

SECTION 11 MARKETING

Mel Garber
Section Editor and Moderator

Estimating the Value of the Ornamental Plants and Turfgrass Industries In Louisiana

Roger Hinson and David Hughes
Louisiana

Nature of Work: Sales of plants, and related services and products, in the US were \$68 billion in 1995 (1), with an annual growth rate estimated at 4.7% through the year 2000 (8). Individual states are interested in documenting the economic contribution of their green industries, and this report documents a method of assessing the size and importance of the woody ornamental, greenhouse, and turfgrass industries in Louisiana, and the industry's contribution to the Louisiana economy, in 1995.

Method and Measurement: The Impact analysis for Planning (IMPLAN) model is an Input-Output (I-O) model used to examine economic impacts, such as the green industry in Arizona (5), and the national economy (6). We updated a 1992-based version to 1995, to analyze Louisiana's economy for a total impact of *direct effects* (industry's direct sales); *indirect effects* (initial and further impacts of purchases from suppliers); and *induced effects* (wages to households that set off further economic activity).

The IMPLAN data set was modified through industry surveys and knowledgeable professionals to measure important economic interactions in Louisiana. We established producers' wholesale sales of environmental horticulture plants, foliage/cut flower/bedding plant producers, and sod, and sales by industry middlemen, service vendors, and retailers.

A. Wholesale Sales of Plant Material. We used a knowledgeable professional based data set (8). A confirmation procedure, using a 1994 trade flow survey of Louisiana woody ornamental growers (3) adjusted for a small annual price increase, affirmed the quality of these estimates.

We needed sales estimates for the greenhouse and the turfgrass segments of the industry, but had no source of information to corroborate the knowledgeable professional data set referenced above. Given the apparent accuracy in the woody ornamentals segment, value estimates from this same data set were used. The sales values on which economic impact estimates are based were woody ornamentals (\$63,027,000), greenhouse (\$34,513,315), and sod (\$8,937,600).

B. Commercial services sales. Some industry components use nursery products as inputs for further business activity, such as interiorscape and exteriorscape vendors who provide design, installation and maintenance services. Many sporting activities, particularly golf, also fall into this general category. A survey that estimated the percent of expenditures going to wages in the industry, and detailed wage data for the entire industry (9), were used to estimate the total direct value of service vendor output. This estimate (\$146,347,000) was \$23.0 million greater than that given in the 1992 IMPLAN model, and was used because it embodies a conservative expectation of industry growth between 1992 and 1995.

C. Sector Expenditures. We also surveyed landscape contractor licensees and maintenance company expenditures on inputs purchased to produce sales of goods and services, further validated by available literature. Expenditures on supplies and labor by growers were available from published cost of production estimates (10), and in an evaluation of value of the turfgrass industry in Tennessee (4), among others.

Results and Discussion. Results are discussed as the multiplier effect of a unit change in industry output on economic activity, and as an aggregate estimate of green industry impact on the Louisiana economy.

Multiplier Analysis. Of more than 500 industries included in the IMPLAN model, we used about 400. Only 14 output multipliers are presented in Table 1, some of which are weighted summations of several related industries. Multipliers reflect the total change in economic activity across all industries for a given change in activity for a particular industry. In these results, a \$1 increase in output (total sales) by Greenhouse and Nursery Producers resulted in a \$1.4291 increase in total economic activity when household spending effects (induced effects) were excluded (the Type I Multiplier), and in a \$1.993 increase when the effect of spending by households was included (the Type II Multiplier). Other rows in Table 1 would have similar interpretations for the specified industry.

Impact Analysis. Impact analysis can be used to assess the effects of the green industry on total economic activity, or when all direct, indirect and induced effects are accounted for. Total Industry Output (TIO) at the Greenhouse and Nursery Producers level was estimated to be \$104,628,000, and TIO for Landscape and Horticultural Products producers was estimated at \$146,437,000. Employment in the Greenhouse and Nursery industry was estimated at 1338 jobs, while employment in the Landscape and Horticultural Products industry was estimated at 4,630 jobs.

Activity in the primary production sectors led to additional activity through indirect and induced effects in the rest of the Louisiana economy. Individual sectors are indicated in Table 1, beginning with Mining and continuing through Farming Machinery and Equipment. Those sectors with larger than average indirect and induced impacts (or TIO's) included Petroleum Products (\$14,570,000), Agricultural Chemicals (\$6,594,000), and Construction (\$7,380,000).

The final set of rows in Table 1 are related industries with smaller impacts that have been combined or aggregated for convenience in presentation, making them appear larger in impact than the individual sectors. Impacts were concentrated in the Services Sector (\$61,692,000 in TIO, 1436 jobs) and Trade (\$41,800,000 in TIO, 1092 jobs). In industries other than those reported individually or in aggregate here (in other parts of the Louisiana economy), \$352,606,000 in TIO, \$210,498,000 in personal income and 3,479 jobs resulted from output of the green industry and its directly related service sectors. These values appear indirectly as a component of the total impact row.

Total impacts on the Louisiana economy were \$603,670,000 in TIO, \$315,518,000 in Personal Income, and 9447 jobs. Of the total impacts, 58.4% in TIO, 65.1% in personal income and 36.8% of jobs were in indirectly affected sectors. Indirect impacts were concentrated in Agricultural Chemicals and Petroleum Products, primarily because of their direct linkages with the primary industries. Large impacts in the Trade; Finance, Insurance, and Real Estate; and Services sectors were primarily due to the impact of household spending directly and indirectly generated by the green industry production.

Significance to Industry. This model represents a selected subset of Louisiana's green industry, specifically (1) the production of woody ornamentals, greenhouse products, and sod, and (2) the provision of services such as landscaping and maintenance activities. The analysis suggests an industry with strong linkages into the general economy, one that provides substantial values in terms of total output, income, and employment. This documentation of industry value are valuable when the industry requests support for research efforts to improve efficiency, and to evaluate the benefits and costs of regulatory actions.

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Table 1. Multiplier and Impact Analysis of the Green Industry Production Sector on the Louisiana Economy as estimated with the Louisiana IMPLAN Input-Output Model.

Industry Name	Output Multipliers		Industry Output	Total Personal Income	Total Value Added	Employment Added
	Type I	Type II				
millions of dollars						
Primary industries						
Greenhouse and Nursery Products	1.4291	1.9930	104.628	40.291	50.327	1338.4
Landscaping and Horticultural Products	1.4907	2.8920	146.437	69.965	69.892	4630.2
Secondary individual industries						
Agricultural Chemicals	1.5458	3.0142	6.594	1.226	0.985	19.6
Petroleum Products	1.2628	1.5758	14.570	0.934	3.069	12.6
Farming Machinery and Equipment	1.3305	2.5141	3.247	0.755	1.185	27.3
Secondary aggregated industries						
Agriculture, Forestry, Fisheries	1.2211	1.7007	2.444	0.732	1.577	47.7
Mining	1.3741	2.1193	2.954	0.444	1.822	9.2
Construction	1.3600	2.8788	7.380	2.894	3.843	99.3
Other Manufacturing	1.3241	2.6155	15.052	3.362	5.539	93.0
Transportation, Communications, Utilities	1.3080	2.6159	30.335	7.443	14.225	205.7
Trade	1.2835	3.0860	41.800	19.912	30.542	1092.5
Finance, Insurance and Real Estate	1.2561	2.127	38.991	5.919	23.908	289.8
Services	1.2070	3.0468	61.692	34.401	41.720	1436.4
Government	1.1411	4.6182	4.038	3.740	3.817	145.5
Total	Na	Na	603.670	315.518	375.940	9447.1

Notes: Na means not applicable. Type II Multipliers (calculated outside of IMPLAN) are earnings based and include the household industry row. Totals include returns to households as an industry (\$123.509 million in output, income and value added).

Marketing to Landscape Maintenance Firms

Mel Garber
Georgia

Nature of Work: A survey of landscape maintenance firms in Georgia was conducted to gather information that could be used by growers to develop marketing plans for this important segment of the landscape industry. Seventy-two completed questionnaires sent to landscape maintenance firms in Georgia were received for a response rate of about 38%. Approximately two-thirds of the landscape maintenance firms were located in the metro Atlanta area and about 98% of their projects were in Georgia. Firms surveyed were involved primarily (approximately 95% of their projects) in outdoor maintenance activities, however, 50% of the large firms were involved in some level of indoor plant maintenance. Three size classes of firms were established based on their 1993 wholesale value of plant material purchased, small (<\$25K), medium (\$25K - \$100K), and large (>\$100K). The large firms accounted for 26% of the respondents, 72% of the gross revenue, and 79% of the plant materials purchased.

Results and Discussion: The wholesale value of plant material purchased by the responding landscape maintenance firms totaled \$6M and equipment purchased totaled approximately \$2.5M. Based on this data, the value of plant material purchased by the entire landscape maintenance industry is estimated at about \$16M, which is about 45% of the value of plant material purchased by landscape installers (1). The lower plant purchases for maintenance firms coincides with their emphasis on maintenance and not plant installation. Large firms accounted for 79% of the plant material purchases. The mean plant material purchase for large firms was about 37 times that for small and 6 times that for medium firms. Mean gross revenue for large firms was about thirteen times that of small firms. The mean plant material purchase as a percentage of mean revenue increased with firm size; small (4.0%), medium (8.2%), and large (10.9%) averaging about 9% for all firms combined. This result suggests that small firms focus primarily on maintenance activities while large firms have a second element of diversity not practiced by small firms, plant installation.

The source of plant material purchased by landscape maintenance firms is important to the development of grower marketing plans. All size firms purchased plants from growers, rewholesalers, garden centers or brokers. For all size firms, slightly more than half (52.5%) of the plant material was purchased direct from growers. The next source of plant material was rewholesalers, 35% of plant material. All size firms purchased the greatest percentage of plant material direct from growers. Large firms purchased a higher percentage of plant material (55.4%) direct from growers than did small (37.5%) or medium (44%) firms. The purchase of plant material from rewholesalers did not vary greatly among the 3 firm sizes; small (36.6%), medium (40.0%), and large (33.8%). Small firms purchased a much higher percentage (14.5%) of their plant material from garden centers than did medium (5.5%) or large (2.8%) firms. The 3 firm sizes purchased about the same percentage of plant material from brokers, small (11.4%),

medium (10.0%) and large (8.0%). Purchasing habits of landscape maintenance firms is similar to landscape installation firms (2). However, landscape maintenance firms buy a smaller percentage of plant material direct from growers (about 10 percentage points) and a higher percentage from rewholesalers (about 5 percentage points) and brokers (about 5 percentage points). The data from landscape installation and landscape maintenance firms suggests that the smaller volume plant purchases are more likely to be made from rewholesalers or brokers. Only the small firms purchased a sizeable portion of their plants (14.5%) from garden centers. This result could be an indication that some garden centers are re-wholesaling or, provide convenience and specialty items where price is not as important. The mean plant purchases for landscape maintenance firms is less than for landscape installation firms and the maintenance firms purchase a higher percentage of their product from rewholesalers. As with landscape installers, the firms with smaller mean purchases rely more on the local rewholesalers or, in the case of small maintenance firms, the local garden center. The implication for nurserymen marketing to the landscape trade is that rewholesalers should be one of the outlets for plants if the grower is to reach the smaller landscape maintenance or installation firms.

Significance to Industry: Results of this survey provide information regarding the business characteristics of the landscape maintenance industry and trends impacting the future economic growth of this industry. Nursery producers, industry trade associations, and other segments of the nursery/landscape industry could use the information to develop marketing and support plans for the landscape maintenance industry. Opportunities for industry trade associations to assist landscape maintenance firms include monitoring state and national legislation to minimize regulatory and employer mandated costs, and increased training for new members of the industry. Growers that sell to the landscape industry should note that landscape maintenance firms purchase a higher percentage of plant material from rewholesalers than do landscape installation firms, making rewholesalers an important outlet for nursery crops. This paper provides a short summary of a portion of the full study (3,4).

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Count Customers and Defections in Marketing Analysis

Forrest E. Stegelin
Georgia

Nature of Work: Customers provide a wealth of information which can influence the success of a nursery business. Loyal customers have a positive impact on the cash flow as well as the profits of a nursery, whether it is a wholesaler, re-wholesaler, or a retailer. Over the life span of doing business with a loyal customer, a company reaps enormous profits. Research has shown that by reducing customer defections by only five (5) percentage points, a marketer can double the profits in some industries [1]. The nursery and garden center sector is among the businesses where this has become evident.

Customer defections are really a loss in value in the nursery business, and nurserymen are in the business of creating value. Unearthing the reasons for defections can be a powerful marketing tool in setting priorities, and giving customers the reason to maintain loyalty should be a key to the corporate strategic plan. Using a customer survey designed to determine the primary causes for customer defections and/or why nonusers do not buy from the nursery in question, 342 surveys were completed representing 15 rural Georgia nurseries/garden centers. In cooperation with the management of these retail businesses, (1) respective customers were divided into key groups - loyal customers, occasional customers, and known prior customers (defectors); (2) conditions were analyzed which could either bring customers back or cause them to defect; and (3) purchases of key customers and their levels and types of expenditures were tracked so that strategic market planning could be implemented [2]. Consumer-characteristic segmentation of sociological and psychological nature is common among marketers; market segmentation of customers can therefore be done demographically or psychographically [3].

Results and Discussion: Why defectors and nonusers do not buy from the studied rural nurseries/garden centers? Multiple responses were encouraged, if appropriate, so percentage totals exceed 100 percent.

<i>Reason for Defection or Nonuse</i>	<i>% of Responses</i>	<i>Rating</i>
Does not offer green goods or hard goods that customer likes.	47	1
Product or service specification not met.	39	2
Too expensive.	23	3
Employees either not knowledgeable or not customer-oriented	18	4
Products or services in general do not appeal to potential customer.	15	5
Plants and green goods do not look healthy, high quality, maintained.	14	6
Long lines at check-out counter or service desk.	10	8
Facilities or parking inadequate for environmental hort business	7	9
Plants or products returned because satisfaction not realized.	4	10

Of the ten primary causes cited for defections or nonusage, none obtained a majority response when the 342 surveys from the defectors and nonusers plus the occasional customers were analyzed. The most commonly cited concern related to product diversification and availability (47% of responses). Although a reasonable hypothesis would suggest returned merchandise to lead to a primary cause for defection, only 4% reported it as a major influence in the decision to shop elsewhere. Ten percent of those surveyed did not perceive a primary concern that led to a defection, hence they "never thought about [why they shop elsewhere]".

Significance to Industry: The long run success of a company is built on customer loyalty, especially if profits can be nearly doubled by reducing customer defections by only five percentage points. Marketing managers of nurseries and garden centers should not ignore customers who defect, instead learn from them. Improving service and products by learning from mistakes and from less-than-loyal customers will surely build toward monetary success. The intent of the lessons learned should be incorporated into the strategic marketing plan for the nursery or garden center.

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Nationwide Growth in the Nursery Industry: Are Southern States Gaining or Losing Market Share?

John R. Brooker
Tennessee

Nature of Work: Demand for green-industry products experienced extraordinary growth in the United States during the past decade. In some states, the growth has been impressive; however, in a few states, like Tennessee, yearly cash receipts may have increased with respect to dollar value, but relative market shares have declined. For nursery crops (environmental horticulture) alone, according to the census data, U.S. grower cash receipts increased 32 percent between 1987 and 1992 (Table 1). However, grower cash receipts in the northeast region increased by 22 percent compared to a 50 percent increase for the northcentral region. The increase for the south (36 percent) was higher than the U.S. average but well below the growth reported for the northcentral region.

Two nation-wide surveys, one in 1989 and the second in 1994, included two questions related to the topic of market growth (Brooker and Turner; Brooker, Turner, and Hinson). While 23 states participated in 1989 and 24 states in 1994, only 19 states participated in both surveys. Among those states, Delaware was the only state to experience negative growth (1-4 percent), according to the census data. On top, with respect to expansion in cash receipts, were Arkansas, Maine, Oklahoma, and Oregon with 78, 75, 70, and 73 percent increases in cash receipts, respectively. Illinois, North Carolina, and Ohio also experienced growth in cash receipts that were above 50 percent. While cash receipts increased in most states, adjustments in market shares between 1987 and 1992 ranged from -4.76% in California to 2.19% in Oregon. The northeast and west regions experienced 1.04% and 2.21 % reductions in market shares, respectively. The northcentral and south regions increased in market shares by 2.07% and 1.21 %, respectively. Out of the 19 states reported in Table 1, market shares declined in 9 states and increased in the other 10 states.

One survey question listed ten factors considered potentially important to nurserymen regarding overall expansion of their nursery business. Another question asked nurserymen to list factors (an open-ended question in 1989) that limited or prevented their ability to expand the geographic scope of their trading area. The nurserymen were asked to select and rank the top five.

Results and Discussion: The 9 southern states included in this paper were divided into two groups the 5 states where market shares increased and the 4 states with a decline in market share. Based on the 1988 survey data, "capital" was ranked as the most important factor limiting overall expansion by the group of states with increased market shares, followed by "labor" and market demand" (Table 2). "Labor" was ranked as the most important factor among those states where market shares declined. The order of ranking for 1993 did not change among the top three factors, but results did vary among the states. "Environmental regulations" was ranked quite low in all the states except Florida and Mississippi. "Market demand" was ranked first in Tennessee and Florida. "Labor" was ranked first or second for every state except Florida, where it was ranked seventh. Tennessee nurserymen ranked "weather uncertainty" fourth, yet no other state ranked it higher than sixth.

Among factors limiting geographic expansion of sales territory, "production" was the number one limitation in 1988 for all 9 states, followed by "transportation," "marketing," and "personnel." "Personnel" was ranked first in Alabama, Arkansas, Kentucky, and North Carolina. "Transportation" was ranked first in Louisiana and Mississippi. "Capital" was ranked first in Georgia and second in Tennessee. In contrast to the results obtained for 1988, "production" was ranked last in every state except Alabama (2nd) and Mississippi (4th), The lowest numerical ranking for any factor was associated with "production" in Tennessee.

Significance to Industry: Comparison of the nurserymen' responses among the ten states included in this paper did not reveal any obvious answers to the question as to why some states have experienced more rapid growth during the late 80s and early 90s. However, it did appear that consideration of market demand has become more important to nurserymen in both groups of states. Nurserymen in the group that experienced an increase market between the two census years did rank "market demand" a little higher than those in the reduced market share group. Also, because of the reduction in the emphasis placed on the importance of "production," perhaps nurserymen feel they can handle the production side of their business, but may have become more cautious regarding their confidence to sell at a reasonable price. Having a positive competitive position as a grower, or group of growers in a selected production region, may be defined as the ability to enter a market and maintain a share of that market. Because sales will go to the nurserymen with the best product, other things being equal, nurserymen with lower quality products, or higher priced products, may find it increasingly difficult to sell the volume they desire at their desired prices. As long as overall market demand expands more rapidly than production, this may not be critical. However, a slowdown in the overall economy, which is a matter of when, not if, will probably place even greater pressure on growers and regions plagued with a poor quality reputation.

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Table 1. Nursery Crop Cash Receipts

Region or State	1987	1992	Percentage Change	
			Cash Receipts	Market share
	\$ 1,000		percent	
United States	1,991,009	2,618,311	32	—
Northeast	279,988	341,013	22	-1.04
Northcentral	296,789	444,435	50	2.07
South	674,680	918,086	36	1.21
West	739,552	914,777	24	-2.21
Selected States:				
Alabama	52,396	61,666	18	-.028
Arkansas	3,300	5,871	78	0.06
California	497,126	528,996	6	-4.76
Connecticut	55,755	58,480	5	-0.57
Delaware	4,451	4,265	-4	-0.06
Florida	226,965	309,090	36	0.41
Georgia	40,913	52,597	27	-0.05
Illinois	59,147	93,375	58	0.06
Kentucky	11,692	14,444	24	-0.04
Louisiana	15,818	20,160	27	-0.02
Maine	3,044	5,323	75	0.05
Michigan	75,248	103,660	38	0.18
Mississippi	5,330	7,288	37	0.01
New Jersey	64,241	81,685	27	-0.11
North Carolina	44,949	73,884	64	0.56
Ohio	66,196	102,541	55	0.59
Oklahoma	34,461	58,684	70	0.51
Oregon	138,396	239,315	73	2.19
Tennessee	63,454	77,903	23	-0.21

Source: 1992 Census of Agriculture

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Table 2. Factors limiting overall expansion potential

	States where market shares declined					States where market shares increased			
	AL	GA	KY	LA	TN	AR	FL	MS	NC
Capital:									
1988	3.47 ^a	2.96	2.58	3.20	2.28	3.21	2.68	3.75	3.00
1993	2.04	3.53	2.50	3.40	2.77	2.91	3.26	3.50	2.76
Labor:									
1988	3.33	3.15	3.25	2.10	3.64	3.50	3.00	2.50	3.17
1993	3.15	3.30	3.24	3.04	3.13	3.73	1.47	3.00	3.15
Market demand:									
1988	3.47	2.54	1.00	3.82	1.46	3.78	2.83	2.75	1.88
1993	1.88	2.45	2.92	3.17	3.14	2.36	3.75	2.40	2.64
Land:									
1988	2.20	1.44	2.42	1.18	2.31	1.00	1.88	0.62	2.94
1993	0.69	1.74	1.68	1.60	1.64	1.00	1.72	1.00	1.75
Ability to hire competent management:									
1988	2.47	1.74	2.33	1.05	1.84	2.28	2.34	1.20	2.27
1993	1.27	1.66	1.63	1.34	1.00	2.27	1.29	1.70	1.31
Own management:									
1988	1.60	1.35	3.08	0.92	0.72	2.71	1.45	2.38	2.12
1993	1.42	1.58	1.79	1.49	0.96	1.27	1.00	2.00	1.68
Competition:									
1988	2.93	1.62	0.75	2.60	0.81	1.86	1.67	1.00	0.95
1993	0.38	1.30	1.26	1.55	1.73	1.82	2.21	2.30	0.95
Water supply:									
1988	1.40	1.62	1.83	0.95	1.84	0.50	1.05	1.12	1.59
1993	1.00	0.94	0.42	0.57	0.62	0.45	0.89	0.00	1.28
Weather uncertainty:									
1988	2.67	1.62	1.00	1.15	1.92	1.00	0.41	1.12	0.33
1993	1.42	1.04	0.92	1.28	2.36	1.54	0.53	1.00	1.03
Environmental regulations:									
1988	1.00	0.13	0.17	0.10	0.22	0.43	0.93	1.12	0.33
1993	1.46	1.13	0.60	1.72	0.56	1.36	2.57	2.40	1.40

^a Respondents ranked factors from 1 to 5 in order of importance, with 5 being the most important.

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Table 3. Limitations to expansion of geographic scope of trading area

	AL	GA	KY	LA	TN	AR	FL	MS	NC
Production:									
1988 (percent) ^a	0	28	7	14	24	7	21	4	25
1993 (ranking) ^b	2.92	2.66	2.27	2.28	0.98	2.00	2.42	2.92	2.71
Transportation:									
1988 (percent)	0	17	2	8	15	3	18	1	20
1993 (ranking)	2.58	3.09	2.65	3.23	2.88	2.67	3.04	3.50	2.97
Personnel:									
1988 (percent)	0	25	2	8	13	4	4	2	12
1993 (ranking)	3.38	3.29	3.56	3.17	3.04	3.67	2.77	2.67	3.29
Marketing:									
1988 (percent)	0	28	3	2	7	3	17	0	19
1993 (ranking)	2.73	2.92	3.12	3.18	3.55	2.93	3.47	3.42	3.15
Capital:									
1988 (percent)	0	16	3	9	5	0	8	2	5
1993 (ranking)	2.50	3.32	3.37	3.15	3.34	2.73	3.28	3.00	2.82

^a Respondents were asked to list the limiting factors in an open - ended question.

Answers were grouped onto these five areas, so the percentages reveal the relative ranking based on the number of times a factor was listed.

^b Respondents ranked factors from 1 to 5 in order of importance, with 5 being the most important.

Comparison of Traditional and Non-Traditional Retail Garden Center Service Quality

Jay Hudson, Bridget Behe, Harry Ponder and Bill Barrick
Alabama

Nature of Work: Traditional garden center dominance in the retail landscape horticulture industry is changing. Competition from non-traditional outlets such as home improvement warehouses, mass merchandisers, and supermarkets has captured a significant portion of traditional retail garden center sales. When product offerings become nearly identical, one strategy that could potentially help a business build a competitive advantage is for them to deliver high-quality customer service. One of the more established common survey methods for assessing service quality, SERVQUAL, was developed by Zeithaml, Parasuraman and Berry. SERVQUAL is a questionnaire which consists of 22 pairs of questions, half of which measure expectations and half of which measure perceptions of service quality. Expectations are what consumers would expect from an ideal retailer. Perceptions are what consumers felt they got from shopping in their outlet. The level of service quality is defined as the difference between customer perceptions and expectations. A negative service quality gap meant that the retailer was not meeting customer expectations while a positive service quality gap meant the retailer exceeded customers expectations.

SERVQUAL was used to identify divided into five dimensions of service quality by factor analysis: tangibles, reliability, responsiveness, assurance, and empathy (2). Tangibles are the appearance of physical facilities. Reliability is a retailer's ability to perform a promised service dependably and accurately. Responsiveness is the willingness to help customers and provide prompt service. Assurance is employees knowledge and courtesy. Empathy is caring, individualized customer service. For the purposes of this survey a product dimension was added. We also asked customers to rate the importance of each dimension by assigning a total of 100 points to the five service quality dimensions. Demographics research indicated that Charlotte, North Carolina, only 450 miles from Auburn University, was the nearest suitable test market (1). We defined traditional garden centers (TGC) as free-standing primarily horticultural retailers offering a full line of products and services, which could include landscape services and delivery. We defined non-traditional garden centers (NTO) as standing as a component of a mass-merchandising operation whose product mix was primarily non-horticultural products and offered few or no horticultural services. Surveys were distributed on March 31 and April 1, 28, and 29, 1995 by Auburn University graduate students in five TGCs and three NTOs distributed geographically in the Charlotte, North Carolina, market

Results and Discussion: Researchers distributed 3,629 surveys over two weekends, with 1,224 distributed in TGC's and 2,505 distributed in NTO's. We received a total of 640 surveys for an overall response rate of 17.6%.

A comparison of customers' point allocation for the five dimensions showed that TGC and NTO customers ranked assurance and responsiveness as most important, allocating a similar number of points to these two dimensions (Table 1). NTO customers valued the physical appearance of equipment, personnel, and printed materials (tangibles) more than TGC customers did. TGC customers valued caring, individualized attention more than NTO customers did. The physical appearance of equipment, personnel, and printed materials (tangibles) was rated by both groups as least important. Employee knowledge and trust were relatively more important to both groups than the physical condition of facilities.

NTO and TGC customers had similar expectations on 15 of 22 service quality items (Table 2). Even though expectations were similar, perceptions were markedly different between TGC and NTO customers. Perceptions were similar for only five of 22 items. TGC customers had higher perceptions of service quality than NTO customers on 14 of 22 items. In customers' assessment of product quality, a high number of similar expectations were observed. However, product quality perceptions items were different when the two groups were compared.

Because expectations were similar and perceptions were not, gaps in service quality were identified (Table 2). Gaps were more numerous and larger for NTO's than for TGC's, clearly giving a competitive advantage to TGC's in service quality. Yet, gaps were evident for both types of retailers.

Significance to the Industry: As the product mix between traditional garden centers (TGC) and non-traditional garden center outlets (NTO) becomes more similar, a retailer's ability to differentiate his outlet from competitors will increasingly come from the quality of services offered. Assessing retail product and service quality can be crucial in the development of a marketing strategy. Identifying important service quality dimensions and the perceived level of product and service quality can indicate to retailers weaknesses that need to be improved and strengths on which the retailer could capitalize. This research demonstrated that customers of NTO's and TGCs have very similar expectations of service quality from their respective retailers. However, TGCs clearly better met customer expectations. Both types of retail outlets had significant product and service quality gaps, yet gaps for TGSs were substantially smaller. Narrowing product and service quality gaps by focusing first on the largest gaps can be a substantial component of a marketing strategy to improve competitiveness.

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Table 1. Relative importance of 5 service quality dimensions as rated by traditional and non-traditional garden center customers.

Dimension	<u>Traditional Customers</u>		<u>Non-traditional Customers</u>	
	Points ^x	Rank ^y	Points ^x	Rank ^y
Assurance	25.6	1	25.5	1
Responsiveness	24.1	2	23.9	2
Empathy	20.5	3	18.6	3
Reliability	17.5	4	17.3	4
Tangibles	12.1	5	14.7	5

^x=average points for all participants; ^y=based on the Wilcoxon rank-sum test.

Table 2. Average expectations, perceptions, and gap scores for 5 SERVQUAL and 1 product quality dimensions as rated by traditional and non-traditional garden center customers.

Dimension	<u>Expectations</u>		<u>Perceptions</u>		<u>Service Quality Gap</u>	
	Traditional	Non-Trad.	Traditional	Non-Trad.	Traditional	Non-Trad.
Tangibles	3.59	3.86*	3.67	3.91*	0.08	0.05
Reliability	4.72	4.72	4.06	3.79*	-0.66	-0.93*
Responsiveness	4.57	4.65*	4.12	3.50*	-0.45	1.15*
Assurance	4.63	4.63	4.30	3.61*	-0.33	-1.02*
Empathy	4.42	4.39	4.14	3.57*	-0.28	-0.82*
Product	4.49	4.53	3.86	3.52*	-0.63	-1.01*
SERVQUAL	4.40	4.47*	4.03	3.65*		

Certified Nurseries Use of Media, Fertilizer and Composted Waste Products

Bridget Behe and Catherine Walker
Alabama

Nature of Work: Disposal of organic waste products has come under closer scrutiny from the Environmental Protection Agency because of the potential for nitrates to contaminate ground and surface water supplies (U.S.E.P.A., 1990) and to overload landfill capacity in many communities. The horticulture industry has the potential to recycle organic wastes as components of some growing media in plant production. Benefits of using composted organic waste products in landscape plant production have been investigated, and May et. al (1994) found that at least half of surveyed companies indicated that there was substantial potential to use the compost in container and field production.

Our objective was to determine how Alabama nurseries purchased growing media and fertilizer for their businesses so that we could examine the extent of composted waste product use (i.e. animal manures, tree and grass trimmings, etc.) and environmentally conscious practices implemented in the horticultural industry.

We obtained a mailing list of certified Alabama nurseries from the State Department of Agriculture in January, 1995, and developed a survey with open- and closed-ended questions to ascertain the production and business practices related to the use of organic waste products and recycling materials. We mailed two modified surveys to each of 648 certified nurseries, one on Jan. 12 and one on Jan. 26, 1995. We received 227 responses, 214 of which were usable, yielding a return rate of 35% and a response rate of 33%.

Results and Discussion: Of the 214 respondents, 37% produced deciduous trees, 43% produced deciduous shrubs, 38% produced perennials, 4% produced Christmas trees, 49% produced evergreens, 37% produced annuals, 5% produced aquatic plants, 33% produced vines and ground covers, and 24% produced other plants not listed. The mean percentage of sales that were wholesale was 61%. When asked what percentage of the businesses' 1994 total sales were made outside of Alabama, 43% of respondents said that none of their sales were made outside the state.

We asked how the businesses purchased growing media for plant production. Twenty-one percent bought all their media prepackaged and ready to use. Forty-one percent mixed all their media on-site. Thirty-eight percent bought some media prepackaged and ready to use and mixed some of their own on-site. When asked how many yd³ of media they purchased or mixed for plant production in 1994, 23% reported they used 49 yd³ or less, and 18% reported they used 50 to 100 yd³. Twenty-nine percent said they used 101 to 500 yd³, 11% said they used between 4 -501 and 1,000 yd³, 15% said they used between 1,001 and 10,000 yd³, and 6% said they used more than 10,000 yd³ of media in 1994. The average media used by respondents was 2,701 yd³.

Respondents were then asked, if they mixed some of their media, which components they used. Sixty-four percent used sphagnum peat moss, 17% used wood chips, 11% used composted animal manure, 13% used sawdust, 27% used vermiculite, and 54% used sand. In addition, 17% used field soil, 81% used bark, 1% used peanut hulls, 2% used rice hulls, 2% used Styrofoam, 36% used perlite, and 13% used other components.

Surveyed businesses were next asked about the pounds and types of fertilizer they used in 1994. Of fertilizer with 5% or less nitrogen, 90% of respondents used none, 5% used 100 lbs or less, and 5% used more than 100 lbs. After businesses listed the pounds and types of fertilizer used, we asked them how much of that fertilizer was slow- or controlled-release fertilizer. The mean percentage of slow-release fertilizer used was 56%. We also asked what percentage of the fertilizer used was soluble or liquid fertilizer. The mean percentage of soluble fertilizer used was 34%.

We also asked the businesses about some general environmental practices. Twenty-five percent said they contained irrigation water run-off, 10% said they recycled irrigation water, and 37% said they recycled used plastics. Thirty-nine percent of companies said they composted plant material refuse, and 49% said they composted used growing media.

Fertilizer selection and media type affect nitrate runoff. Many businesses (78%) used a fertilizer with 11 to 20% nitrogen with an average of 2,604 pounds used per firm. Few (30%) used fertilizers with more than 20% nitrogen or 10% or less nitrogen (78%). Many used controlled-release fertilizer products; only 15% used no controlled-release fertilizer. With a high percentage of nurseries growing both herbaceous and woody plants and such a low percentage not using controlled-release fertilizers, it would follow that controlled-release fertilizers were being used on both herbaceous and woody plants in at least some nurseries. While irrigation practices were not specifically investigated, Fare et. al (1991) suggest that the selection and use of controlled-release fertilizers reduces nitrate runoff.

Alabama currently has no state legislation that supersedes the EPA guidelines on 10 ppm nitrate nitrogen as the upper limit in drinking water. Yet, one-quarter of the certified nurseries contain irrigation water, and 10% recycle it. There is also no legislation regulating plastic disposal, and an even higher percentage of nurseries has taken the initiative to recycle plastics. Some municipal communities regulate the composition of landfills. Some nurseries have responded by composting both plant material and growing media refuse. These results show a proactive strategy in coping with waste disposal. One nursery added, "I would very much like to use composted waste materials if a reasonable cost source could be located."

Significance to the Industry: Many Alabama nurseries have adopted environmentally conscious practices, including the use of composted organic waste as growing media components, use of controlled-release fertilizers, containment and/or recycling of irrigation water, and composting waste plant and media. The adoption of such practices should put these businesses in a favorable position within the community, and, if legislation is passed, they should be prepared to easily comply with the new regulations. The potential exists to market composted waste products to nursery producers, and they could comprise a substantial segment of the market for disposal of such products. More nurseries may adopt environmentally friendly practices even without the interference of legislation.

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Characteristics, Perceptions and Judgements of Consumers of Nursery Products in Greater Metropolitan Nashville, Tennessee

Surendra P. Singh, Enefiok Ekanem, Fisseha Tegegne and Sam O. Dennis
Tennessee

Nature of Work: The nursery industry is an important sector of Tennessee's economy. The state ranks among the top ten U.S. nursery-producing states. Nursery growers in the state increased by 38% between 1989 and 1993 while floriculture growers increased by 137% between the same period. Grower sales, live plant dealer sales and horticultural services added about \$480.5 million to the state's economy in 1993 (Tennessee Department of Agriculture, 1994). Despite the importance of the nursery and greenhouse industry, researchers and policy-makers still lack crucial information needed to plan production and marketing (Johnson, 1992). The objectives of this research were: (1) to provide information on characteristics of nursery product buyers in metropolitan Nashville, Tennessee, and (2) report on the perceptions of buyers of these products.

To accomplish the objective of this research, a two-page questionnaire survey was mailed out in the Summer of 1995 to one-hundred and fifty selected households in Nashville metropolitan area soliciting responses to a number of questions. Seventy-eight useable surveys were returned (52% response rate). Data in the returned questionnaires were coded into computer and qualitative and quantitative analyses of data was done using the Statistical Package for the Social Sciences (Norusis, 1993).

Results and Discussion: Qualitative analysis of data provided a detailed profile of customers buying plants in Nashville. Some of the findings are presented in the section following. Among the respondents, 75% were white, 23% black and 2% identified themselves as belonging to other ethnic group. Thirty-one percent of respondents had an annual household income of \$50,000 to \$80,000 and 27% had an annual household income of over \$80,000. About 22% had incomes of between \$35,000 to \$50,000. Nineteen percent of respondents had income of less than \$35,000. Majority of the respondents had either received a B.S. degree (36%) or had some college training (35%). About 10% had high school, while 1% had less than high school. The relatively high income for the sample is probably due to the fact that majority of the households surveyed were still working (86%) and many had advanced degrees (18%). Earning power of the household is significantly enhanced by these two facts. Four percent of the respondents were between 25 to 35 years of age; 37% were between 35 to 45 years of age; 28% were between 45 to 55 and 18% were between 55 to 65. Thirteen percent of all respondents were over 65 years of age. Respondents spent an average of \$62 during their most recent visit to the store where they shopped for nursery/bedding plants. During 1994, each households spent an average of \$430 on plants and about \$81 on cut flowers. Landscape and lawn care expenses amounted to \$193 and \$335 respectively. While most respondents (93%) were repeat buyers, only 7% were new buyers. Respondents to the survey said they bought their nursery and bedding plants from either of three places: garden centers (58%), nurseries (31%) or chain stores (11%). Most respondents (32%) purchased perennials next were annuals (24%) and

bedding plants (12%). This result is consistent with earlier research showing that the demand for perennial has been increasing during the past few years (Garber, 1996). Overall, about two-thirds (68%) of all participants in the survey indicated that their purchases of nursery and bedding plants have increased. About twenty-seven percent of respondents, however, indicated that their consumption has remained the same while 5% indicated a decrease in their purchases.

Analysis of data showed that income, age, educational level, race and the type of store customer selected for plant purchases significantly influenced household expenditures on bedding and nursery plants for metropolitan Nashville residents ($p \leq 0.05$). These results are consistent with findings from previous studies (Gineo, 1988; Gineo and Omamo, 1990; Turner, Dorfman and Fletcher, 1990; Behe, Prince and Tayama, 1992).

Perception of quality/health of plants, appearance, length, price location and provision of planting/maintenance instructions affect consumer plant purchases in Nashville, Tennessee. Table 1 shows household ratings of factors affecting nursery/bedding plant purchases.

Table 1. Household Rating of Selected Factors Affecting Plant Purchases

Selected Factor	Response Category*		
	Very Important	Important	Not Important
(Percent of Households)			
Quality	81.9	18.1	0.0
Appearance	64.3	35.7	0.0
Price	36.1	56.9	6.9
Length/Age of Plant	33.3	59.4	7.2
Planting/Maintenance			
Instructions	27.8	58.3	13.9
Location where planted	13.9	40.3	45.8

* Categories based on customer judgement and/or perception

Eighty-seven percent of the participants of this survey indicated that quality was very important in their decision on whether or not to buy plants. This is consistent with findings of other studies (Makus, et. al., 1992; Singh et. al., 1994). Respondents noted that the actual quality of plants bought from stores where they shopped were poor (1%), fair (29%), good (53%) or very good (17%). As was anticipated, 64% of respondents said they would pay a higher price for better quality/healthy plants. Only 10% percent of the respondents said they would not pay the higher price and 26% were not sure they would be willing to pay the higher price for better quality. The study revealed that households surveyed spent more on plants in garden centers/chain stores than they did in nurseries. This particular finding suggests that buyers may have perceived quality to be higher in garden centers than in nurseries or chain stores.

Significance to the Industry: The present survey provides useful information on the characteristics of consumers of nursery products in Nashville, Tennessee. This information can be useful to nursery businesses in evaluating current marketing plans and planning future strategies. The nursery industry can use all the information it can get about its customers. This study would hopefully contribute significantly to the industry by providing new information on customer perceptions and judgement on products of the industry.

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Influential Factors on Out-of-State Product Sales by U.S. Wholesale Nurseries

Steven C. Turner, Forrest Stegelin, Randall E. Cleland
Georgia

Nature of work: A survey of nurseries in 24 states was conducted in 1994 to investigate trade flows and marketing practices within the United States nursery industry during 1993. Research of this nature was performed by Hill, et. al. (1981) on the U.S. grain market and showed that by matching origins and destinations, better information could be provided to assist firms in identifying potential marketing opportunities.

An objective of this research was to identify the important factors that influence the use of out-of-state markets. These out-of-state markets were separated into sales to mass merchandisers, garden centers, other retailers, landscapers, and re-wholesalers. Sales were measured as percentages of out-of-state sales to each of the sectors. The age of the firm, computerization, acres in production, percent of sales made in containers, number of trade shows attended annually, whether or not the nursery sold directly to consumers (retail), percent of total sales allocated to the specified category, percent of sales revenue allocated to advertising, trade journal advertising, total sales, population density of the state, and region of the country (with the middle U.S. being the base) were hypothesized to affect a nursery's out-of-state sales to the above sectors. A separate Tobit model was developed for out-of-state sales to each sector to test the above hypotheses.

The sample size for the 24 states was 4,890 and 1,316 nurseries responded to the survey. Only 530 nurseries answered all the relevant questions to this study. Furthermore, only those nurseries with some sales to that particular sector were included in analyzing sales to that sector. Thus, 115 observations were included in the mass merchandiser model, 369 were included in the garden center model, 114 were included in the other retailer model, 418 were included in the landscaper model, and 280 were include in the re-wholesaler model.

Results and Discussion: For sales to mass merchandisers out-of-state, age of firm, computerization, and the West region were the only significant influences. Detailed results from each model are presented in Table 1. This implies that older nurseries were more likely to sell to mass merchandisers out-of-state. Computerization was also important, as hypothesized. The efficiency gains as reflected by computerization of inventory, sales, and order taking seemed to be important to mass merchandisers. Firms in the West region of the country were less likely to sell to mass merchandisers out-of-state relative to the Middle region. Out-of-state sales to garden centers were positively influenced by acres in production, trade show attendance, overall sales to garden centers, trade journal advertising, and total sales. These results suggest that large firms, in terms of acreage and total sales, are more likely to sell to garden centers in other states. As they attend more trade shows and advertise in trade journals, sales in this category also increase. Also, the higher the percentage of sales to garden centers, the more likely it is a firm will sell to garden centers out-of-state, as would be expected. Sales to garden centers in other states were negatively influenced by percent of sales in containers, the retail sales dummy variable, and the West region of the country. Sales in containers was hypothesized to have a positive affect on out-of-state sales, but the results contradict that hypothesis. Also, firms that make direct retail sales were less likely to sell to garden centers in other states. Again, the West region of the country had significantly less sales to out-of-state garden centers relative to the Middle region.

Sales to other retailers out-of-state were positively influenced by acres in production. Overall, larger firms, in terms of acreage, sold more to other retailers out-of-state. This result suggests that very few sales in this category were in other states.

Sales to landscapers out-of-state were positively influenced by acres in production, trade show attendance, and trade journal advertising. These results support the hypothesis that large firms who utilize trade shows and trade journal advertising tend to sell to out-of-state landscapers. Percent of sales in containers, the retail sales dummy variable, overall sales to landscapers, and West region of the country all had significant negative affects on sales to out-of-state landscapers. It appears that non-container plant material is more likely being shipped out-of-state to landscapers. This would probably be trees or other balled and burlapped material. Also, if a firm made retail sales, they were less likely to sell to landscapers in other states. The negative affect that overall sales to landscapers had on out-of-state sales to landscapers was not expected. This result suggests that if firms were heavily dependent on landscaper sales, they were less likely to sell to landscapers out-of-state. Lastly, firms in the West region of the country were less likely to sell to out-of-state landscapers, relative to those firms in the Middle region.

Sales to re-wholesalers out-of-state were positively influenced by overall sales to re-wholesalers and trade journal advertising. The more a firm sells to re-wholesalers, the more likely that firm is to sell to re-wholesalers in other states. Again, trade journal advertising reached re-wholesalers in other states and increased sales to them. On the other hand, percent of sales in containers, retail sales dummy variable, and West region of the country had a negative affect on out-of-state sales to re-wholesalers. Plants sold in containers were hypothesized to have a positive affect here, but once again they seem to have the opposite affect. Again, retail sales deter sales to re-wholesalers out-of-state and the West region of the country sold significantly less to re-wholesalers out-of-state.

Significance to Industry: An important finding of this research was that factors that influence out-of-state sales by nurseries are different depending on the sector of the sales. Factors which are consistently significant are acreage (positive), containerization (negative), trade show attendance (positive), direct retail sales (negative), trade journal advertising (positive), and the Western region of the U.S. (negative). It appears that nurseries that have greater percentages of sales to garden centers or re-wholesalers are more likely to ship out-of-state to those sectors, while nurseries that have greater percentages of sales to landscapers were less likely to ship out-of-state to landscapers.

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Table 1. Tobit Parameter Estimates for Out-of-State Markets Analysis

Independent Variables	Dependent variables Out-of-State Sales to:				
	Mass Merchandisers	Garden Centers	Other Retailers	Landscapers	Re-wholesalers
	Parameter estimates (Student t-value)				
INTERCEPT	34.8841 (1.489)	6.0884 (.510)	-24.2132 (-.771)	40.6307 (3.698) ^a	21.6600 (1.529)
AGE	0.4800 (2.047) ^a	0.1031 (.753)	-0.0429 (-.127)	0.1002 (.818)	0.0950 (.549)
COMPUTER	23.9557 (1.596) ^a	2.5830 (.389)	25.5666 (1.437)	-.3803 (-.066)	8.1300 (.994)
ACREAGE	0.0026 (.680)	0.0070 (2.057) ^a	0.0126 (1.743)	0.0057 (1.831)	0.0045 (.911)
CONTAINER	-0.2288 (1.324)	-0.1969 (2.328) ^a	-0.0087 (.036)	-0.2696 (-3.495) ^a	-.1678 (1.730) ^a
TRADE SHOW	0.6772 (1.340)	0.7213 (2.221) ^a	0.8179 (1.229)	0.7260 (2.483) ^a	0.4967 (1.214)
RETAIL	-1.9828 (-.179)	-21.4484 (-3.855) ^a	-11.6982 (-.793)	-17.661 (-3.354) ^a	-23.3615 (-3.354) ^a
CATSALES	-0.0908 (-.157)	0.4203 (3.911) ^a	0.1075 (.352)	-0.4544 (-5.380) ^a	0.2364 (2.008) ^a
ADVERT	-0.1063 (-.090)	0.0950 (.218)	1.0016 (.628)	-0.0816 (-.190)	0.148¢ (.165)
TRDEJRNL	13.9957 (1.335)	19.1549 (3.378) ^y	10.2814 (.726)	16.9985 (3.276) ^y	23.0019 (3.423) ^y
TOTSALES	3.665E-7 (.168)	2.5278-6 (1.748) ^a	2.251E-8 (.007)	8.699E-8 (.063)	1.232E-7 (.075)
POPDENS	-0.0152 (-.349)	-0.0074 (-.458)	-0.0464 (-.845)	0.0149 (1.058)	.0001 (.004)
SOUTHE	-18.7773 (-1.572)	9.5613 (1.307)	21.2594 (1.248)	1.1796 (.180)	-6.1250 (-.697)
NORTHE	-11.5229 (-.378)	7.8787 (.670)	34.1194 (.973)	0.8282 (.080)	14.9352 (.978)
WEST	-60.7664 (-3.883) ^a	-23.6116 (-2.588) ^a	-14.5875 (-.661)	-24.3115 (-2.850) ^a	-28.3021 (-2.648) ^a
N ^b	115	369	114	418	280
LR ^c	882.94	2735.42	656.96	2714.66	2586.76

^aSignificant at the .10 level.

^b Number of observations in the model.

^c Likelihood ratio for the model. All were significant at the a=0.005 level.