therefore, the ornamental horticulture industry’s expenditures were desegregated and allocated to the sectors provided by IMPLAN that most closely resemble the specific ornamental horticulture and turfgrass activity. Specifically, the industry’s expenditures were allocated to the IMPLAN sectors Greenhouse and Nursery Products, Landscape and Horticultural Services, Building Materials and Gardening, General Merchandise Stores, and Miscellaneous Retail.

For each of the IMPLAN sectors, the indirect and induced impacts associated with industry sales were estimated by allocating these industry sales according to the IMPLAN sectors. Based on industry labor and non-labor expenditure patterns, the IMPLAN model estimates the indirect and induced changes in the state’s output, income and employment attributable to the initial sales in the industry.<sup>10</sup>

The IMPLAN analysis provides the initial, secondary (indirect and induced), and total changes in economic activity (income and employment) allocated to the affected economic sectors. IMPLAN estimates indicate that expenditures by ornamental horticulture and turfgrass firms for materials and services and personal consumption expenditures by firm employees resulted in 11,982 additional FTE jobs and \$444,857,795 in additional income to the state (Table 6 & 7). The economic sectors that experienced the largest gains in employment were Greenhouse and Nursery Products and Services, Trade, Manufacturing, and Services. The Finance, Insurance, and Real Estate sector (FIRE) experienced large gains in income but relatively small employment gains due to the relatively high income per job in the sector.

**Figure 19. Economic Impact of the Ornamental Horticulture and Turf grass Industry**



Of principal importance to this study are the total (initial plus indirect and induced) employment and income effects associated with ornamental horticulture and turfgrass firms in SC. Results of our analysis indicate that 48,464 FTE jobs were attributed to these firms, 36,482 at ornamental horticulture and turf firms and 11,982 in other sectors of the state economy. The total 1999 state income resulting from ornamental horticulture and turfgrass operations was \$1,159,633,179, \$714,775,386 at ornamental horticulture and turfgrass businesses and \$444,857,795 in other sectors of the economy. Thus, for every job created at one of these horticultural related businesses, 0.33 additional jobs were generated through indirect and induced effects (11,982.2/36,482.5). And for every dollar of income earned at the state's ornamental horticulture and turf grass firms, \$0.62 in additional income resulted from the secondary effects (\$444,857,795/\$714,775,386).

Employment and income multipliers for an economic activity are estimated by dividing the total effects of the sector (total = direct + indirect + induced) by the initial employment or income attributable to the activity. The estimated 1999 employment multiplier for ornamental horticulture and turfgrass businesses was 1.33 (48,464.7/36,482.5), and the estimated income multiplier was 1.62 (\$1,159,633,179/\$714,775,386). The estimated income and employment multipliers are state averages and the multipliers applicable to an individual business will vary depending on the business' propensity for purchasing goods and

services from outside the state. Also, a local multiplier for an individual business in the Greenville or Columbia area, for example, will be less than the state average due to significant expenditure leakage at the local level.<sup>11</sup>

Employment and income data provided by the IMPLAN input-output model are conservative estimates of the contribution of the ornamental horticulture and turfgrass industry to the SC economy. Missing from these estimates are the dollars spent by SC residents on out-of-state ornamental horticulture and turf grass products and services. For example, sod for a household's lawn may be supplied and installed by an out-of-state landscaping business. The survey results indicated an estimated \$485 million sales that the landscaping sector of this industry contributed to SC's income. A significant amount of additional spending would be attributable to the state's landscaping businesses if only in-state businesses and not out-of-state counterparts generated a small proportion of these sales. A second missing economic contributor to this industry is the purchases of plant materials and supplies by SC residents from mail order or Internet businesses located outside of SC. Businesses that attract sales away from SC businesses reduce spending within the state and consequently reduce the initial, indirect and induced affects of the income on the state's economy.<sup>12</sup>

**Table 6. Ornamental Horticulture and Turfgrass Industry's Income Impact, 1999<sup>a</sup>**

<u>Industry</u>	<u>Direct</u>	<u>Indirect</u>	<u>Induced</u>	<u>Total</u>
Agriculture	\$0.0	\$2,346,998	\$1,612,536	\$3,959,534
Greenhouse & Nursery Products	113,369,232	34,803,332	491,399	148,663,960
Forestry Products	6,027,835	2,604	2,346	6,032,785
Landscape & Horticultural Service	307,235,968	239,244	448,248	307,923,464
Mining	0	61,703	197,711	259,414
Construction	0	3,704,998	3,652,110	7,357,107
Manufacturing	0	11,013,771	43,958,347	54,972,119
TCPU	0	12,388,442	28,301,878	40,690,320
Trade	0	7,436,439	39,657,858	47,094,298
Building Materials & Gardening	82,812,721	86,325	3,069,899	85,968,946
General Merchandise Stores	54,955,914	159,383	5,746,106	60,861,403
Food Stores	17,914,830	236,934	8,939,476	27,091,240
Miscellaneous Retail	132,458,886	262,732	9,657,698	142,379,314
FIRE	0	17,227,830	73,578,546	90,806,376
Services	0	26,506,249	87,309,412	113,815,657
Government	0	692,469	19,216,369	19,908,838
Other	0	0	1,848,406	1,848,406
Foreign Trade	0	0	0	0
Domestic Trade	0	0	0	0
<b>Total</b>	<b>\$714,775,386</b>	<b>\$117,169,451</b>	<b>\$327,688,344</b>	<b>\$1,159,633,179</b>

<sup>a</sup> 1997 Dollars – if results are deflated and aggregated, then deflators displayed are set to 1.0 (results have been deflated). Total income includes proprietor's income, employee compensation impact, and other property type income.



**Table 7. Ornamental Horticulture and Turfgrass Industry's Employment Impact, 1999**

<u>Industry</u>	<u>Direct</u>	<u>Indirect</u>	<u>Induced</u>	<u>Total</u>
Agriculture	0.0	103.6	71.2	174.8
Greenhouse & Nursery Products	2,936.9	901.6	12.7	3,851.3
Forestry Products	29.1	0.0	0.0	29.1
Landscape & Horticultural Service	19,287.9	15.0	28.1	19,331.1
Mining	0	0.8	2.4	3.2
Construction	0	115.1	113.4	228.5
Manufacturing	0	205.2	819.2	1,024.4
TCPU	0	188.4	430.4	618.8
Trade	0	266.1	1,419.1	1,685.2
Building Materials & Gardening	2,823.6	2.9	104.7	2,931.2
General Merchandise Stores	3,177.3	9.2	332.2	3,518.8
Food Stores	1,012.3	13.4	505.2	1,530.9
Miscellaneous Retail	7,215.3	14.3	526.1	7,755.7
FIRE	0	188.5	805.1	993.6
Services	0	982.1	3,235.1	4,217.2
Government	0	17.2	478.5	495.7
Other	0	0	75.2	75.2
Foreign Trade	0	0	0	0
Domestic Trade	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>36,482.5</b>	<b>3,023.6</b>	<b>8,958.6</b>	<b>48,464.7</b>

### Summary and Conclusions

The purpose of this study was to estimate the contribution of the ornamental horticulture and turfgrass industry to the SC economy. The study found an estimated 24,710 total FTE jobs attributable to the industry. The industry generated sales income of \$1.4 billion in 1999. Sales by business class were as follows: landscaper, \$484.6 million; retail garden center, \$223 million; florist, \$207 million; wholesale grower, \$203 million; mass merchandiser, \$182 million; grocery store, \$45 million; hardware store, \$23 million; and turf farm, \$12 million.

The largest product line sales by the industry were landscaping design, installation and/or maintenance services (\$383 million). The remaining product line sales for 1999 were estimated as follows: floral material, \$231 million; greenhouse plants, \$127 million; shrubs, \$124 million; gardening supplies, \$101 million; perennials, \$90 million; trees, \$75 million; chemicals, soil conditioners and fertilizers, \$73 million; landscaping supplies, \$67 million; turf material, \$58 million; and other products, \$48 million.

SC's ornamental horticulture and turfgrass businesses relied on different marketing outlets to generate sales. Most business classes relied upon retail and wholesale markets both within SC and outside of the state. Just under 70% of total industry sales were to retail customers. Overall, only 19% of industry sales were to out-of-state customers.

Purchases made by ornamental horticulture and turfgrass businesses totaled an estimated \$351.2 million in 1999. As with sales, industry businesses made wholesale and

retail purchases in SC and outside of the state. Approximately 83% of total industry purchases were at the wholesale level. Ornamental horticulture and turfgrass businesses purchased 51% of industry related products and services outside of SC.

The estimated employment, sales and purchases figures represent only the direct income, expenses and employment in 1999. The total effects including the initial, indirect and induced impact were estimated from the IMPLAN input-output model. The total impact in 1999 is estimated to be 48,464 FTE jobs and about \$1.2 billion in income. This suggests an employment multiplier of 1.33 and income multiplier of 1.62 meaning that for every one job and one dollar in income generated by the ornamental horticulture and turfgrass industry, another 0.33 jobs and \$0.62 in income is brought to the SC economy.

In the 1994 study, estimated total sales, purchases, and employment in the ornamental horticulture and turfgrass industry from the survey were \$726 million, \$77 million, and 18,478 FTEs, respectively. The IMPLAN model estimated the total impact on the SC economy from the industry to be 28,727 jobs and \$537 million in income. Thus for every dollar of income generated an additional \$1.10 of income was input into SC. And, for every job created in the industry an additional 0.59 jobs was created in 1994.

The ornamental horticulture and turfgrass industry has experienced a lot of growth as documented by census data. From 1994 to 1999, our studies indicate a growth in estimated sales from \$726 million to \$1.4 billion and employment from 18,478 to 24,710. IMPLAN analysis computed the total employment impact in SC increased from 28,727 in 1994 to 48,464 in 1999 and the total income impact increased from \$537 million to \$1.1 billion from 1994 to 1999. However, as direct sales and employment increased, the total impact (including indirect and induced) decreased from an additional \$1.10 in income to \$0.62 and an additional 0.59 jobs to 0.33. This decrease in overall economic impact can be explained by looking at purchases data. The maximum impact would occur if all products were completely grown/formulated/produced entirely in SC. This survey suggests that 51% of purchases by SC firms were from out-of-state companies. In 1994, SC producer purchases from out-of-state firms was 49% of total purchases. So as the ornamental horticulture and turfgrass industry sales increased, products purchased for those sales were more from out-of-state than in-state.

## Endnotes

1. US Department of Agriculture, National Agricultural Statistics Service, 1997 Census of Agriculture, Census of Horticulture Specialties (1998), Volume 3, Special Studies Part 2.
2. US Bureau of the Census, Economic Census, Census of Retail Trade, 1992 and 1997.
3. US Department of Agriculture, National Agricultural Statistics Service, SC Agricultural Statistical Service, SC Agricultural Statistics AE 490, October 2000.
4. 1986 South Carolina Ornamentals and Turf Survey, July 1988, Janice Tuten, J. S. Lytle and P. J. Rathwell, Agricultural Economics and Rural Sociology Report AE 452, SC Agricultural Experiment Station.
5. 1990 South Carolina Ornamental Horticulture Survey, South Carolina Department of Agriculture, D. Leslie Tindal, Commissioner.
6. Contributions of the Ornamental Horticulture and Turfgrass Industries to the State Economy: South Carolina 1994, 1995, P. James Rathwell, Mark S. Henry, David L. Barkley and Michalann G. Evatt, Agricultural and Applied Economics EER 160, Clemson University Public Service Activities.
7. Questionnaire design and implementation carried out according to Dillman's total design method. Mail and Internet Surveys, The Tailored Design Method by Don A. Dillman, John Wiley & Sons, Inc., 2000.
8. State level estimates of sales, purchases and employment are based on extrapolations from the survey responses. The responses provided by the firms were expanded and extrapolated to fit the number of firms by business class (NAICS sector) indicated by the US Bureau of the Census, 1998 County Business Patterns, South Carolina, USDA Agricultural Census, 1997 & 1998, and the US Bureau of the Census, Economic Census, Census of Retail Trade, 1997. Mean sales, purchases and employment values were calculated for each sales income range and multiplied by the number of total firms in the corresponding business class to provide statewide totals for sales, purchases and employment. Annual sales income ranges were defined similar to census sources as follows: less than \$10,000, \$10,000-\$19,999, \$20,000-\$24,999, \$25,000-\$39,999, \$40,000-\$49,999, \$50,000-\$99,999, \$100,000-\$249,999, \$250,000-\$499,999, \$500,000-\$999,999, and \$1 million or more.

9. IMPLAN (Impact Analysis for PLANing) is a computer program that performs regional input-output analysis. The model can be defined for any region in the US 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. Industry sales are “marginal” for the trade sectors in the IMPLAN model.
10. Multiplier effects include indirect and induced effects from added spending by employees of ornamental horticulture and turfgrass 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 turfgrass 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 turfgrass businesses. For example, wages, profits and other property income are 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.

11. 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 turfgrass 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, 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, 1.33 is the ratio of total employment (48,464) in the 24 sectors – direct, indirect and induced – needed to support the (26,482) direct employees in the ornamental horticulture and turf industry’s activities.

Or, for each 100 direct industry activity employees, another 0.33 employees are needed to provide inputs to firms and to provide goods and services to consumers.

12. The income and employment estimates provided for SC ornamental horticulture and turfgrass firms are based on the assumption that SC 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 turfgrass 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 turfgrass industry to the state's economy.

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