SELECTED TOPICS IN ALABAMA'S ENVIRONMENTAL HORTICULTURE

INDUSTRY: THE ECONOMIC IMPACT OF ALABAMA'S GREEN

INDUSTRY AND MIGRANT LABOR IN ALABAMA'S

HORTICULTURE INDUSTRY

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_____
Moriah J. Bellenger

Certificate of Approval:

_____	_____
L. Conner Bailey Professor Agricultural Economics and Rural Sociology	Deacue Fields, Chair Assistant Professor Agricultural Economics and Rural Sociology
_____	_____
Diane Hite Assistant Professor Agricultural Economics and Rural Sociology	Kenneth Tilt Professor Horticulture

_____
Stephen L. McFarland
Dean
Graduate School

SELECTED TOPICS IN ALABAMA'S ENVIRONMENTAL HORTICULTURE INDUSTRY: THE ECONOMIC IMPACT OF ALABAMA'S GREEN INDUSTRY AND MIGRANT LABOR IN ALABAMA'S HORTICULTURE INDUSTRY

Moriah J. Bellenger

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Moriah J. Bellenger

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Signature of Author

_____
Date

VITA

Moriah Bellenger was born on December 23, 1980 and grew up in Tuscaloosa, Alabama. She graduated from Florida State University in 2003, with a Bachelor of Science in Economics and International Affairs. She plans to enter the doctorate program in Economics at Oregon State University in the fall of 2005.

THESIS ABSTRACT

SELECTED TOPICS IN ALABAMA'S ENVIRONMENTAL HORTICULTURE INDUSTRY: THE ECONOMIC IMPACT OF ALABAMA'S GREEN INDUSTRY AND MIGRANT LABOR IN ALABAMA'S HORTICULTURE INDUSTRY

Moriah J. Bellenger

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The environmental horticulture industry, known as the green industry, constitutes the states highest selling and fastest growing agricultural crop sector. The author, in collaboration with Deacue Fields and Kenneth tilt, conducted an extensive mail out survey of industry firms, which provided the data for this study. This thesis contains two separate papers, prepared for subsequent publication. The first paper uses an input-output model to estimate the industry's total economic impact, which includes direct and indirect measures of output, value added, tax revenue, and employment. The second paper uses the seemingly unrelated regression model to examine the role of migrant workers in the

industry's labor force, by estimating their effects on average wage levels and worker productivity, as well as producer hiring decisions.

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I. THE ECONOMIC IMPACT OF ALABAMA'S GREEN INDUSTRY

Moriah Bellenger, Deacue Fields, and Kenneth Tilt

Introduction

The green industry, which comprises those who propagate, produce, sell, distribute, design, install and maintain nursery plants, represents the fastest growing segment of U.S. agriculture. In the U.S., nursery and greenhouse crops represent the third largest crop and rank seventh among all commodities in cash receipts. Green industry products and services make positive contributions to the attractiveness and value of homes, universities, government buildings, parks, resorts, golf courses, and other public and private establishments. Record low interest rates have fueled increased construction and strong growth rates for green industry purchases. By adding aesthetic quality, green industry services and products constitute an investment in property value for both the private and public sectors. Americans spent approximately $68.5 billion maintaining and improving their homes in 2002. In 2003, U.S. households spent an average of $503 on lawncare and landscaping (NASS, 2004).

Despite recent economic insecurity and the increased competitive pressure of globalization, the continued growth of Alabama's green industry provides one bright spot in the state's economy. While Alabama's total crops cash receipts declined from $673.1 million to $583.8 million for the period 1980-2002, green industry sales more than

doubled, from $142.7 million to $295.6 million. By 2002, the green industry comprised just over half of all crop sales, making it the state's leading crop and third leading agricultural commodity. Greenhouse, nursery sales, and sod combined to $251.5 million, roughly 80% of horticultural crop sales. For the given period, all other horticultural crops actually declined, but the green house, sod, and nursery sectors' combined growth rate of over 350% enabled overall industry growth (Alabama Agricultural Statistics Service, 2004)

The success of Alabama's green industry is consistent with national industry statistics. From 1979 to 1998, total national industry sales grew from $3.2 billion to $10.6 billion, which equals a growth rate of 331 percent for the period. Interestingly, the total number of operations increased only slightly, from 22,347 to 23,758. This implies a growth in average sales per operation from approximately $143,000 in 1979 to $446,000 in 1998, or 312 percent. By 1997, Alabama ranked 16th nationally for total nursery and greenhouse sales, and two of the state's counties, Mobile and Baldwin, ranked among the country's 100 highest selling counties. In 2002, the five top selling counties in Alabama comprised nearly 75% of green industry sales, and the adjoining Mobile-Baldwin region accounted for slightly less than 50% of green industry sales.

Although cash receipts have been documented, this study represents the first estimation of the total impact of the green industry on Alabama's economy. Total economic impact includes the direct effects of total sales and employees, the indirect effects of transactions between the green industry and other related industries within the state, and the induced effects of employee household consumption.

Data

The data used in this study is drawn primarily from a 2002 survey of Alabama green industry producers (See Appendix A). The survey was administered based upon Dillman's tailored design methodology (Dillman). Surveys requesting detailed revenue and expenditure information were used to improve existing state data quality and assess the validity of the production function information in IMPLAN. Mailing lists were acquired from the Alabama Department of Agriculture and Industries (ADAI) for nursery and greenhouse growers, nursery stock dealers, and licensed lawn and landscape service providers. Membership and mailing lists from the Alabama Nurserymen's Association and Alabama Turfgrass Association were used to verify and update ADAI lists. The list of golf course superintendents was developed by merging membership directories from the Gulf Coast and Alabama Golf Course Superintendents Associations. A random sample of commercial and institutional firms was acquired from the American Business Directory through InfoUSA.

Six survey instruments were customized to gather specific data from nursery and greenhouse producers, lawn and landscape service providers, turfgrass and sod producers, green industry retailers, golf course superintendents, and commercial and institutional consumers. The instruments were developed and pre-tested based upon other instruments found in relevant literature. Support paragraphs from the Commissioner of Agriculture Alabama Cooperative Extension System Director, Alabama Nurserymen's Association President, and Alabama Turfgrass Association President were included on the inside cover of each survey. The Dillman format was used to develop a cover letter, which was personally addressed and included in each survey.

Table 1 presents information on mailing and response rates for each sector surveyed. A pre-survey postcard was mailed to the population of all sectors excluding commercial and institutional consumers. This was done as a first contact to prepare individuals for the upcoming survey and to identify incorrect addresses before surveys were mailed. More than 100 postcards were returned with incorrect addresses and these were excluded from the survey mail out. After the initial survey mailing, a follow up postcard was sent as a reminder/thank you, then a second survey was mailed. Table 1 shows that response rates ranged from 7.5% for commercial and institutional consumers to 39.3% for turfgrass and sod producers. Blank surveys and surveys with limited information were excluded from the number of completed responses. Some common responses on incomplete and/or blank surveys were 'no longer in business', 'involved in other activities not related to the green industry', and 'not considered a commercial operation.'

Table 1. Summary of Survey Administration

Sector	*Pre-survey Postcard*	*Surveys Mailed*	*Total Responses*	*Completed Responses*	*Response Rate*
Nursery and Greenhouse	851	822	158	114	19.2%
Turfgrass and Sod	64	61	24	17	39.3%
Lawn and Landscape Services	1,430	1403	243	190	17.3%
Retail Sales	1,841	1,250[1]	112	42	9.0%
Golf Course Superintendents	174	170	38	25	22.4%
Commercial and Institutional	N/A	750	56	26	7.5%
TOTAL	4,000	4,456	631	414	14.2%

[1]1,250 Retail Sales firms were randomly sampled from a total of 1,829 valid addresses

The survey data is reported based upon the 414 respondents and is not expanded to make inferences about the entire population. The survey findings are reported in Appendix B.

Revenues and Expenditures

Table 1 of Appendix B provides the sales and expenditures of survey respondents in the various sectors of the green industry. Gross sales for all sectors were over $189 million and expenditures totaled $82.6 million. The total number of respondents represents less than 10% of the firms participating in green industry activities, which provides some indication of the overall size of the industry.

Nursery and Greenhouse

Annual Sales for the nursery and greenhouse sector are listed in Table 2. In the nursery and greenhouse sector 114 respondents indicated total sales of $70.8 million. Average gross income per firm totaled just over $620,000.00. Container-grown shrubs accounted for about 37 percent of all nursery and greenhouse sales followed by bedding plants with slightly more than 10 percent. Field grown trees comprised roughly 8 percent of total revenue.

Table 3 outlines the nursery and greenhouse sales market for 2002. The leading consumer outlets for the surveyed nursery and greenhouse producers were sales to resale/wholesalers, other retail nursery and garden centers, and landscape contractors.

The respondents sold roughly 25 percent of their products each to resale/wholesalers and retail nursery and garden centers, another 20 percent to landscape

contractors, and 12 percent to retail mass merchandisers. Nearly 10 percent of sales were made directly to the public, and municipalities comprised just fewer than 2 percent of the nursery and greenhouse sales market. Annual Expenditures for the nursery and greenhouse sector are listed in Table 4. The 114 respondents from the nursery and greenhouse sector accrued just under $26.3 million in 2002 expenses. Average expenditures per firm totaled just over $450,000.00. Overhead accounted for 25 percent of annual expenditures. Another 15 percent of annual expenditures lay in unspecified miscellaneous items. This is followed respectively by 11 percent and 10 percent in plants purchased from other growers and in propagation stock.

Turfgrass and Sod

Annual acreage and sales for the turfgrass and sod sector are summarized in Table 5. The eighteen respondents in the turfgrass and sod sector indicated sales of $12.9 million and an average of roughly $925,000.00 per firm. Growers listed 322 acres of certified product and just over 16,000 acres of non-certified product. Non-certified sod and non-certified centipede turf each accounted for nearly 40 percent of total acreage. This is followed by non-certified Bermuda turf, which made up another 13 percent of total acreage.

The turfgrass and sod sales market is described in Table 6. Leading consumer outlets for turfgrass and sod producers are landscape contractors, sales directly to the public and retail nursery and garden centers, with respective market shares of 29 percent, 19 percent, and 13 percent. This is followed by landscape installation firms, resale/wholesalers, and other turf producers, each comprising roughly 10 percent. Golf

courses purchased 7 percent of turf and sod products, and municipalities purchased 2 percent.

Table 7 lists the 2002 annual expenditures for the turfgrass and sod sector. The 18 respondents accrued just over $5.5 million in total expenditures, averaging nearly $400,000 in annual expenditures per firm. By far, the greatest cost facing turfgrass and sod growers lies in shipping and transportation, which accounted for 40 percent of total expenditures in 2002. This is followed by overhead and miscellaneous items, which made up another 15 percent and 10 percent of total costs, respectively.

Lawn and Landscape

Estimates for lawn and landscape sales are listed in Table 8. There were a total of 191 respondents in the lawn and landscape sectors. These respondents indicated total sales of $61.8 million and average gross income of just over $340,000.00. Landscape installation comprised the largest portion of this income, accounting for almost 25 percent of all sales. This is followed by landscape maintenance and lawncare maintenance, which combined for another 18 percent of total sales.

Table 9 outlines the lawn and landscape sales market. More than half of all lawn and landscape services (56%) were provided to homeowners. 19 percent and 12 percent of services were to commercial establishments and builder/ developers, respectively. Other leading sales outlets include Apartments and condominiums with 9 percent. Government and Municipalities comprise just one percent of the lawn and landscape sales market.

2002 expenditures for the lawn and landscape sector are summarized in Table 10. The 191 respondents in the lawn and landscape sector listed $36.2 million in total expenditures, averaging roughly $190,000.00 in annual expenditures per firm. Materials accounted for nearly a third of all expenditures. This is followed by overhead, which comprised roughly 14 percent. Equipment purchases and leases, fuel, and fertilizers each made up around 10 percent of total expenditures.

Retail

Table 11 summarizes 2002 annual sales for the retail sector. The 43 respondents to the retail survey amassed gross sales of $15.8 million, with an average gross income of roughly $385,000.00 per firm. The highest selling retail and garden center items were container-grown shrubs and bedding plants, which each accounted for about 11 percent of sales. This is followed by unspecified miscellaneous products and turfgrass products, which represented more than 10 percent and 6 percent of sales. The 51 respondents in the consumer sectors (golf courses and commercial and institutional, indicated that they spent more than $18 million on green industry related goods and services.)

2002 annual expenditures for the retail sector are listed in Table 12. The 43 respondents from the retail sector indicated $11.3 million in total expenditures, averaging roughly $280,000 in annual expenditures per firm. The sector's greatest expense lay in overhead costs, which accounted for around 15 percent of total expenditures. This is followed closely by purchases of shrubs at 13 percent. Hard goods and bedding plants each accounted for roughly 10 percent of annual expenditures.

Golf Course

2002 annual sales for the golf course sector are listed in Table 13. The 26 golf course respondents indicated $29 million in total sales, with average gross income reaching just over $1.3 million per firm. The respondents counted nearly 700,000 rounds for 18 holes and 20,000 rounds for 9 holes. This averages to roughly 30,000 and 10,000 rounds per firm respectively. Roughly $7 million or 25 % of total revenue was generated through membership and green fees. Another $4.5 million or 15 % of revenue came from golf cart rentals and lessons. The remaining $6.0 million or 21 % of revenue was generated through golf lessons, pro shops and refreshments.

Estimates for annual golf course expenditures are listed in Table 14. This sector's single greatest expense lies in construction, with the average cost of construction being $4.7 million. The average year of construction for the represented firms is 1976, with an average last major renovation in 1997. Purchases of turf and equipment comprise the two greatest annual expenditures, each reaching approximately $1.8 million for a combined 35 % of total expenditures. Other major expense categories include chemicals and fertilizers (21 %), facilities and maintenance (20 %), and overhead and miscellaneous costs (16 %).

Commercial and Institutional

The estimates for commercial and institutional expenditures are recorded in Table 15. These peripheral consumers of green industry products include local businesses, as well as public schools, colleges and universities, and hospitals. The 26 respondents within this sector spent a total of $490,000 on green industry products, or an average of

just over $40,000 per firm. Major purchase categories include container and field grown shrubs and trees, turfgrass and sod, hard goods and propagation materials, and assorted flowering plants. However, these items combined make up just 25 percent of annual expenditures. The greatest cost for the commercial and institutional sector lay in overhead, which accounted for 42 percent of annual expenditures. Other significant expenditures include miscellaneous costs (11 percent), telephone and communication (6 percent), and facilities (5 percent).

Employment

The 418 firms represented in the survey employ a total of 3,025 workers, including seasonal/part time, full time, management and clerical, as well as sales staff employees. Table 16 summarizes the distribution of workers by sector, and includes only totals for direct employment levels. In 2002, the surveyed firms employed a total of 1,065 seasonal and part time workers, 1,392 full time workers, 375 managerial and clerical workers, and 193 sales staff. Tables 17-21 provide a more detailed summary of employment composition by sector, including average levels for wages and hours, as well as total benefits and varying degrees of migrant labor participation.

Wage estimates were calculated by dividing total payroll expenses by total man hours for each firm. Wage observations were then averaged across all firms in each sector. The resulting wage levels represent average wage values for each sector, rather than individual wage rates. Estimates for annual hours per worker were calculated similarly. Survey respondents were asked to approximate total weekly hours, as well as total work weeks per year for each employee category. These figures were then

multiplied to estimate total annual hours per worker for each employee category. For instance, a survey response with a 40-hour week for 50 weeks per year would equal 2000 annual hours per worker. Again, the resulting products were averaged across firms for each sector. Estimates are also provided for the average number of workers per firm for each employee category. It should be noted that these averages include only firms hiring employees in each category, and excludes firms that did not hire workers for each particular category.

Survey respondents were asked to provide an approximate ratio of migrant to local workers within their firm. These ratios were averaged across firms to provide an approximate level of migrant participation for each sector. Total benefits listed within the survey include health and life insurance, worker's compensation, and annual bonuses. The total benefits expense was then divided by the total number of employees to equal total benefits per worker for each firm. These levels were averaged across firms to provide an estimate of total benefits per worker for each sector.

Nursery and Greenhouse

Employee composition for the nursery and greenhouse sector is summarized in Table 17. The nursery and greenhouse respondents employed a total of 990 workers. The 115 firms represented in this study employed a total of 315 seasonal and part time workers, with an average of 5.3 seasonal and part time workers per firm during 2002. These employees earned an average wage of $9.88 per hour, and worked an average of 741 annual hours per employee. The nursery and greenhouse sector relies more heavily upon its full time and professional employees, with a total of 498 full time workers, 116

management and clerical workers, and 61 sales staff. Full time workers earned an average wage of $10.87 per hour, and worked an average of 2,090 annual hours per employee, or just over 40 hours per week. Producers employed an average of 9.2 full time workers per firm. Respondents employed an average 2.8 management and clerical staff, who earned an average wage of $18.04, for an average of 2,196 annual hours per worker. The mean wage for sales staff employees is $16.59 but may not fully reflect commission earnings. There were 3.1 Sales staff employees per firm, who worked an average of 2141 hours per year. Roughly 16.8 % of the nursery and greenhouse labor force was comprised by migrant workers in 2002. Producers paid an average of $1,341 in annual benefits per worker.

Turfgrass and Sod

Employment estimates for the turfgrass and sod sector are listed in Table 18. The 18 respondents for turfgrass and sod employed 158 workers in 2002. Nearly half of these employees or 68 were seasonal and part time workers, for an average of 5.7 per firm. Seasonal and part time workers earned an average wage of $9.60 and worked approximately 925 hours per year. Producers employed 61 full time workers, or 5.1 per firm. Full time workers earned an average wage of $10.52 and worked an average 2,246 hours per year. Survey respondents employed 25 management and clerical workers, or 2.1 per firm. These employees earned an average wage of $21.42 and worked roughly 2,030annual hours. Just three of the respondents hired sales staff workers, for a total of 4 workers, or 1.3 per firm. Sales staff employees earned an average wage of $22.22 and worked approximately 2,132 hours per year. Migrant workers comprised 9.4 % of the

turfgrass and sod labor force and producers paid roughly $1,158 in annual benefits per worker.

Lawn and Landscape

The lawn and landscape survey responses for employment are listed in Table 19. The lawn and landscape respondents employed 1,123 workers. With a total of 426 employed and 3.9 per firm, seasonal and part time workers comprise a greater portion of this sector's labor force. Seasonal and part time employees earned an average wage of $9.33 per hour and worked an average 819 hours per year. Survey respondents employed 485 full time workers for an average of 4.3 per firm. Full time employees earned an average wage of $9.71 and worked approximately 2,022 annual hours. The lawn and landscape sector relies less heavily upon its professional staff. Producers employed a total of 138 management and clerical workers, or 1.9 per firm. These employees earned an average wage of $13.26 and worked roughly 1937 annual hours. Producers employed a total of 74 sales staff, or 1.6 per firm. Sales staff employees earned an average wage of $13.44 and worked an average of 1,925 hours per year. Migrant workers comprise just 7.4 % of the lawn and landscape labor force. Survey respondents paid an average of $1,039 in annual benefits per worker.

Golf Course

The golf course employment levels are summarized in Table 20. The 25 respondents employed 507 workers in 2002. Of these, 150 were seasonal and part time employees, for an average of 6.8 per firm. Seasonal and part time employees earned an

average wage of $7.68 and worked approximately 853 hours per year. Full time employees comprised more than half of all workers in the golf course sector. The 287 full time workers earned an average wage of $9.98 and worked roughly 2,227 annual hours. There were an average 12.0 full time workers per firm. The respondents employed 66 management and clerical workers, or 3.3 per firm. Their average wage rate was $17.26 for 2,466 hours per year. Just 3 firms hired sales staff employees, for a total of 4 or 1.3 per firm. Sales staff employees earned an average wage of $16.25 and worked approximately 2,000 hours in 2002. At 20.4 %, the golf course sector employed the greatest proportion of migrant workers. Golf course respondents also provided the highest level of annual benefits to their employees, roughly $1,672 per worker.

Retail

Employment estimates for the retail sector are listed in Table 21. The retail sector relies more heavily than the other industry sectors upon seasonal and part time workers. The 43 retail respondents employed a total of 248 workers, of whom 107 are seasonal and part time, for an average of 4.0 per firm. At $7.48 this sector has the lowest average seasonal and part time wage rate. These employees worked approximately 962 hours in 2002. The respondents hired 61 full time workers, or 3.8 per firm. Full time employees earned a wage rate of roughly $10.46 for 2,088 annual hours. The respondents hired 30 management and clerical workers, or 1.7 per firm. These employees earned an average wage of $15.96 and worked approximately 1,890 hours in 2002. Retail firms hired 50 sales staff workers, or 3.3 per firm. This is the highest proportion of sales staff within the survey. Sales staff employees earned an average wage rate of $12.49 and worked 2,165

annual hours. Respondents paid an average of $1,395 in benefits per worker. Retail firms were not asked to report their levels of migrant labor participation.

Industry Concerns

The final component of the survey catalogues a series of possible threats to each sector. Respondents were asked to indicate their level of concern regarding each possible threat on a scale from 1 to 5, from very little concern to very high concern. The average levels of concern for each sector regarding each possible threat are listed in Table 22.

Not surprisingly, water restrictions appear to pose one of the most serious threats to all sectors included in the survey. The producer sectors (Nursery and Greenhouse, Turfgrass and Sod, Lawn and Landscape), as well as the retail sector shared high levels of concern for both low prices and high production costs. The retail, golf course, and commercial/ institutional sectors each indicated high levels of concern for general economic conditions. The lawn and landscape, retail, and golf course respondents highlighted rising energy costs as a major threat. The lawn and landscape and retail sectors shared a common concern for lack of professionalism within their labor force. Both the nursery and greenhouse and golf course respondents expressed their greater concern for chemical restrictions. Lawn and landscape and golf course respondents each signaled equipment costs as a threat to their industry. The retail and golf course respondents shared high levels of concern for government regulations. Interestingly, although the retail sector recorded the lowest average wages for seasonal and part time workers, retail respondents indicated the highest level of concern for labor costs. The

nursery and greenhouse respondents also expressed their unique concern for the market power of large chains.

Methodology

An IMPLAN input-output model was used to estimate the economic impact of Alabama's green industry (MIG, Inc., 2004), based upon the survey data. The survey findings for the nursery and greenhouse, lawn and landscape, and turfgrass and sod sectors were first expanded to estimate state levels for total income, total costs and total exports. Due to the varied availability of statewide information, separate expansion methods are imposed for each sector. Expansion results are listed in Appendix C.

The expanded survey results were then imported into the IMPLAN model. IMPLAN uses an input-output framework (Miller and Blair) to model a regional or state economy through estimated industry, employee, household, and government transactions. The model is based upon a set of direct, indirect, and induced multipliers to estimate the total economic impact of stated producer activity. The multipliers for output, value added, and indirect business taxes represent units of dollars per dollar of output. The employment multiplier represents total jobs per million dollars in output. The multipliers differ by sector due to variances in industry structure and local supply chains. Total economic impact includes the direct effects of total sales, as well as the indirect effects of producer purchases from firms external to the industry, and the induced effects of employee household spending.

Total economic impacts for the nursery and greenhouse, turfgrass and sod, and lawn and landscape sectors were calculated through:

$$I_{ij} = S_i (A_{ij}) + E_i (B_{ij} + C_{ij});$$

Total economic impacts for the retail trade sector were calculated through:

$$I_{ij} = G_i (A_{ij}) + E_i (B_{ij} + C_{ij}),$$

where

I_{ij} is total impact for each sector (i), and economic activity (j) for output, employment, value added, and indirect business taxes.

S_i is total sales for each sector (i).

E_i is total export sales, both to other states and international, for each sector (i).

G_i is the gross margin (0.295) on retail sales for sector (i).

A_{ij} represents the direct effects multiplier for sector (i) and economic activity (j).

B_{ij} represents the indirect effects multiplier.

C_{ij} represents the induced effects multiplier.

Expansions

Nursery and greenhouse

Income expansions for the nursery and greenhouse sector are listed in Table 1. A total of 115 nursery and greenhouse firms responded to the survey, out of an estimated 767 statewide. The total number of state firms is derived from the Alabama Department of Agriculture and the Alabama Nurseryman's Association membership roster. The state total farms and survey respondents are each stratified according to their levels of 2002 cash receipts, ranging from less than $1,000 to $1 Million or more. Expansion factors are calculated as the ratio of state total farms to total survey respondents for each level of cash receipts. The expansion factors are then applied to the survey's total reported income

to reach an expanded income estimate for each level of cash receipts. The expansions result in a total estimated income just under $205 Million for the nursery and greenhouse sector.

$$Expansion\ Factor_i = Total\ Farms_i \,/\, Total\ Respondents_i$$

$$Expanded\ Income_i = Expansion\ Factor_i (Reported\ Income_i)$$

This method of stratification is employed to prevent an overweighting of larger firms, which would result in inflated estimates for total income. For instance, without stratification there would be one expansion factor, 6.7 (767/115). When applied to total reported income, this leads to an expanded income of roughly $475 Million, which is more than twice the estimate achieved through stratification. In addition, the Alabama Department of Agriculture records in its annual bulletin total cash receipts for the nursery and greenhouse and turfgrass and sod combined sectors at roughly $250 Million for 2002. In light of these estimates, stratification is believed to provide a more accurate income expansion.

While exports are included in total income, they are also transformed separately in the IMPLAN model. Unlike cash receipts, exports are considered a final demand product. In other words, it is assumed that export output leaves the state, unlike the domestic portion of cash receipts which may have additional transactions within the state economy. Table 2 lists the estimated nursery and greenhouse exports for 2002.

Stratification by cash receipts is similarly employed for nursery and greenhouse exports. The percentage of respondents who reported export income in the survey is calculated for each level of cash receipts. This percentage is then applied to the state total number of firms to reach an estimated number of state total firms with exports for

2002. This results in an estimated 402 state firms with exports. The survey's reported export income is averaged for each level of cash receipts. This average level of exports per firm is then applied to the number of estimated total firms with exports for an estimated total exports by category. The estimated 2002 state total exports for the nursery and greenhouse sector are roughly $89 Million.

$$Estimated\ Farms_i = \%Exporting\ Respondents_i (Total\ Farms_i)$$

$$Estimated\ Exports_i = Estimated\ Farms_i (Average\ Exports_i)$$

The income expansion method is replicated to estimate total costs for the nursery and greenhouse sector, provided in Table 3. The cost expansion factors slightly differ from the income expansion factors due to the respondents' occasional decision to omit either cost or income levels. Thus, there are 113 respondents reporting costs, compared to 115 respondents reporting income. Again, the expansion factor is simply the ratio of total farms to the number of respondents. The expansion factors are then applied to total reported costs, to reach estimates for statewide costs by level of cash receipts. This results in a statewide total estimated cost of roughly $77 Million for the nursery and greenhouse sector.

$$Expansion\ Factor_i = Total\ Farms_i \,/\, Total\ Respondents_i$$

$$Expanded\ Costs_i = Expansion\ Factor_i (Reported\ Costs_i)$$

Turfgrass and Sod

Table 4 compiles results for the turfgrass and sod income expansion. Figures for total firms and stratification levels were drawn from the Alabama Turfgrass and Sod

Association, as well as a telephone interview with the Alabama state statistician. There are an estimated 69 total turfgrass and sod firms in the state for 2002, and a total of 17 survey respondents for this sector. The turfgrass and sod expansions employ the same methods used for the nursery and greenhouse sector. The expansion factor is the ratio of total state firms to total survey respondents, stratified by cash receipts. This expansion factor is applied to the total reported income to reach an expanded income for each level of cash receipts. This results in an expanded total income of just over $78 Million for the turfgrass and sod sector.

Estimated Exports for the turfgrass and sod sector are listed in Table 5. The percentage of farms reporting exports for each level of cash receipts was calculated from survey data. These percentages were than applied to the state total farms to estimate a total of 48 farms statewide with exports. The estimated number of farms is applied to the average level of exports to produce estimated export income for each level of cash receipts. The total estimated export income for 2002 is roughly $19 Million for the turfgrass and sod sector.

Table 6 outlines the turgrass and sod cost expansion. The expansion factors used to estimate total costs are identical to those used to estimate income for the turfgrass and sod sector. The 17 respondents for this sector reported total costs of nearly $6.7 Million. The expansion factors were applied to the survey's total reported costs for each level of cash receipts to arrive at subsequent estimates for total statewide costs. The estimated total cost for the turfgrass and sod sector is $38 Million.

Lawn and Landscape

State totals for income, costs and exports in the lawn and landscape sector are drawn directly from IMPLAN estimates. Table 7 lists these totals. This is due partly to a lack of income stratification in state reporting, but also to the existence of unlicensed lawn and landscape firms operating in the state. The survey was mailed exclusively to licensed firms, resulting in a likely under-representation of the size of the lawn and landscape sector. IMPLAN bases its estimate not only on agricultural census results, but also upon county business patterns. The IMPLAN estimates for total income and exports in the state's lawn and landscape sector are just over $521 Million and $110 Million respectively. IMPLAN does not estimate total costs. Total costs are estimated based upon the ratio of IMPLAN estimated state total income to the survey's reported income, an expansion factor of 8.43. This expansion factor is applied to the survey's total reported costs to equal an estimated state total cost of roughly $305 Million.

Expansion Factor=IMPLAN Income/Reported Income

Expanded Costs=Expansion Factor(Reported Costs)

Impact Results

Impact Results are listed in Appendix D. The nursery and greenhouse expanded sales and exports, an estimated $205 Million and $89 Million respectively, were imported into the IMPLAN model below in Table 1. The direct effects of total sales, combined with the indirect and induced effects of total exports, generate total output impacts nearing $306 Million. The industry directly employs 4,319 workers, with an estimated total employment impact of 5,726 jobs statewide. Total value added impacts and indirect

business tax impacts include the direct effects of total sales, as well as the indirect and induced effects of export sales. Total value added impacts and indirect business tax impacts for the nursery and greenhouse industry were roughly $167 Million and $6 Million respectively.

Table 2 reports the total economic impacts for the turfgrass and sod sector. With direct effects of $78 Million in total sales, added to the indirect and induced effects of $19 Million in export sales, the industry fuels a total output impact near $100 Million. The 69 turfgrass and sod firms produce a total employment impact of roughly 1,300 jobs. The industry creates $53 Million in total value added impacts, and offered $1.5 Million in indirect business tax impacts.

The Lawn and Landscape economic impacts are listed in Table 3. The direct effects of $521 Million in total sales, along with the indirect and induced effects of $110 Million in total exports propelled a total output impact just under $650 Million. The 1,029 firms employ a total of 8,521 workers, creating a total of 10,273 jobs statewide. Largely a service based industry, the lawn and landscape sector lends nearly $400 Million in total value added impacts. The industry also provides roughly $18 Million in indirect business tax impacts to the state of Alabama.

The retail sector ranges from locally owned garden centers to corporate supermarkets, home improvement warehouses and mass merchandisers. Due to its wide structural variance coupled with a low survey response rate, the retail sector proved more difficult to quantify or expand given survey data. However, the retail sector plays a vital role in purveying green industry goods to consumer markets. Estimates for total firms, employees, sales, and exports were subsequently derived from county business patterns.

Results for the retail economic impacts are provided in Table 4. There are an estimated 727 green industry retail firms employing 6,957 employees. Through transport, marketing, and customer services, retail firms add relatively higher value to green industry products, which supports the sector's $1.4 Billion in total sales, along with $407 Million in total exports.

It is important to note that only the gross margin of retail sales is subject to direct multiplier effects. A standard gross margin of 29.5 percent is applied to total sales. Because retail firms purchased their goods from the producer sectors, applying the direct effects multiplier to total sales would result in a double counting of these green industry products, along with inflated total output impact estimates. The direct effects of gross margin sales, combined with the indirect and induced effects of export sales, produce a total output impact just over $850 Million. The retail industry also creates more than 13,000 jobs statewide, and provides more than $240 Million in indirect business tax impacts. The retail sector's most dramatic contribution to the state lies in value added. The industry generates just over $640 Million in total value added impacts, which is roughly half of the industry's total value added impact.

Table 2 summarizes the total green industry economic impacts. The 2,592 total firms amassed roughly $2.2 Billion in total sales, of which $625 Million was derived from exported goods and services. The industry directly employs nearly 21,000 workers, and creates an additional 10,000 jobs in related industries. Total value impacts top $1.2 Billion, mostly due to the retail sector. The industry provides $270 Million in indirect business tax impacts to the state budget. Total estimated output impacts are $1.9 Billion.

Table 2. Total Green Industry Economic Impacts, 2002

Total Operations		2,592
Total Sales	$	2,161,653,295
Export Sales	$	625,600,104
Number Employees		20,845
Total Employment Impacts (jobs)		30,860
Total Value Added Impacts	$	1,258,883,904
Total Indirect Business Tax Impacts	$	269,352,100
Indirect Output Impacts	$	107,872,285
Induced Output Impacts	$	594,259,727
Total Output Impacts	$	1,906,797,356

Conclusion

Several recent green industry economic impact studies have been conducted in the southeast region. A 2000 report of the Florida green industry estimates a total output impact of $9.16 Billion, total value added impact of 6.40 Billion, and a total employment impact of 192,000 jobs (Hodges and Haydu). A 2001 study conducted for Tennessee finds a total output impact of $6.37 Billion, total value added impact of $4.50 Billion, and a total employment impact of 73,486 jobs (Hall). Louisiana holds the greatest similarities to Alabama in the region. A 2001 Louisiana impact study reports $2.03 Billion in total green industry output impact and a total employment impact of 47,776 jobs (Pinel, et al.).

Alabama's green industry has experienced remarkable growth relative to other crop sectors within the state. Despite its ranking by the state department of agriculture as Alabama's largest crop in terms of cash receipts, the green industry is omitted from the state agricultural statistics bulletin's list of state highlights, agricultural export analysis, and major crop analysis. Major crops detailed in the bulletin include cotton, soybeans, and peanuts. In perspective, horticulture crops reported higher cash receipts than the cotton, soybean, and peanut industries combined. While the green industry continues to

grow within the state, these commodities have either remained static, or steadily declined for the past two decades. The green industry represents a relatively new provider of agricultural goods and services, in light of the state's history growing cotton, soybeans, and peanuts. This may explain its lack of recognition compared to the state's more traditional commodities.

Horticultural firms contributed $1.9 Billion in total output impact and more than 30,000 jobs to the Alabama economy in 2002. The estimated 2002 gross state product (GSP) for Alabama is roughly $125 Billion (Bureau of Economic Analysis), making the green industry 1.5 percent of the total state economy. This study represents the first attempt to estimate the green industry's role in Alabama's economy. This is a dynamic industry, with rapid growth both in the state and nationally. Hence, continued future study will be critical to maintain an accurate determination of the green industry's economic impact in Alabama.

Appendix A

Survey Administration

Initial Contact Postcard

Date

Dear Green Industry Affiliate:

Within the next two weeks you will receive in the mail a request to complete a brief survey that will be used in an upcoming economic impact study of for the green industry. This study is being conducted by researchers at Auburn University, and it is supported by the Alabama Department of Agriculture and Industries as well as industry associations.

I am writing in advance to inform you that you will be contacted. This is an important study designed to help public agencies and private firms evaluate the overall economic contribution of the green industry to Alabama's economy.

If you are no longer associated with this industry, please call the number below and you will be removed from the mailing list.

I sincerely appreciate your time and consideration. Your knowledge and experience will enable researchers to further emphasize the importance of the green industry in Alabama.

Nursery and Greenhouse Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

1. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

2. Please indicate the types of products grown by listing the **dollars earned or percent of total nursery sales** they represent:

Type Of Crop		Dollars	Or	% of Sales
Greenhouse Crops	Foliage	$		%
	Bedding plants	$		%
	Potted flowering plants	$		%
	Herbaceous plants	$		%
	Vegetable transplants	$		%
Nursery Crops	Container-grown shrubs	$		%
	Container-grown trees	$		%
	Field-grown shrubs	$		%
	Field-grown trees	$		%
	Container grasses and ground cover	$		%
	Perennials	$		%
	Roses	$		%
Turf Grass Crops		$		%
Christmas Trees		$		%
Propagation Materials (liners, plugs, tissue culture, etc.)-for sale only		$		%
Other (Specify)		$		%
TOTAL		$		**100%**

3. How much area of production space does your nursery utilize at this general location (include aisles, driveways, and walkways):

(a) _____**acres** of nursery bed space in the open (b) _____**sq. ft**. of greenhouse or shade house enclosed

4. Please indicate the percentage of your labor force that comes from the following sources. (Total should add up to 100%)

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____%
(d) Local Labor_____%

5. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire.

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

6. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

7. What is your annual cost for the following employee-related coverage?

   (a) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
   (d) $_____Bonuses

8. By what percentage do you expect you business volume to change over the next 5 years?

   _____% ☐ Increase ☐ Decrease

9. What percent of your **total firm sales** are made to buyers **outside of Alabama** _____%?

10. In which places do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (e) Other Southeast ☐ (g) Northeast ☐ (International_____
☐ (b) Florida ☐ (d) Georgia ☐ (f) Southwest ☐ (h) Northwest

11. In what county or counties is your operation located? _____ _____
    _____

(Over please – more on reverse side)

12. Please provide a "**best estimate"** of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent or	Percent of Sales
Containers	**$**	%
Soil mixes	**$**	%
Propagation stock (seed, cuttings, plugs, tissue culture plantlets, etc.)	**$**	%
Plants purchased from other growers	**$**	%
Pesticides (all agri-chemicals)	**$**	%
Fertilizers (synthetic and organic)	**$**	%
Hardscape material (irrigation etc.)	**$**	%
Equipment (purchases, leases, maintenance, and repairs)	**$**	%
Facilities (purchases, leases, maintenance, and repairs)	**$**	%
Shipping and transportation	**$**	%
All overhead items (utilities, insurance, interest, etc.)	**$**	%
Other (specify):	**$**	%
TOTAL	**$**	**100%**

13. In order to estimate the total size of the grower sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000
(b) $100,000 to $199,999
(c) $200,000 to $299,999
(d) $300,000 to $399,999
(e) $400,000 to $499,999
(f) $500,000 to $749,999
(g) $750,000 to $999,999
(h) $1,000,000 to $1,999,999
(i) $2,000,000 to $2,999,999
(j) $3,000,000 to $3,999,999
(k) $4,000,000 to $4,999,999
(l) $5,000,000 or above

14. Please provide a **"best estimate"** of the percentage of your total sales to the following sources? (Total should add up to 100%.)

Categories	**Percent of Total Sales**
Directly to the Public	%
Municipalities	%
Retail Nursery/Garden Centers	%
Retail Mass Merchandisers	%
Re-wholesalers (brokers, other growers, etc.)	%
Landscape Contractors	%
Lawn and Landscape Installation and Maintenance Firms	%
Florists	%
Arborists	%
Other (Specify)	%
TOTAL	**100%**

15. Please provide an estimate of your annual **water usage**. _____**gallons.** What percentage of your water used comes from:

(a) Private Well_____% (b) Natural Surface _____% (c) Recaptured _____%
(d) City/County _____%

16. What percentage of your company's marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

17. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition by plant substitutes	**1**	**2**	**3**	**4**	**5**
Competition from imported plants	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Turfgrass and Sod Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

18. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

19. Please indicate the level of **turfgrass production in acres** for your operation:

	Type Of Production	Certified	Non-Certified
Production	Sod	acres	acres
	Sprigs	acres	acres
	Seed	acres	acres
Types of Turf	Fescue	acres	acres
	Bermuda	acres	acres
	Centipede	acres	acres
	Zoysia	acres	acres
	St. Augustine	acres	acres
	Other (Specify)	acres	acres
TOTAL		**acres**	**acres**

20. How much do you plan to change your acreage in turf production over the next five years?

_____acres ☐ Increase ☐ Decrease

21. Please indicate the percentage of your labor force that comes from the following sources. (Total should add up to 100%)

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____% (d) Local Labor_____%

22. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire?

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

23. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

24. What percent of your **total firm sales** are made to buyers **outside of Alabama** _____%?

25. In which places do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (e) Other Southeast ☐ (g) Northeast ☐ (i) International_____

☐ (b) Florida ☐ (d) Georgia ☐ (f) Southwest ☐ (h) Northwest

26. What is your annual cost for the following employee-related coverage?

(b) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

27. Please provide an estimate of your annual **water usage**. _____**gallons.** What percentage of your water used comes from:

(a) Private Well_____% (b)Natural Surface _____% (c) Recaptured_____% (d) City/County _____%

28. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

29. In what county or counties is your operation located? _____ _____ _____

(Over please – more on reverse side)

30. Please provide a "**best estimate"** of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent Or	Percent of Sales
Shipping and transportation	$	%
Equipment repairs and maintenance	$	%
Equipment purchases and leases	$	%
Plant material purchased	$	%
Fuel	$	%
Pesticides	$	%
Fertilizers	$	%
Other Chemicals	$	%
Telephone and other communication	$	%
Soil Fumigation	$	%
Hardscape materials (irrigation, etc.)	$	%
Advertising and marketing	$	%
All overhead items (utilities, insurance, interest, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

31. In order to estimate the total size of the grower sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000
(b) $100,000 to $199,999
(c) $200,000 to $299,999
(d) $300,000 to $399,999
(e) $400,000 to $499,999
(f) $500,000 to $749,999
(g) $750,000 to $999,999
(h) $1,000,000 to $1,999,999
(i) $2,000,000 to $2,999,999
(j) $3,000,000 to $3,999,999
(k) $4,000,000 to $4,999,999
(l) $5,000,000 or above

32. Please provide a **"best estimate"** of the percentage of your total sales to the following sources? (Total should add up to 100%.)

Categories	Percent of Total Sales
Directly to the Public	%
Golf Courses	%
Municipalities	%
Retail Nursery/Garden Centers	%
Retail Mass Merchandisers	%
Re-wholesalers (brokers, other growers, etc.)	%
Other Turfgrass Producers	%
Greenhouse Growers	%
Landscape Contractors	%
Landscape Installation and Maintenance Firms	%
Lawn Care and Maintenance Firms	%
TOTAL	**100%**

33. What percentage of your company's marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

34. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition from new firms	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor costs	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Lawn and Landscape Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

35. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

36. Please report **dollars earned or percentage of sales** for the following products or services: (Use the most convenient estimate.)

Type Of Service/Material	Dollars Earned Or	Percent Of Sales
Landscape design services	$	%
Landscape installation services	$	%
Landscape maintenance services	$	%
Lawn care and maintenance services	$	%
Sub-contracts: design, maintenance, and service	$	%
Irrigation installation or contracting	$	%
Live Plants	$	%
Horticultural supplies, equipment or hard goods	$	%
Other (Specify)	$	%
TOTAL	$	**100%**

37. Please indicate the percentage of your labor force that comes from the following sources. **(Total should equal 100%)**

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____%
(d) Local Labor_____%

38. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire?

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

39. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

40. What is your annual cost for the following employee-related coverage?

41. $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp (d) $_____Bonuses

42. What percent of your **firm's work** and/or **services** is provided for customers **outside of Alabama** _____%?

43. In which states do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (c) Other_____
☐ (b) Florida ☐ (d) Georgia

44. Please give an estimate of planned expenditures on major construction or equipment purchases for 2003.

$_____Equipment $_____Construction

45. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

46. In what county or counties is your operation located? _____ _____ _____

47. In order to estimate the total size of the landscape sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000	(e) $400,000 to $499,999	(i) $2,000,000 to $2,999,999
(b) $100,000 to $199,999	(f) $500,000 to $749,999	(j) $3,000,000 to $3,999,999
(c) $200,000 to $299,999	(g) $750,000 to $999,999	(k) $4,000,000 to $4,999,999
(d) $300,000 to $399,999	(h) $1,000,000 to $1,999,999	(l) $5,000,000 or above

(Over please – more on reverse side)

48. Please give your best estimate of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent Or	Percent of Sales
Material Expenses (costs of resale materials such as plants, mulches, sod, seed, etc.)	$	%
Equipment repairs and maintenance	$	%
Equipment purchases and leases	$	%
Fuel	$	%
Pesticides	$	%
Fertilizers	$	%
Other Chemicals	$	%
Telephone and other communication	$	%
Hardscape materials (irrigation, etc.)	$	%
Facilities (mortgages, leases, maintenance, and repair)	$	%
All overhead items (utilities, insurance, interest, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

49. What percentage of your total sales/services was to the following sources? (Please make sure the percentage sums to 100%. **For example,** if total sales came equally from two categories, then write in 50% in the blank next to each).

Categories	Percent of Total Sales
Homeowners	%
Apartments and condominiums	%
Commercial establishments (restaurants, hotels, cemeteries, etc..)	%
Governments	%
Builders and developers	%
Other landscapers, interiorscapers or lawn maintenance firms	%
Other (Specify) _____	%
TOTAL	**100%**

50. What percentage of your company's advertising/marketing budget is allocated to the following marketing practices?

_____% Personal Selling	_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Commissioned Salespersons	_____% Radio or Television Advertising
_____% Promotions	_____% Computer Website
_____% Trade Shows	_____% Direct Mail
_____% Trade Magazine Advertising	_____% Other (Specify)_____

51. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Unlicensed competitors	**1**	**2**	**3**	**4**	**5**
Increasing equipment costs	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition by plant substitutes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
OSHA requirements	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor cost	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Retail Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

52. How would you classify your operation?

☐ (a) Independent Garden Center
☐ (b) Garden Center Chain (multiple outlets)
☐ (c) Mass Merchandiser

53. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

54. Please report the **dollars or percentage of sales** for the following products or services: (Use the most convenient estimate.)

Type Of Product	Dollars	Or	% of Sales
Foliage	$		%
Bedding plants	$		%
Potted flowering plants	$		%
Herbaceous plants	$		%
Vegetable transplants	$		%
Container-grown shrubs	$		%
Container-grown trees	$		%
Field-grown shrubs	$		%
Field-grown trees	$		%
Container grasses and ground cover	$		%
Perennials	$		%
Roses	$		%
Turf Grass Crops	$		%
Christmas Trees	$		%
Propagation Materials (liners, plugs, tissue culture, etc.)-for sale only	$		%
Hard goods (tools, irrigation parts, lawnmowers, etc.)	$		%
Other (Specify)	$		%
TOTAL	$		**100%**

55. What is the approximate size of your retail display area (including indoor and outdoor areas)?

(a) _____ **sq. ft.** Devoted to Hard Line Products (b) _____ **sq. ft.** Devoted to Green Goods

56. By what percentage do you expect your square footage to expand over the next 5 years? _____%

57. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

58. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire.

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

59. What is your annual cost for the following employee-related coverage?

(c) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

60. What is the total dollar amount of plant materials purchased last year from producers **outside of Alabama? $** _____
What percentage of your total purchases does this represent? _____%

61. In what county or counties is your operation located? _____ _____ _____

62. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

(Over please – more on reverse side)

63. Approximately what percentage of your 2002 sales volume was:

(a) Residential _____% (b) Commercial/Industrial _____% (c) Government/Public _____%

64. Please provide the following information regarding buildings (structures), vehicles, and equipment (including office equipment):

Item	Total Current Value	Annual Maintenance & Repairs	Cost to Replace
Buildings and Structures			
Vehicles			
All other equipment			

65. Please give your best estimate of your **annual expenditures (in dollars) or percent of total garden center sales** for the following products (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Sold Or	Percent of Sales
Agri-Chemicals (all types)	$	%
Fertilizers (synthetic and organic)	$	%
Soil and potting mixes	$	%
Turfgrass/Sod	$	%
Foliage plants	$	%
Bedding plants	$	%
Potted flowering plants	$	%
Vegetative or herb plants	$	%
Shrubs	$	%
Trees	$	%
Christmas trees	$	%
Other plant material	$	%
Facilities (purchases, leases, maintenance, and repairs)	$	%
Telephone and other communication	$	%
Hard goods (tools, irrigation parts, lawnmowers, etc.)	$	%
Shipping and transportation	$	%
All overhead items (utilities, insurance, interest, repairs, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

66. In order to estimate the total size of the grower sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000
(b) $100,000 to $199,999
(c) $200,000 to $299,999
(d) $300,000 to $399,999
(e) $400,000 to $499,999
(f) $500,000 to $749,999
(g) $750,000 to $999,999
(h) $1,000,000 to $1,999,999
(i) $2,000,000 to $2,999,999
(j) $3,000,000 to $3,999,999
(k) $4,000,000 to $4,999,999
(l) $5,000,000 or above

67. What percentage of your company's marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

68. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:

1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Quality of green industry products	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor cost	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Golf Course Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

69. How would you classify your golf operation in terms of ownership?

☐ (a) Private	Privately owned and use generally is restricted to members and guests. (Example: membership-only golf clubs
☐ (b) Semi-private	Privately owned, but the facility is open on a fee basis to nonmembers. (Example: resort-oriented golf courses
☐ (c) Public	Owned by a government agency and generally open to the public for use. (Example: city golf courses)

70. How many holes does your facility have?_____(number of holes)

71. How many rounds of golf are played per year?

(a) 9 holes_____(number of rounds) (b) 18 holes_____(number of rounds)

72. What is the weekday greens fee for 18 holes with a cart? $_____ Without a cart $_____

73. What was the approximate construction cost for the golf course? $_____

74. In what year was it constructed? _____(year)

75. In what year was the most recent major renovation?_____(year)

76. What percentage of the total rounds was played by tourists (individuals who were not Alabama residents)? _____% tourists

77. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

78. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

79. Please indicate the percentage of your labor force that comes from the following sources. (Total should add up to 100%)

(a) Migrant Labor_____% (b) Local Labor_____%

80. What is your annual cost for the following employee-related coverage?

(d) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

81. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire.

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

82. In what county or counties is your operation located? _____ _____ _____

83. Please provide the following information regarding buildings (structures), vehicles, and equipment (including office equipment):

Item	Total Current Value	Annual Maintenance & Repairs	Cost to Replace
Buildings and Structures			
Vehicles			
All other equipment			

(Over please – more on reverse side)

84. What is the total dollar amount of plant materials and equipment purchased last year from producers **outside of Alabama?**
$_____. What percentage of your total purchases does this represent? _____%

85. Please give your best estimate of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent Or	Percent of Sales
Agri-Chemicals (all types)	$	%
Fertilizers (synthetic and organic)	$	%
Soil, soil conditioners and mulch	$	%
Irrigation	$	%
Turf installation and maintenance	$	%
Plant materials purchased	$	%
Equipment purchases and leases	$	%
Facility mortgages and rentals	$	%
Facilities and equipment repairs and maintenance	$	%
Telephone and other communications	$	%
All overhead items (utilities, insurance, interest, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

86. In order to estimate the total size of your sector in Alabama, please give your firm's **total gross income for 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000
(b) $100,000 to $199,999
(c) $200,000 to $299,999
(d) $300,000 to $399,999
(e) $400,000 to $499,999
(f) $500,000 to $749,999
(g) $750,000 to $999,999
(h) $1,000,000 to $1,999,999
(i) $2,000,000 to $2,999,999
(j) $3,000,000 to $3,999,999
(k) $4,000,000 to $4,999,999
(l) $5,000,000 or above

87. What was the total amount of revenue generated from the following sources in 2002?

Item	Revenue Generated
Membership Fees/Dues	$
Green Fees	$
Golf Cart Rental	$
Driving Range Usage and Golf Lessons	$
Pro Shop	$
Food and Beverages	$

88. Please provide an estimate of your annual **water usage**. _____**gallons.** What percentage of your water used comes from:

(a) Private Well_____% (b) Natural Surface _____% (c) Recaptured_____% (d) City/County _____%

89. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Poor worker education or skills	**1**	**2**	**3**	**4**	**5**
Increasing costs of equipment	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Quality of green industry products	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Competition from other golf courses	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor cost	**1**	**2**	**3**	**4**	**5**
Increasing energy/fuel costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Commercial and Institutional Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

90. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

91. How many years has this company been in business? _____ years

92. Please report the **dollars or percentage of your company's total purchases were** for the following products or services:
(Use the most convenient estimate.)

Type Of Product	Dollars	Or	% of Purchases
Cut foliage and flowers	$		%
Bedding plants	$		%
Potted flowering plants	$		%
Herbaceous plants	$		%
Vegetable transplants	$		%
Container-grown shrubs	$		%
Container-grown trees	$		%
Field-grown shrubs	$		%
Field-grown trees	$		%
Container grasses and ground cover	$		%
Perennials	$		%
Roses	$		%
Turf Grass Crops	$		%
Christmas Trees	$		%
Propagation Materials (liners, plugs, tissue culture, etc.)-for sale only	$		%
Hard goods (tools, irrigation parts, lawnmowers, etc.)	$		%
Other (Specify)	$		%
TOTAL	$		**100%**

93. In 2002, what was the approximate area of lawn and garden maintained for your company (**report either square footage or acreage**)?

(a) _____ square feet **or** (b) _____ acres

94. By what percentage do you expect this area to expand over the next 5 years? _____%

95. What percentage of your grounds maintenance is performed by:

(a) In-house staff _____% (b) Contractors _____ %

96. In 200, how many in-house employees worked with grounds maintenance in 2002? _____ number of employees

97. Please report your total annual expenditures for in-house grounds maintenance employees for 2002.
$_____

98. Please check the proper category that represents the total value of each product or service purchase by your business in 2002.

Product or Service	Total Value of Purchases								
	Less than $100	$100 to $499	$500 to $999	$1,000 to $2,999	$2,000 to $3,999	$4,000 to $5,999	$6,000 to $7,999	$8,000 to $9,999	$10,000 or more
Landscape plants									
Lawn and garden equipment or supplies									
Landscape design, installation or maintenance services									

99. What is the total dollar amount of plant materials purchased last year from producers **outside of Alabama? $** _____
What percentage of your total purchases does this represent? _____%

100. In what county or counties is your operation located? _____ _____ _____

101. By what percentage do you expect your purchases of green industry products and/or services to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

(Over please – more on reverse side)

102. Please provide the following information regarding buildings (structures), vehicles, and equipment (including office equipment):

Item	Total Current Value	Annual Maintenance & Repairs	Cost to Replace
Buildings and Structures			
Vehicles			
All other equipment			

103. Please give your best estimate of your **annual expenditures (in dollars) or percent of total garden center sales** for the following products (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Sold	Or	Percent of Sales
Agri-Chemicals (all types)	$		%
Fertilizers (synthetic and organic)	$		%
Soil and potting mixes	$		%
Turfgrass/Sod	$		%
Foliage plants	$		%
Bedding plants	$		%
Potted flowering plants	$		%
Vegetative or herb plants	$		%
Shrubs	$		%
Trees	$		%
Christmas trees	$		%
Other plant material	$		%
Facilities (purchases, leases, maintenance, and repairs)	$		%
Telephone and other communication	$		%
Hard goods (tools, irrigation parts, lawnmowers, etc.)	$		%
Shipping and transportation	$		%
All overhead items (utilities, insurance, interest, repairs, etc.)	$		%
Other (specify):	$		%
TOTAL	**$**		**100%**

104. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:

1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Quality of green industry products	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor cost	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Appendix B

Survey Findings

Table 1. Total Alabama Green Industry of Survey Respondents Sales and Expenditures, 2002

Sector	Gross Sales	Total Expenditures	Respondents
Nursery and Greenhouse	$ 70,840,892	$ 26,292,997	114
Turf Grass and Sod	$ 12,957,595	$ 2,473,911	17
Lawn and Landscape	$ 61,829,095	$ 23,074,239	191
Retail	$ 15,782,200	$ 12,387,717	43
Golf Course	$ 27,601,466	$ 10,179,946	25
Commercial and Institutional	N/A	$ 1,707,260	26
Total	$ 189,011,248	$ 82,610,859	414

Table 2. Alabama Green Industry Survey Respondents Nursery and Greenhouse Annual Sales, 2002

Type of Crop	*Total Revenue*	*Revenue Share*	*Average Revenue*
Foliage	$ 1,448,647	2.0%	$ 12,707
Bedding Plants	$ 7,388,250	10.4%	$ 64,809
Potted Flowering Plants	$ 2,486,850	3.5%	$ 21,814
Herbaceous Plants	$ 323,250	0.5%	$ 2,836
Vegetable Transplants	$ 162,800	0.2%	$ 1,441
Container-Grown Shrubs	$ 26,123,347	36.9%	$ 229,152
Container-Grown Trees	$ 3,910,653	5.5%	$ 34,304
Field-Grown Shrubs	$ 1,946,752	2.7%	$ 17,228
Field-Grown Trees	$ 5,907,400	8.3%	$ 52,278
Container Grasses/Ground Cover	$ 2,614,703	3.7%	$ 22,936
Perennials	$ 1,063,350	1.5%	$ 9,328
Roses	$ 1,089,663	1.5%	$ 9,558
Turf Grass Crops	$ 5,230,000	7.4%	$ 46,283
Christmas Trees	$ 371,000	0.5%	$ 3,283
Propagation Materials	$ 410,500	0.6%	$ 3,633
Other	$ 325,000	0.5%	$ 2,876
Average Gross	$ 621,411		
Total Gross Income	$ 70,840,892		

Table 3. Alabama Green Industry Survey Respondents Nursery and Greenhouse Sales Market, 2002

Category	*Percent of Total Sales*	*Total Sales*
Directly to Public	9%	$ 6,224,350
Municipalities	2%	$ 1,633,198
Retail Nursery/ Garden Centers	24%	$ 16,698,458
Retail Mass Merchandisers	12%	$ 8,285,479
Re-Wholesalers	26%	$ 18,414,065
Landscape Contractors	20%	$ 13,995,424
Landscape Installation	6%	$ 3,907,425
Florists	1%	$ 595,987
Arborists	0%	$ -
Other	2%	$ 1,086,507
Total	100%	$ 70,840,892

Table 4. Alabama Green Industry Survey Respondents Nursery and Greenhouse Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Containers	$ 1,373,647	5.2%	$ 27,473
Soil Mixes	$ 1,114,890	4.2%	$ 21,036
Propagation Stock	$ 2,735,993	10.4%	$ 66,732
Plants Purchased from Other Growers	$ 2,904,184	11.0%	$ 66,004
Pesticides	$ 1,082,665	4.1%	$ 18,667
Fertilizers	$ 1,120,184	4.3%	$ 18,364
Hardscape Material	$ 456,727	1.7%	$ 11,711
Equipment	$ 1,339,381	5.1%	$ 23,918
Facilities	$ 1,176,531	4.5%	$ 32,681
Shipping and Transportation	$ 2,441,961	9.3%	$ 65,999
All Overhead Items	$ 6,480,815	24.6%	$ 124,631
Other	$ 4,066,019	15.5%	$ 271,068
Average Expenditures	$ 457,600		
Total Expenditures	$ 26,292,997		

Table 5. Alabama Green Industry Survey Respondents Turfgrass and Sod Annual Acreage, 2002

Production Type		*Certified (Acres)*	*Non-Certified (Acres)*
Production	Sod	264	6,044
	Sprigs	4	0
	Seed	0	0
Types of Turf	Fescue	0	74
	Bermuda	54	2,032
	Centipede	0	6,349
	Zoysia	10	1,192
	St. Augustine	0	510
	Other	0	40
Total Acreage		332	16,241
Average Sales			$ 925,542
Total Sales			$12,957,595

Table 6. Alabama Green Industry Survey Respondents Turfgrass and Sod Sales Market, 2002

Category	*Percent of Total Sales*	*Total Sales*
Directly to the Public	19%	$ 2,414,664
Golf Courses	7%	$ 862,746
Municipalities	2%	$ 298,416
Retail Nursery/ Garden Centers	13%	$ 1,643,969
Retail Mass Merchandisers	0%	$ -
Re-Wholesalers	9%	$ 1,221,241
Other Turf Grass Producers	9%	$ 1,132,684
Greenhouse Growers	0%	$ -
Landscape Contractors	29%	$ 3,731,989
Landscape Installation and Maintenance Firms	10%	$ 1,266,036
Lawn Care and Maintenance Firms	3%	$ 385,850
Total	100%	$ 12,957,595

Table 7. Alabama Green Industry Survey Respondents Turf Grass and Sod Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Shipping and Transportation	$ 2,197,689	39.5%	$ 219,769
Equipment Repairs and Maintenance	$ 279,075	5.0%	$ 21,467
Equipment Purchases and Leases	$ 594,659	10.7%	$ 45,743
Plant Material Purchased	$ 72,476	1.3%	$ 8,053
Fuel	$ 287,836	5.2%	$ 22,141
Pesticides	$ 44,923	0.8%	$ 4,084
Fertilizers	$ 100,170	1.8%	$ 8,348
Other Chemicals	$ 54,523	1.0%	$ 5,452
Telephone and Other Communication	$ 229,677	4.1%	$ 19,140
Soil Fumigation	$ 17,000	0.3%	$ 2,833
Hardscape Materials	$ 111,081	2.0%	$ 12,342
Advertising and Marketing	$ 180,126	3.2%	$ 13,856
All Overhead Items	$ 831,000	14.9%	$ 63,923
Other	$ 563,499	10.1%	$ 80,500
Average Expenditures	$ 391,277		
Total Expenditures	$ 5,563,733		

Table 8. Alabama Green Industry Survey Respondents Lawn and Landscape Sales, 2002

Service/Material	*Total Revenue*	*Revenue Share*	*Average Revenue*
Landscape Design Services	$ 1,420,767	2.3%	$ 7,517
Landscape Installation Services	$ 15,047,130	24.3%	$ 79,614
Landscape Maintenance Services	$ 3,495,999	5.7%	$ 67,231
Lawn Care / Maintenance Services	$ 7,621,016	12.3%	$ 107,338
Sub-Contracts: Design, Maintenance	$ 176,538	0.3%	$ 10,385
Irrigation Installation or Contracting	$ 3,239,544	5.2%	$ 68,926
Live Plants	$ 2,600,970	4.2%	$ 78,817
Horticultural Supplies	$ 1,002,549	1.6%	$ 50,127
Other	$ 1,267,575	2.1%	$ 50,703
Average Gross	$ 341,597		
Total Gross Income	$ 61,829,095		

Table 9. Alabama Green Industry Survey Respondents Lawn and Landscape Sales Market, 2002

Category	*Percent of Total Sales*	*Total Sales*
Homeowners	56%	$ 34,377,825
Apartments and Condominiums	9%	$ 5,684,064
Commercial Establishments	19%	$ 12,033,089
Governments	1%	$ 548,986
Builders and Developers	12%	$ 7,337,453
Other Landscapers	2%	$ 1,457,210
Other	1%	$ 390,469
Total	100%	$ 61,829,095

Table 10. Alabama Green Industry Survey Respondents Lawn and Landscape Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Material Expenses	$ 11,423,917	32%	$ 64,909
Equipment Repairs and Maintenance	$ 2,800,668	7.7%	$ 16,189
Equipment Purchases and Leases	$ 3,417,175	9.4%	$ 20,340
Fuel	$ 3,485,593	9.6%	$ 19,473
Pesticides	$ 1,649,720	4.6%	$ 11,072
Fertilizers	$ 3,289,076	9.1%	$ 20,303
Other Chemicals	$ 277,512	0.8%	$ 2,151
Telephone and Other Communication	$ 751,115	2.1%	$ 4,367
Hardscape Materials	$ 1,355,456	3.7%	$ 9,413
Facilities	$ 1,486,347	4.1%	$ 10,180
All Overhead Items	$ 5,001,064	13.8%	$ 30,309
Other	$ 1,263,008	3.5%	$ 12,262
Average Expenditures	$ 191,538		
Total Expenditures	$ 36,200,652		

Table 11. Alabama Green Industry Survey Respondents Retail Garden Center Annual Sales, 2002

Item	*Total Revenue*	*Revenue Share*	*Average Revenue*
Foliage	$ 584,850	4%	$ 13,925
Bedding Plants	$ 1,767,008	11.2%	$ 42,072
Potted Flowering Plants	$ 637,630	4.0%	$ 15,182
Herbaceous Plants	$ 184,750	1.2%	$ 4,399
Vegetable Transplants	$ 446,600	2.8%	$ 10,633
Container-Grown Shrubs	$ 1,781,332	11.3%	$ 42,413
Container-Grown Trees	$ 565,967	3.6%	$ 13,475
Field-Grown Shrubs	$ 112,390	0.7%	$ 2,676
Field-Grown Trees	$ 253,545	1.6%	$ 6,037
Container Grasses/ Ground Cover	$ 261,350	1.7%	$ 6,223
Perennials	$ 452,800	2.9%	$ 10,781
Roses	$ 76,650	0.5%	$ 1,825
Turf Grass Crops	$ 979,249	6.2%	$ 23,315
Christmas Trees	$ 130,500	0.8%	$ 3,107
Propagation Materials	$ 87,500	0.6%	$ 2,083
Hard Goods	$ 903,765	5.7%	$ 21,518
Other	$ 1,585,070	10.0%	$ 37,740
Average Gross	$ 384,932		
Total Gross Income	$ 15,782,200		

Table 12. Alabama Green Industry Survey Respondents Retail Garden Center Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Agri-Chemicals	$ 437,620	3.8%	$ 19,027
Fertilizers	$ 833,603	7.3%	$ 34,733
Soil and Potting Mixes	$ 525,898	4.6%	$ 20,227
Turf Grass and Sod	$ 316,249	2.8%	$ 22,589
Foliage Plants	$ 574,150	5.0%	$ 33,774
Bedding Plants	$ 1,083,658	9.5%	$ 47,116
Potted Flowering Plants	$ 488,000	4.3%	$ 27,111
Vegetative or Herb Plants	$ 227,150	2.0%	$ 13,362
Shrubs	$ 1,513,572	13.3%	$ 65,807
Trees	$ 839,082	7.4%	$ 39,956
Christmas Trees	$ 6,200	0.1%	$ 2,067
Other Plant Material	$ 164,950	1.5%	$ 14,995
Facilities	$ 616,396	5.4%	$ 28,018
Telephone and Communication	$ 165,730	1.5%	$ 5,919
Hard Goods	$ 1,176,665	10.3%	$ 47,067
Shipping and Transportation	$ 175,470	1.5%	$ 10,967
All Overhead Items	$ 1,698,632	14.9%	$ 65,332
Other	$ 530,800	4.7%	$ 106,160
Average Expenditure	$ 284,346		
Total Expenditure	$ 11,373,825		

Table 13. Alabama Green Industry Survey Respondents Golf Course Annual Sales, 2002

Item	*Total Revenue*	*Revenue Share*	*Average Revenue*
Membership Fees	$ 7,324,857	25.2%	$ 610,405
Green Fees	$ 10,650,671	36.6%	$ 591,704
Golf Cart Rental	$ 4,449,234	15.3%	$ 278,077
Driving Range/Golf Lessons	$ 666,122	2.3%	$ 47,580
Pro Shop	$ 1,902,048	6.5%	$ 118,878
Food and Beverages	$ 4,076,344	14.0%	$ 226,464
Average Number of Holes	22.5		
Total Rounds (9 Holes)	20,000		
Average Rounds (9 Holes)	10,000		
Total Rounds (18 Holes)	698,166		
Average Rounds (18 Holes)	29,090		
Average Greens Fee (With Cart)	$ 46		
Average Greens Fee (Without Cart	$ 33		
Average Gross	$ 1,314,356		
Total Gross Income	$ 29,069,276		

Table 14. Alabama Green Industry Survey Respondents Golf Course Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Average Year of Construction	1976		
Average Cost of Construction	$ 4,704,444		
Agri-Chemicals	$ 1,100,402	11.0%	$ 45,850
Fertilizers	$ 1,024,676	10.2%	$ 42,695
Soil, Soil Conditioners and Mulch	$ 201,986	2.0%	$ 10,099
Irrigation	$ 249,719	2.5%	$ 11,891
Turf Installation and Maintenance	$ 1,753,515	17.5%	$ 97,417
Plant Materials	$ 73,850	0.7%	$ 4,103
Equipment	$ 1,775,098	17.7%	$ 80,686
Facilities	$ 1,132,250	11.3%	$ 157,286
Facilities and Equipment Repairs	$ 986,410	9.9%	$ 39,798
Telephone and other Communications	$ 163,868	1.6%	$ 7,803
All Overhead Items	$ 927,423	9.3%	$ 54,554
Other	$ 684,250	6.8%	$ 171,063
Average Expenditures	$ 417,123		
Total Expenditures	$ 10,010,946		

Table 15. Alabama Green Industry Survey Respondents Commercial and Institutional Annual Expenditures, 2002

Item	*Total Expense*	*Cost Share*	*Average Expense*
Agri-Chemicals	$ 15,440	3.2%	$ 2,573
Fertilizers	$ 12,850	2.6%	$ 1,606
Soil and Potting Mixes	$ 13,175	2.7%	$ 1,882
Turf Grass and Sod	$ 8,000	1.6%	$ 2,667
Foliage Plants	$ 1,250	0.3%	$ 417
Bedding Plants	$ 18,800	3.8%	$ 3,133
Potted Flowering Plants	$ 2,725	0.6%	$ 681
Vegetative or Herb Plants	$ 400	0.1%	$ 200
Shrubs	$ 13,300	2.7%	$ 3,325
Trees	$ 17,250	3.5%	$ 5,750
Christmas Trees	$ 100	0.0%	$ 100
Other Plant Material	$ 25,050	5.1%	$ 12,525
Facilities	$ 24,450	5.0%	$ 6,113
Telephone and Communication	$ 31,400	6.4%	$ 5,233
Hard Goods	$ 35,450	7.2%	$ 7,090
Shipping and Transportation	$ 10,300	2.1%	$ 5,150
All Overhead	$ 205,000	41.9%	$ 68,333
Other	$ 54,750	11.2%	$ 18,250
Average Expenditure	$ 40,808		
Total Expenditure	$ 489,690		

Table 16. Alabama Green Industry Survey Respondents Green Industry Employment of Survey Respondents, 2002

Sector	*Seasonal/ Part Time*	*Full Time*	*Management*	*Sales Staff*
Nursery and Greenhouse	315	498	116	61
Turfgrass and Sod	68	61	25	4
Lawn and Landscape	425.5	485	138	74
Retail	107	61	30	50
Golf Course	149.5	287	66	4
Total	1,065.00	1,392.00	375	193
Total All Firms	3,025.00			

Table 17. Alabama Green Industry Survey Respondents Nursery and Greenhouse Employment, 2002

Category	*Seasonal/Part Time*	*Full Time*	*Management*	*Sales Staff*
Average Wages	$ 9.88	$ 10.87	$ 18.04	$ 16.59
Average Annual Hours	741	2090	2196	2141
Average Weekly Hours	32	42	43	41
Total Employees	315	498	116	61
Average Employees	5.3	9.2	2.8	3.1
Average Annual Benefits	$ 1,341			
Percent Migrant	16.8%			

Table 18. Alabama Green Industry Survey Respondents Turfgrass and Sod Employment, 2002

Category	*Seasonal/Part Time*	*Full Time*	*Management*	*Sales Staff*
Average Wages	$ 9.60	$ 10.52	$ 21.42	$ 22.22
Average Annual Hours	925	2,246	2,030	2,132
Average Weekly Hours	39	46	40	48
Total Employees	68	61	25	4
Average Employees	5.7	5.1	2.1	1.3
Average Annual Benefits	$ 1,158			
Percent Migrant	9.4%			

Table 19. Alabama Green Industry Survey Respondents Lawn and Landscape Employment, 2002

	Seasonal/Part Time	*Full Time*	*Management*	*Sales Staff*
Average Wages	$ 9.33	$ 9.71	$ 13.26	$ 13.44
Average Annual Hours	819	2022	1937	1925
Average Weekly Hours	32	46	40	40
Total Employees	426	485	138	74
Average Employees	3.9	4.3	1.9	1.6
Average Annual Benefits	$ 1,039			
Percent Migrant	7.4			

Table 20. Alabama Green Industry Survey Respondents Golf Course Employment, 2002

	Seasonal/Part Time	*Full Time*	*Management*	*Sales Staff*
Average Wages	$ 7.68	$ 9.98	$ 17.26	$ 16.25
Average Annual Hours	853	2227	2466	2000
Average Weekly Hours	38	43	48	40
Total Employees	150	287	66	4
Average Employees	6.8	12.0	3.3	1.3
Average Annual Benefits	$ 1,672			
Percent Migrant	20.4			

Table 21. Alabama Green Industry Survey Respondents Retail Employment, 2002

	Seasonal/Part Time	*Full Time*	*Management*	*Sales Staff*
Average Wages	$ 7.48	$ 10.46	$ 15.96	$ 12.49
Average Annual Hours	962	2,088	1,900	2,162
Average Weekly Hours	33	41	40	43
Total Employees	107	61	30	50
Average Employees	4.0	3.8	1.7	3.3
Average Annual Benefits	1,395			
Percent Migrant	N/A			

Table 22. Alabama Green Industry Concerns (Average Scores), 2002
1=Strongly Disagree 2=Disagree 3=Neither Agree nor Disagree 4=Agree 5=Strongly Agree

Concern	*Nursery and Greenhouse*	*Lawn and Landscape*	*Retail*	*Turf Grass and Sod*	*Golf Course*	*Commercial/ Institutional*
Water Restrictions	3.79	3.84	3.86	3.82	4.25	3.74
Chemical Restrictions	3.74	3.38	3.56	3.50	3.92	3.65
Low Prices	3.77	3.83	3.85	4.06	N/A	3.39
Production Costs	3.93	3.84	3.83	4.00	N/A	3.94
Equipment Costs	N/A	3.75	N/A	N/A	4.00	N/A
Labor Costs	3.59	3.71	3.93	3.06	3.63	3.42
Energy Costs	N/A	3.86	3.71	3.47	3.79	3.58
Unlicensed Competitors	N/A	4.34	N/A	N/A	N/A	N/A
Competition from Imports	2.80	N/A	N/A	N/A	N/A	N/A
Competition from Other Firms	2.78	2.89	N/A	3.65	3.58	N/A
Market Power of Large Retail Chains	3.82	3.37	N/A	3.00	N/A	N/A
Government Regulations	3.55	3.42	3.81	3.00	3.75	3.67
OSHA Requirements	N/A	3.25	N/A	N/A	N/A	N/A
Taxes	3.62	3.77	N/A	3.65	N/A	N/A
Green Industry Product Quality	N/A	N/A	3.54	N/A	3.08	3.37
Lack of Professionalism	3.09	3.91	3.85	3.24	3.00	3.25
Poor Worker Education and Skills	N/A	N/A	N/A	N/A	3.58	N/A
Lack of Business Management Training	2.93	3.56	3.75	3.18	3.29	3.44
General Economic Conditions	N/A	3.72	4.00	3.50	4.08	3.78
Labor Shortage	3.34	3.46	3.34	3.06	3.33	3.28

Appendix C

Expansions

Table 1. Alabama Green Industry Survey Respondents Nursery and Greenhouse Income Expansion, 2002

Cash Receipts$	*Total Farms*	*Respondents*	*Reported Income*	*Expansion Factor*	*Expanded Income*
1,000,000 or more	41	17	$ 53,785,248	2.4	$ 129,717,362
500-999,999	37	11	$ 8,367,939	3.4	$ 28,146,703
250-499,999	51	14	$ 4,791,178	3.6	$ 17,453,577
100-249,999	86	17	$ 2,480,168	5.1	$ 12,546,732
50-99,999	130	14	$ 1,089,501	9.3	$ 10,116,795
25-49,999	104	23	$ 786,600	4.5	$ 3,556,800
10-24,999	133	9	$ 154,100	14.8	$ 2,277,255
5-9,999	101	1	$ 9,000	101	$ 909,000
2,500-4,999	39	5	$ 17,500	7.8	$ 136,500
1-2,499	31	3	$ 3,700	10.3	$ 38,233
Less than 1000	14	1	$ 500	14	$ 7,000
Total	767	115	$ 71,485,434		$ 204,905,960

Table 2. Alabama Nursery and Greenhouse Estimated Exports, 2002

Cash Receipts$	*Total Farms*	*%Respondents w/ Exports*	*Estimated Farms*	*Average Exports*	*Estimated Exports*
1,000,000 or more	41	82.40	34	$ 2,060,191	$ 69,561,743
500-999,999	37	81.80	30	$ 311,382	$ 9,426,376
250-499,999	51	64.30	33	$ 193,641	$ 6,348,664
100-249,999	86	58.80	51	$ 23,248	$ 1,176,070
50-99,999	130	50.00	65	$ 23,775	$ 1,545,380
25-49,999	104	65.20	68	$ 8,486	$ 575,572
10-24,999	133	55.60	74	$ 3,774	$ 278,848
5-9,999	101	0.00	0	$ 0	$ 0
2,500-4,999	39	60.00	23	$ 1,820	$ 42,588
1-2,499	31	33.30	10	$ 30	$ 310
Less than 1000	14	100.00	14	$ -	$ -
Total	767		402		$ 88,955,552

Table 3. Alabama Green Industry Survey Respondents Nursery and Greenhouse Cost Expansion, 2002

Cash Receipts$	*Total Farms*	*Respondents*	*Reported Costs*	*Expansion Factor*	*Expanded Costs*
1,000,000 or more	41	17	$20,432,853	2.4	$49,279,234
500-999,999	37	11	$ 2,579,200	3.4	$ 8,675,491
250-499,999	51	14	$ 968,362	3.6	$ 3,527,604
100-249,999	86	16	$ 1,609,332	5.4	$ 8,650,160
50-99,999	130	11	$ 460,108	11.8	$ 5,437,640
25-49,999	104	25	$ 195,950	4.2	$ 815,152
10-24,999	133	9	$ 38,085	14.8	$ 562,812
5-9,999	101	1	$ -	101	$ -
2,500-4,999	39	5	$ 1,632	7.8	$ 12,730
1-2,499	31	2	$ 5,300	15.5	$ 82,150
Less than 1000	14	2	$ 1,200	7	$ 8,400
Total	767	113	$26,292,022		$77,051,372

Table 4. Alabama Green Industry Survey Respondents Turfgrass and Sod Income Expansion, 2002

Cash Receipts$	*Total Farms*	*Respondents*	*Reported Income*	*Expansion Factor*	*Expanded Income*
1,000,000 or more	20	3	$ 9,000,000	6.7	$ 60,000,000
500-999,999	15	4	$ 2,410,000	3.8	$ 9,037,500
250-499,999	19	5	$ 1,850,000	3.8	$ 7,030,000
100-249,999	11	4	$ 637,595	2.8	$ 1,753,386
50-99,999	4	1	$ 60,000	4	$ 240,000
Total	69	17	$ 13,957,595		$ 78,060,886

Table 5. Alabama Turfgrass and Sod Estimated Exports, 2002

Cash Receipts$	*Total Farms*	*%Respondents with Exports*	*Estimated Farms*	*Average Exports*	*Estimated Exports*
1,000,000 or more	20	66.7	13	$1,250,000	$16,666,667
500-999,999	15	50	8	$ 156,833	$ 1,176,250
250-499,999	19	80	15	$ 84,875	$ 1,290,100
100-249,999	11	75	8	$ 10,000	$ 82,500
50-99,999	4	100	4	$ 30	$ 120
Total	69		48	$1,501,738	$19,215,637

Table 6. Alabama Green Industry Survey Respondents Turfgrass and Sod Cost Expansion, 2002

Cash Receipts$	*Total Farms*	*Respondents*	*Reported Costs*	*Expansion Factor*	*Expanded Costs*
1,000,000 or more	20	3	$ 4,590,000	6.7	$30,600,000
500-999,999	15	4	$ 1,185,832	3.8	$ 4,446,870
250-499,999	19	5	$ 505,901	3.8	$ 1,922,424
100-249,999	11	4	$ 343,300	2.8	$ 944,075
50-99,999	4	1	$ 26,680	4.0	$ 106,720
Total	69	17	$ 6,651,713		$38,020,089

Table 7. Alabama Green Industry Survey Respondents Lawn and Landscape Income Expansions, 2002

		Total Farms	Respondents	Expansion Factor
Reported Income	$ 61,829,095	1,029	184	8.43
Reported Costs	$ 36,200,652	1,029	166	8.43
Estimated Income	$ 521,256,730			
Expanded Costs	$ 305,193,428			
Estimated Exports	$ 110,200,000			

Appendix D

Economic Impacts

Table 1. Alabama Nursery and Greenhouse Economic Impacts, 2002

	Output Multipliers	*Employment Multipliers (Jobs/ $M)*	*Total Value Added Multipliers*	*Indirect Business Tax Multipliers*
Direct Effects	1.000	19.2	0.519	0.007
Indirect Effects	0.370	5.1	0.207	0.017
Induced Effects	0.766	10.7	0.474	0.035
	Total Firms 767	Total Employees 4,319	Total Sales $204,905,960	Total Exports $88,955,552
	Total Output Impacts	Total Employment Impacts (jobs)	Total Value Added Impacts	Total Indirect Business Tax Impacts
Indirect Output Impacts	$32,892,917			
Induced Output Impacts	$68,167,796			
Total Impacts	$305,966,672	5,726	$166,942,915	$6,105,089

Table 2. Alabama Turfgrass and Sod Economic Impacts, 2002

	Output Multipliers	*Employment Multipliers (Jobs/ $M)*	*Total Value Added Multipliers*	*Indirect Business Tax Multipliers*
Direct Effects	1.000	19.2	0.519	0.007
Indirect Effects	0.370	5.1	0.207	0.017
Induced Effects	0.766	10.7	0.474	0.035
	Total Firms 69	Total Employees 1,030	Total Sales $78,060,886	Total Exports $19,215,637
	Total Output Impacts	Total Employment Impacts (jobs)	Total Value Added Impacts	Total Indirect Business Tax Impacts
Indirect Output Impacts	$7,105,328			
Induced Output Impacts	$14,725,192			
Total Impacts	$99,891,406	1,334	$53,603,808	$1,556,657

Table 3. Alabama Lawn and Landscape Economic Impacts, 2002

	Output Multipliers	*Employment Multipliers (Jobs/ $M)*	*Total Value Added Multipliers*	*Indirect Business Tax Multipliers*
Direct Effects	1.000	31.0	0.616	0.025
Indirect Effects	0.301	4.3	0.168	0.011
Induced Effects	0.825	11.6	0.512	0.038
	Total Firms 1,029	Total Employees 8,521	Total Sales $521,256,730	Total Exports $110,200,000
	Total Output Impacts	Total Employment Impacts (jobs)	Total Value Added Impacts	Total Indirect Business Tax Impacts
Indirect Output Impacts	$33,215,602			
Induced Output Impacts	$90,916,322			
Total Impacts	$645,388,655	10,273	$396,275,256	$18,587,180

Table 4. Alabama Retail and Garden Center Economic Impacts, 2002

	Output Multipliers	*Employment Multipliers (Jobs/ $M)*	*Total Value Added Multipliers*	*Indirect Business Tax Multipliers*
Direct Effects	1.000	21.2	0.878	0.164
Indirect Effects	0.085	1.0	0.049	0.003
Induced Effects	1.032	15.1	0.664	0.045
	Total Firms 727	Total Employees 6,957	Total Sales 1,357,429,719	Total Exports 407,228,916
	Total Output Impacts	Total Employment Impacts (jobs)	Total Value Added Impacts	Total Indirect Business Tax Impacts
Indirect Output Impacts	$34,658,439			
Induced Output Impacts	$420,450,417			
Total Impacts	$855,550,622	13,527	$641,711,244	$243,103,174

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II. MIGRANT LABOR IN ALABAMA'S HORTICULTURE INDUSTRY

Moriah Bellenger, Deacue Fields, and Diane Hite

Introduction

The green industry, comprised of horticultural goods and services plays an important role in the state of Alabama. A recent statewide economic impact study finds that in 2002 the industry generated roughly $2.0 Billion and is credited with over 30,000 state jobs (Bellenger and Fields). The green industry inherently adds to the aesthetic beauty of the state, and its products are also exported throughout the world. This study examines and evaluates the role of migrant workers within the industry, specifically their effects on average wages and worker productivity.

Due to the perishable nature of horticultural goods, a skilled and accessible labor supply is imperative for continued industry growth. The variation in labor composition among producers statewide, from local to migrant, highlights the need to study the use of migrant labor in the horticulture industry. What factors influence a producer's decision to hire migrant rather than local workers? Do migrant workers depress wages, as is often feared by local workers? Finally, how do migrant workers affect productivity within a firm?

These research objectives will be explored using data from a 2002 survey of Alabama green industry producers. A log-linear seemingly unrelated regression (SUR)

model is employed to estimate these relationships, coupled with a detailed imputation of missing survey data, and Heckman's (1979) two-stage test for sample selection bias.

Background

The United States and the South in particular, have a long history of importing agricultural workers to meet seasonal demands for labor. Today, producers' hiring practices are regulated by the Immigration Reform and Control Act of 1986 (IRCA), and agricultural labor is specifically regulated by IRCA section H2-A, known as the H2-A program. IRCA grants temporary H2-A visas to foreign workers based on two conditions, intended to both insure access to labor for producers, and protect local workers from wage decline due to a labor surplus. To procure H2-A visas, producers must demonstrate to the U.S. Department of Labor that:

> (A) There are not sufficient workers who are able, willing, and qualified, and who are available at the time and place needed, to perform the labor or services involved in the petition, and
>
> (B) The employment of the alien in such labor or services will not adversely affect the wages and working conditions of workers in the U.S. similarly employed

Despite the above provisions, both producers and U.S. workers voiced concerns with the passage of IRCA. The H2-A program provided legal status to a large number of existing migrant workers. Producers feared that these workers would transition out of agriculture into other sectors of the economy, which would restrict their labor supply, placing upward pressure on wages. U.S. workers feared the opposite, that legalization through the H2-A program would attract even more workers to cross the border, which

would lead to a labor surplus, depressing both wages and working conditions (Gunter et. al.; Pagạn; Perloff et. al.; Thompson and Wiggings).

The present study uses data from a recent survey of 2002 Alabama green industry producers. The research objectives were to estimate the effects of migrant labor on employee wages and worker productivity. In addition, stated producer concerns contained within the survey are used to evaluate hiring decisions. Few similar studies can be found in the existing economic literature. Ise and Perloff find that documentation among migrant workers significantly influences both wages and hours. Using data from the National Agricultural Worker's Survey, the authors find that unauthorized workers, as well as those with amnesty earn lower wages than their U.S. counterparts. The current literature lacks both an analysis of migrant workers and productivity, as well as any evaluation of producer decisions to hire migrant versus local labor.

Data

This study examines data drawn from a 2002 survey of Alabama green industry producers (See Appendix A). The survey was administered based on Dillman's tailored design methodology. Mailing lists were acquired from the Alabama Department of Agriculture and Industries (ADAI) for nursery and greenhouse growers, nursery stock dealers, and licensed lawn and landscape service providers. Membership and mailing lists from the Alabama Nurserymen's Association and Alabama Turf Grass Association were used to verify and update ADAI lists.

The survey instruments were developed and pre-tested based upon other instruments found in relevant literature. Support paragraphs from the Commissioner of Agriculture, Alabama Cooperative Extension System Director, Alabama Nurserymen's Association President, and Alabama Turf Grass Association President were included on the inside cover of each survey. The Dillman format was used to develop a cover letter, which was personally addressed and included in each survey.

Table 1 presents information on mailing and response rates for each sector surveyed. A pre-survey postcard was mailed to the population of all sectors. This was done as a first contact to prepare individuals for the upcoming survey and to identify incorrect addresses before surveys were mailed. More than 100 surveys were returned with incorrect addresses and these were excluded from the survey mail out. After the initial survey mailing, a follow up postcard was sent as a reminder/thank you, then a second survey was mailed. Table 1 shows that response rates ranged from 13.5% for lawn and landscape services to 27.9% for turf grass and sod producers. Blank surveys and surveys with limited information were excluded from the number of completed responses. Some common responses on incomplete and/or blank surveys - were 'no longer in business', 'involved in other activities not related to the green industry', 'and not considered a commercial operation.'

Table 1. Summary of Survey Administration

Sector	*Pre-survey Postcard*	*Surveys Mailed*	*Total Responses*	*Completed Responses*	*Response Rate*
Nursery and Greenhouse	851	822	158	114	13.9%
Lawn and Landscape Services	1,430	1403	243	190	13.5%
Turfgrass and Sod	64	61	24	17	27.9%
TOTAL	2345	2286	425	321	14.0%

The survey findings are reported based upon the 321 completed responses, and they are not expanded to make inferences about the entire population. The total number of respondents represents 14.0% of the firms participating in green industry activities, which provides some indication of the overall size of the industry.

While primary data collection offers many advantages, practicality places limitations on the amount and detail of information that can be accessed, when compared to larger national samples. Wage information contained within the survey represents average wage levels for each firm, rather than individual employee wages. Wage levels were computed by dividing the total number of man-hours (the product of total employees and average hours) worked into the total payroll for both seasonal/part time and full time employees.

Employees are classified as either full time (FT) or seasonal/part time (SPT), but the survey does not identify which employees are local and which are migrant workers. Instead, producers were asked to estimate the percent of their total employees that are local, and the percent of their total employees that are migrant workers. Producers were not asked to provide any socioeconomic information for their employees, on either individual or aggregate levels. Instead, survey respondents were matched to county level

census data for education and employment levels, as a proxy for education levels within the firm and the local labor supply faced by producers.

Sample selection bias poses another potential weakness in any voluntary response mail survey analyzed through ordinary least squares (Hite; Greene). The data used in this study is drawn exclusively from respondents, and firms with certain traits may have a greater tendency to respond than others. Heckman's two-stage estimation method is used to determine the level of selection bias in this sample. The first stage uses a probit model where y=1 for respondents and y=0 for nonrespondents. The original mailing list containing 2286 addresses was matched to county level census data for median household income, education, and unemployment levels. These local demographic indicators, along with sector identity variables (Nursery and Greenhouse, Lawn and Landscape, and Turfgrass and Sod) are used to explain each firm's decision to respond. The respondents were matched by county and sector to the original mailing list for the resulting probit model

$$Pr(Response) = f(demographics, sector) + \varepsilon.$$

The Inverse Mills Ratio or λ is then computed from the probit coefficients for each observation as

$$\lambda = \phi(\beta' X_i) / \Phi(\beta' X_i),$$

where λ is the conditional probability of response based on the ratio of $\phi(.)$, the probability density function to $\Phi(.)$, the cumulative density function. λ is computed as ϕ/Φ for y=1 and $-\phi/(1-\Phi)$ for y=0 (Greene, 1993). The probit results are listed in Table 1 of Appendix B.

The second stage of estimation for sample selection bias imports λ into the linear model, such that

$$Y_{ij} = \beta' X_{ij} + \theta\lambda_i + e_i,$$

where Y is the dependent variable (j) for each observation (i), β is the vector of coefficients corresponding to X, the matrix of explanatory variables, and θ is the coefficient corresponding to λ. Thus, the determination of sample selection bias depends upon the significance of θ.

One final limitation of mail surveys lies in missing data. Of the 321 completed responses, approximately 160 observations lacked one or more answered components to the labor and sales portions of the survey, necessary for analysis in this study. A series of linear regressions was used to impute missing values within the completed responses. The missing variables of interest were:

A) *Percent Migrant*. This variable represents the percentage of total employees comprised by migrant labor.

B) *Seasonal/ Part Time Wage*. This variable represents the average hourly wage rate earned by the firm's seasonal and part time employees.

C) *Full Time Wage*. This variable represents the average hourly wage rate earned by the firm's full time employees.

D) *Seasonal/ Part Time Employees*. This variable represents the total number of seasonal and part time employees.

E) *Full Time Employees*. This variable represents the total number of full time employees.

F) *Gross Sales*. This variable represents each firm's gross sales in 2002.

The missing values were imputed using a least squares estimator such that,

$$Predicted\ Value_{ij} = \hat{\beta}' X_{ij} + \varepsilon_i,$$

where $\hat{\beta}$ is the parameter vector and X represents the matrix of explanatory variables for each observation (i) and variable of interest (j). ε represents the error term. The least squares estimator was then used to predict the missing values such that,

$$Missing\ Value_{ij} = Predicted\ Value_{ij.}$$

The estimation was iterated until no new missing values could be predicted at the 0.05 significance level. This imputation process resulted in approximately 60 additional observations for a final data set containing 218 usable observations. Table 1 of Appendix B briefly explains the variables used in this study. Tables 2 and 3 contain descriptive statistics for both the original and predicted data sets.

Methodology

A log-linear seemingly unrelated regression model, known as the SUR Model (Zellner) is employed to estimate both the effects of migrant labor on wages and productivity, as well as producer decisions to hire migrant versus local workers. A log model is used in consensus with prevailing labor theory, drawing on Roy's lognormal model. Intuitively, wages and earnings will always be positive, as is the log normal distribution.

A system of equations is preferred to separate OLS equations because the dependant variables in this study share many common explanatory variables. Information would be lost in separate equations, which assume that the error terms are uncorrelated. The SUR Model allows for the correlation of error terms between

equations, and better reflects the interrelated nature of the dependant variables in this study. The SUR Model can be written formally as

$$Y = X\beta + \varepsilon.$$

Where

Y is a (j x 1) vector of (j) dependant variables,

X is a (j x n) matrix of (n) explanatory variables,

β is a (j x 1) vector of unknown coefficients,

ε is the (j x 1) random error vector with $\varepsilon \sim N(0,\Sigma)$,

and Σ is the (j x j) covariance matrix.

The resulting system contains four equations, the first of which estimates percent migrant as a function of industry sector, producer concerns, labor supply, and firm size. The second and third equations estimate seasonal/ part time and full time employee wages as a function of industry sector, percent migrant, education and labor supply. The final equation estimates worker productivity, via the ratio of sales per worker, as a function of industry sector, percent migrant, wages, total employees and education. The Inverse Mill's Ratio (IMR), representing λ, is included in each equation to complete the second stage test for sample selection bias. The equations can be written as

$$LnPercent\ Migrant=\beta_1 + \beta_2 Lawn + \beta_3 Turf + \beta_4 Federal\ Funding + \beta_5 Total\ Employees + \beta_6 IMR + \beta_7 Unemployment + \beta_8 Labor\ Shortage$$

$$LnSPT\ Wages=\alpha_1 + \alpha_2\ Lawn + \alpha_3 Turf + \alpha_4 Percent\ Migrant + \alpha_5 IMR + \alpha_6 Education + \alpha_7 Labor\ Shortage$$

$$LnFT\ Wages=\phi_1 + \phi_2 Lawn + \phi_3 Turf + \phi_4 Percent\ Migrant + \phi_5 BPW + \phi_6 IMR + \phi_7 Education + \phi_8 Labor\ Shortage$$

$$LnSales\ per\ Worker = \rho_1 + \rho_2 Lawn + \rho_3 Turf + \rho_4 Percent\ Migrant + \rho_5 SPT\ Wages + \rho_6 FT\ Wages + \rho_9 Total\ Employees + \rho_{10} IMR + \rho_{11} Education.$$

A unique component of the survey examines producers' attitudes and concerns regarding a variety of labor issues. Producers were asked:

A) To rate their support of a federally funded program to hire local labor, rather than migrant labor
B) To rate the level of threat to the industry posed by government regulation
C) To rate the level of threat to the industry posed by lack of management
D) To rate the level of threat to the industry posed by labor shortage
E) To rate the level of threat to the industry posed by labor cost

Producers chose either 1) strongly disagree 2) disagree 3) neither agree nor disagree 4) agree 5) strongly agree

The firm's decision to hire migrant workers is estimated as a function of the above producer attitudes, joined with previously explained indicators for firm size and local socioeconomic conditions. A correlation test revealed elevated correlation levels among the producer concerns, ranging from 0.34 to 0.66. To correct for sample correlation only the variables for federal funding and labor shortage are used to represent producer concerns.

Producers who would support a federally funded program to hire local, rather than migrant labor, likely prefer local labor to migrant labor. It is predicted that producer attitudes regarding possible federal funding of local labor will be negatively related to the hiring of migrant labor. The number of total employees should relate positively to Percent Migrant. In addition to their greater demand for labor, larger firms may be better suited to the H2-A program. The H2-A application process may exact an inordinate level of resources to be worthwhile for producers seeking only marginal increases in their labor force.

A labor shortage provides the most explicit justification for hiring migrant, rather than local labor. It is predicted that concern for labor shortage will be positively related to Percent Migrant. The local unemployment level should reflect producer concerns regarding labor shortage. Lower unemployment levels may signal a restricted labor supply, forcing producers to seek migrant workers as a supplement to local labor. It is predicted that the local unemployment level will be inversely related to Percent Migrant.

Based on the results of similar studies (Ise and Perloff; Hanson et. al.), Percent Migrant should be inversely related to both SPT and FT wages. Consistent with wage model literature, education should be positively related to wages for both SPT and full time workers. Rising producer concerns over labor shortages should signal a restricted labor supply within the industry, which would place upward pressure on wages. Thus, concern for labor shortages is expected to relate directly to both SPT and FT wages.

Presumably, SPT workers are seldom eligible for employee benefits, such as health insurance and bonuses. A measure of benefits per worker (BPW) is included in the FT wage equation, but omitted from the SPT Wage equation. There is a likely tradeoff between employee benefits and wages (Rosen). More recently, Olsen (2002) found that workers accepted 20 percent lower wages in jobs with health insurance benefits than in jobs without benefits. Because employees may substitute lower wages in exchange for greater benefits, an inverse relationship between BPW and FT Wages is proposed.

Sales per worker (SPW), the ratio of total sales to total employees provides a general estimate of worker productivity. Little attention has been paid within labor literature to the relative productivity levels of migrant versus local workers. However, a

recent study of Hispanic tree planters in Alabama (Casanova) does find that timber producers attribute a marked increase in worker productivity to greater levels of migrant labor within the industry. In addition, timber producers also expressed that migrant workers are often more reliable and easier to manage than local workers. Similarly, migrant labor is predicted to raise SPW in this study.

Efficiency wage theory explains that producers may pay premium wages to prevent employee shirking and to motivate greater worker productivity (Akerlof). Wages exceeding the market clearing wage rate impose a greater opportunity cost to nonproductive employee behavior. In other words, workers earning higher wages have added incentive to maintain and excel in their jobs. This theory has recently been applied to the agricultural labor market by Moretti and Perloff, who found that agricultural producers substitute higher wages for increased managerial oversight. Consistent with efficiency wage theory, both SPT and FT wages should be directly related to SPW. Economies of scale posit that as firms grow, they are better able to substitute capital for labor in the production process, increasing worker productivity. This would suggest a positive relationship between the number of total employees and the rate of sales per worker.

Convention places great value in education. Educational attainment represents an investment in human capital. Greater levels of human capital within the workforce should positively influence job performance, raising worker productivity. Heckman (1985) illustrates this relationship by mapping observed skills, including education and experience, to rates of task completion in both the manufacturing and nonmanufacturing labor force. In both cases he finds that higher education levels raise the level of task

completion, and with a greater magnitude than experience alone. Education is expected to increase SPW in this study as well.

Results

The SUR model results are listed in Tables 1-4 of Appendix C. A 0.05 critical value for probability is used to measure significance. There were a total of 218 observations and the model's F-Statistic is 6.54, which renders it significant at the 0.05 level. In the log-linear model, because both the dependant and independent variables are logged, parameter estimates actually represent elasticities.

Percent Migrant

The coefficients for Total Employees, unemployment, and perceived labor shortage were all significant in the percent migrant equation. The model estimates a positive elasticity of 0.43 for total employees, meaning that a one percent increase in a firm's total number of employees results in a 0.43 percent increase in the firm's percentage of migrant workers. This supports the hypothesis that larger firms may be better suited to the H2-A program, in that they may be better equipped administratively for the application process. The H2-A program also imposes several fixed costs, such as housing and transportation, which can be more efficiently spread over many, rather than fewer employees.

Consistent with wage theory, a one percent increase in the local unemployment rate reduces percent migrant by roughly 1.1 percent. Higher local unemployment rates indicate an expanded labor supply, in which more people are actively seeking work.

Under these circumstances producers should better able to fill their labor needs within their local communities, a condition imposed by the H2-A program. Similarly, producers' perception of a local labor shortage is directly related to their decision to hire migrant versus local workers. A one percent increase in perceived labor shortage raises the firm's percentage of migrant workers by 0.62 percent.

Producer attitudes regarding possible federal funding to hire more local, rather than migrant workers appear to have no significant effect on their decision to hire migrant workers. At the time of this survey no such program existed in Alabama. Feelings for a hypothetical program may simply be irrelevant to producers who are forced to make tangible decisions for their firms on a daily basis. There is no evidence of sample selection bias at the 0.05 level, but bias can not be rejected at the 0.10 level of significance.

Seasonal/ Part Time Wages

Only the coefficients for percent migrant and perceived labor shortage are significant in the SPT wage equation. There is a negative and highly significant (P[|Z|>z] is 0.000) relationship between a firm's percentage of migrant workers and its average seasonal/ part time wage. A one percent increase in the percentage of migrant workers lowers the average SPT wage 0.12 percent. Given the nature of the survey, it is impossible to interpret how this affects local and migrant workers separately. More specifically, it is unknown whether all employees, both migrant and local, earn lower wages, or if there is a wage differential between migrant and local workers.

A one percent growth in the perception of labor shortage by producers raises the SPT wage by 0.16 percent. This conforms to the labor theory construct that a constricted labor supply tends to inflate wages. Producers are forced to compete for employees by offering greater levels of compensation.

Interestingly, education has no significant effect on wages for seasonal/ part time workers. This may be due in part to lower skill requirements or fewer responsibilities for part time jobs. Employee education levels may also be somewhat endogenous (Heckman, 1985). Workers with certain levels of education, i.e. education levels appropriate for specific tasks, may self select into specific jobs. However, because the education variable in this study represents county high school graduation rates, rather than individual education levels, the lack of significance can more likely be attributed to generality rather than endogeneity. The coefficient for IMR is also insignificant, which rejects the presence of sample selection bias in the SPT wage equation.

Full Time Wages

As in the SPT wage equation, an inverse relationship exists between percent migrant and full time wages. A one percent increase in percent migrant lowers the average full time wage rate by 0.16 percent and is also highly significant

There may be a somewhat magnanimous interpretation, rather than a substitution effect, for benefits. A one percent increase in BPW corresponds to a 0.02 percent raise in average full time wages. Firms providing greater levels of benefits may also be more likely to provide higher wages, rather than substitute benefits for wages. These firms may simply choose to offer higher levels of compensation than other firms for SPT labor.

Consistent with wage literature, education and perceived labor shortage are positively related to wages in this model. A one percent increase in the local high school graduation rate raises average full time wages by 0.67 percent. Likewise, a one percent increase in perceived labor shortage raises the average full time wage by 0.06 percent. There is no evidence of sample selection bias at the 0.05 level, but bias can not be rejected at the 0.10 level of significance.

Sales per Worker

As expected, percent migrant and wages are all positive and highly significant in the SPW equation. A one percent increase in percent migrant raises SPW by 0.80 percent. This supports previously mentioned producer expectations in the Alabama forestry sector.

A one percent increase in the average seasonal/ part time wage rate raises SPW by 1.97 percent, while the same increase for full time employees raises SPW by 5.37 percent. This supports the efficiency wage theory premise that greater rates of compensation provide an incentive for workers to be more productive. Neither total employees nor education are significant in the SPW equation, and there is no evidence of sample selection bias.

Conclusion

This study confirms the fears expressed by local workers with the advent of the H2-A program. The inclusion of migrant labor in the green industry workforce does appear to lower wages, for both seasonal/ part time and full time employees. The

estimated elasticities between a firm's percentage of migrant workers and its average respective wage rates range from -0.12 to -0.16 for seasonal/ part time workers and full time workers. A survey of individual employees, containing both demographic and wage information could reveal more significant relationships between migrant status, socioeconomic indicators, and wages. In this study, data for migrant status and wages/hours were derived from average levels reported by producers. Information for individual workers could render greater differentials in wages/hours between migrant and local workers. Socioeconomic indicators in this study were weakly proxied using county level census data. Individual education levels may be significantly related to wages for SPT employees, even if local education levels are not significant.

Producer decisions to hire migrant workers are dictated not only by the local labor supply, but also by firm size. The H-2A application process and the program's resulting worker provisions may exact an inordinate toll on smaller firms. This conundrum lends itself to a future cost benefit analysis. According to their size, which firms would actually benefit from hiring migrant workers?

There are apparent gains to productivity in hiring migrant workers, and paying higher wages to both seasonal/ part time and full time employees. These gains from migrant workers mirror recent findings in Alabama's forestry sector, while wage related gains are in line with efficiency wage theory expectations. Increased productivity due to migrant workers, coupled with wage differentials in the literature, and lower average wages in this study, poses a question of equity. The H-2A program requires that migrant workers be paid the prevailing wage rate. This is an industry that is often physically demanding of its workers, and summer in Alabama can be unrelenting.

While previous studies have found consistent wage differentials between migrant and local workers, this is the first known study to examine the effects of migrant labor on average wage levels. While this decision to examine average wage rates was dictated by the available data, it does raise an important question for future study of migrant labor in economics. Specifically, it leads research beyond the determination of wage differentials between migrant and local workers, to also examine the effects of migrant labor on local wage rates.

This study could also be enhanced with the use of time series data to examine the effects of IRCA. The data used in this study provides only information for 2002. Longitudinal data could reveal trends in wages, hours, and percent migrant before and after the implementation of IRCA. An intervention model using national data before and after 1987 could be measured for migrant labor, wages, and worker productivity. It would also be interesting to examine whether producer and local labor attitudes have changed after nearly a decade under IRCA. Such a study would have greater policy implications in evaluating the effects of and need for IRCA.

Appendix A

Green Industry Producer Surveys

Nursery and Greenhouse Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

105. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

106. Please indicate the types of products grown by listing the **dollars earned or percent of total nursery sales** they represent:

	Type Of Crop	Dollars	Or	% of Sales
Greenhouse Crops	Foliage	$		%
	Bedding plants	$		%
	Potted flowering plants	$		%
	Herbaceous plants	$		%
	Vegetable transplants	$		%
Nursery Crops	Container-grown shrubs	$		%
	Container-grown trees	$		%
	Field-grown shrubs	$		%
	Field-grown trees	$		%
	Container grasses and ground cover	$		%
	Perennials	$		%
	Roses	$		%
Turf Grass Crops		$		%
Christmas Trees		$		%
Propagation Materials (liners, plugs, tissue culture, etc.)-for sale only		$		%
Other (Specify)		$		%
TOTAL		$		**100%**

107. How much area of production space does your nursery utilize at this general location (include aisles, driveways, and walkways):

(a) _____**acres** of nursery bed space in the open (b) _____**sq. ft**. of greenhouse or shade house enclosed

108. Please indicate the percentage of your labor force that comes from the following sources. (Total should add up to 100%)

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____%
(d) Local Labor_____%

109. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire.

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

110. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

111. What is your annual cost for the following employee-related coverage?

(e) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

112. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

113. What percent of your **total firm sales** are made to buyers **outside of Alabama** _____%?

114. In which places do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (e) Other Southeast ☐ (g) Northeast ☐ (i) International_____
☐ (b) Florida ☐ (d) Georgia ☐ (f) Southwest ☐ (h) Northwest

115. In what county or counties is your operation located? _____ _____ _____

(Over please – more on reverse side)

116. Please provide a "**best estimate"** of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent or	Percent of Sales
Containers	**$**	%
Soil mixes	**$**	%
Propagation stock (seed, cuttings, plugs, tissue culture plantlets, etc.)	**$**	%
Plants purchased from other growers	**$**	%
Pesticides (all agri-chemicals)	**$**	%
Fertilizers (synthetic and organic)	**$**	%
Hardscape material (irrigation etc.)	**$**	%
Equipment (purchases, leases, maintenance, and repairs)	**$**	%
Facilities (purchases, leases, maintenance, and repairs)	**$**	%
Shipping and transportation	**$**	%
All overhead items (utilities, insurance, interest, etc.)	**$**	%
Other (specify):	**$**	%
TOTAL	**$**	**100%**

117. In order to estimate the total size of the grower sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000	(e) $400,000 to $499,999	(i) $2,000,000 to $2,999,999
(b) $100,000 to $199,999	(f) $500,000 to $749,999	(j) $3,000,000 to $3,999,999
(c) $200,000 to $299,999	(g) $750,000 to $999,999	(k) $4,000,000 to $4,999,999
(d) $300,000 to $399,999	(h) $1,000,000 to $1,999,999	(l) $5,000,000 or above

118. Please provide a **"best estimate"** of the percentage of your total sales to the following sources? (Total should add up to 100%.)

Categories	**Percent of Total Sales**
Directly to the Public	%
Municipalities	%
Retail Nursery/Garden Centers	%
Retail Mass Merchandisers	%
Re-wholesalers (brokers, other growers, etc.)	%
Landscape Contractors	%
Lawn and Landscape Installation and Maintenance Firms	%
Florists	%
Arborists	%
Other (Specify)	%
TOTAL	**100%**

119. Please provide an estimate of your annual **water usage**. _____**gallons.** What percentage of your water used comes from:

(a) Private Well_____% (b) Natural Surface _____% (c) Recaptured _____%
(d) City/County _____%

120. What percentage of your company's marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

121. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:

1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition by plant substitutes	**1**	**2**	**3**	**4**	**5**
Competition from imported plants	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Turfgrass and Sod Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

122. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

123. Please indicate the level of **turfgrass production in acres** for your operation:

Type Of Production		Certified	Non-Certified
Production	Sod	acres	acres
	Sprigs	acres	acres
	Seed	acres	acres
Types of Turf	Fescue	acres	acres
	Bermuda	acres	acres
	Centipede	acres	acres
	Zoysia	acres	acres
	St. Augustine	acres	acres
	Other (Specify)	acres	acres
TOTAL		**acres**	**acres**

124. How much do you plan to change your acreage in turf production over the next five years?

_____acres ☐ Increase ☐ Decrease

125. Please indicate the percentage of your labor force that comes from the following sources. (Total should add up to 100%)

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____% (d) Local Labor_____%

126. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire?

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

127. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

128. What percent of your **total firm sales** are made to buyers **outside of Alabama** _____%?

129. In which places do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (e) Other Southeast ☐ (g) Northeast ☐ (i) International_____

☐ (b) Florida ☐ (d) Georgia ☐ (f) Southwest ☐ (h) Northwest

130. What is your annual cost for the following employee-related coverage?

(f) $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

131. Please provide an estimate of your annual **water usage**. _____**gallons.** What percentage of your water used comes from:

(a) Private Well_____% (b)Natural Surface _____% (c) Recaptured_____% (d) City/County _____%

132. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

133. In what county or counties is your operation located? _____ _____ _____

(Over please – more on reverse side)

134. Please provide a "**best estimate"** of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent Or	Percent of Sales
Shipping and transportation	$	%
Equipment repairs and maintenance	$	%
Equipment purchases and leases	$	%
Plant material purchased	$	%
Fuel	$	%
Pesticides	$	%
Fertilizers	$	%
Other Chemicals	$	%
Telephone and other communication	$	%
Soil Fumigation	$	%
Hardscape materials (irrigation, etc.)	$	%
Advertising and marketing	$	%
All overhead items (utilities, insurance, interest, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

135. In order to estimate the total size of the grower sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000
(b) $100,000 to $199,999
(c) $200,000 to $299,999
(d) $300,000 to $399,999
(e) $400,000 to $499,999
(f) $500,000 to $749,999
(g) $750,000 to $999,999
(h) $1,000,000 to $1,999,999
(i) $2,000,000 to $2,999,999
(j) $3,000,000 to $3,999,999
(k) $4,000,000 to $4,999,999
(l) $5,000,000 or above

136. Please provide a **"best estimate"** of the percentage of your total sales to the following sources? (Total should add up to 100%.)

Categories	**Percent of Total Sales**
Directly to the Public	%
Golf Courses	%
Municipalities	%
Retail Nursery/Garden Centers	%
Retail Mass Merchandisers	%
Re-wholesalers (brokers, other growers, etc.)	%
Other Turfgrass Producers	%
Greenhouse Growers	%
Landscape Contractors	%
Landscape Installation and Maintenance Firms	%
Lawn Care and Maintenance Firms	%
TOTAL	**100%**

137. What percentage of your company's marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

138. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition from new firms	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor costs	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Lawn and Landscape Survey

Your informed BEST ESTIMATES are sufficient for this survey. Exact figures from records are not required.

139. What is your current business structure?

☐ (a) Sole proprietorship ☐ (b) Corporation ☐ (c) Partnership ☐ (d) Limited Liability Company (LLC)

140. Please report **dollars earned or percentage of sales** for the following products or services: (Use the most convenient estimate.)

Type Of Service/Material	Dollars Earned Or	Percent Of Sales
Landscape design services	$	%
Landscape installation services	$	%
Landscape maintenance services	$	%
Lawn care and maintenance services	$	%
Sub-contracts: design, maintenance, and service	$	%
Irrigation installation or contracting	$	%
Live Plants	$	%
Horticultural supplies, equipment or hard goods	$	%
Other (Specify)	$	%
TOTAL	$	**100%**

141. Please indicate the percentage of your labor force that comes from the following sources. **(Total should equal 100%)**

(a) H-2A Program_____% (b) H-2B Program_____% (c) Other Migrant Labor_____%
(d) Local Labor_____%

142. A state or federally funded skills training program for the local labor force would increase the amount of local labor you hire?

☐ (a) strongly disagree ☐ (b) disagree ☐ (c) neither agree nor disagree ☐ (d) agree ☐ (e) strongly agree

143. Please indicate the number of employees and managers in your Alabama operations in 2002 by type:

Type of Employee	Number of Employees	Payroll *(excluding benefits)*	Average Weeks Worked per Year	Average Hours per Week
Seasonal or Part Time Production		$		
Full Time Production		$		
Permanent Management and Clerical		$		
Sales Staff		$		

144. What is your annual cost for the following employee-related coverage?

145. $_____Medical/dental (b) $_____Life insurance (c) $_____Worker's comp
(d) $_____Bonuses

146. What percent of your **firm's work** and/or **services** is provided for customers **outside of Alabama** _____%?

147. In which states do you have out-of-state sales? (Check all that apply)

☐ (a) Tennessee ☐ (c) Mississippi ☐ (c) Other_____
☐ (b) Florida ☐ (d) Georgia

148. Please give an estimate of planned expenditures on major construction or equipment purchases for 2003.

$_____Equipment $_____Construction

149. By what percentage do you expect you business volume to change over the next 5 years?

_____% ☐ Increase ☐ Decrease

150. In what county or counties is your operation located? _____ _____ _____

151. In order to estimate the total size of the landscape sector in Alabama, please give your firm's **total gross sales in 2002**? Choose the appropriate category or enter the value here $_____. (These figures are **strictly confidential** and will be used for survey totals only.)

(a) Less than $100,000	(e) $400,000 to $499,999	(i) $2,000,000 to $2,999,999
(b) $100,000 to $199,999	(f) $500,000 to $749,999	(j) $3,000,000 to $3,999,999
(c) $200,000 to $299,999	(g) $750,000 to $999,999	(k) $4,000,000 to $4,999,999
(d) $300,000 to $399,999	(h) $1,000,000 to $1,999,999	(l) $5,000,000 or above

(Over please – more on reverse side)

152. Please give your best estimate of your **annual expenditures** as a percent of total sales **or** dollars spent annually (whichever is most convenient): **These figures are strictly confidential and will be used for survey totals only.**

Item	Dollars Spent Or	Percent of Sales
Material Expenses (costs of resale materials such as plants, mulches, sod, seed, etc.)	$	%
Equipment repairs and maintenance	$	%
Equipment purchases and leases	$	%
Fuel	$	%
Pesticides	$	%
Fertilizers	$	%
Other Chemicals	$	%
Telephone and other communication	$	%
Hardscape materials (irrigation, etc.)	$	%
Facilities (mortgages, leases, maintenance, and repair)	$	%
All overhead items (utilities, insurance, interest, etc.)	$	%
Other (specify):	$	%
TOTAL	**$**	**100%**

153. What percentage of your total sales/services was to the following sources? (Please make sure the percentage sums to 100%. **For example,** if total sales came equally from two categories, then write in 50% in the blank next to each).

Categories	Percent of Total Sales
Homeowners	%
Apartments and condominiums	%
Commercial establishments (restaurants, hotels, cemeteries, etc..)	%
Governments	%
Builders and developers	%
Other landscapers, interiorscapers or lawn maintenance firms	%
Other (Specify) _____	%
TOTAL	**100%**

154. What percentage of your company's advertising/marketing budget is allocated to the following marketing practices?

_____% Personal Selling
_____% Commissioned Salespersons
_____% Promotions
_____% Trade Shows
_____% Trade Magazine Advertising
_____% Printed Advertising Media (newspaper, brochures, etc.)
_____% Radio or Television Advertising
_____% Computer Website
_____% Direct Mail
_____% Other (Specify)_____

155. Do you agree that the following threats facing your industry are important? Please rate the importance on a scale of 1 to 5, where:
1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree (Please circle the appropriate rating**)**

Drought and water use restrictions	**1**	**2**	**3**	**4**	**5**
Low prices for product or service	**1**	**2**	**3**	**4**	**5**
Increasing costs of production	**1**	**2**	**3**	**4**	**5**
Unlicensed competitors	**1**	**2**	**3**	**4**	**5**
Increasing equipment costs	**1**	**2**	**3**	**4**	**5**
Restrictions on use or reduced availability of chemicals	**1**	**2**	**3**	**4**	**5**
Competition by plant substitutes	**1**	**2**	**3**	**4**	**5**
Market power of large retail chains	**1**	**2**	**3**	**4**	**5**
Government regulations	**1**	**2**	**3**	**4**	**5**
OSHA requirements	**1**	**2**	**3**	**4**	**5**
Local, State, and Federal taxes	**1**	**2**	**3**	**4**	**5**
Lack of professionalism	**1**	**2**	**3**	**4**	**5**
Lack of business management training	**1**	**2**	**3**	**4**	**5**
General economic conditions	**1**	**2**	**3**	**4**	**5**
Labor shortage	**1**	**2**	**3**	**4**	**5**
Direct and indirect labor cost	**1**	**2**	**3**	**4**	**5**
Increasing energy costs	**1**	**2**	**3**	**4**	**5**

AGAIN, THANKS FOR YOUR COOPERATION!

Appendix B

Descriptive Statistics

Table 1. List of Explanatory Variables included in the SUR Model

Variable	*Explanation*
Lawn and Landscape	Dummy variable indicating whether the respondent is a member of the lawn and landscape sector (= 1 if a member, 0 otherwise)
Nursery and Greenhouse	Dummy variable indicating whether the respondent is a member of the nursery and greenhouse sector (= 1 if a member, 0 otherwise)
Turfgrass and Sod	Dummy variable indicating whether the respondent is a member of the turfgrass and sod sector (= 1 if a member, 0 otherwise)
Percent Migrant	The percentage of each respondent's labor force composed of migrant workers
SPT Wage	The average hourly wage rate paid to seasonal and part time workers in each firm
FT Wage	The average hourly wage rate paid to full time workers in each firm
Total Employees	Each firm's total labor force
Benefits	The total amount paid for employee benefits in each firm
BPW	The average amount of benefits per worker in each firm (= Benefits/ Total Employees)
Education	The Census county level figure for the percent of the population with a high school degree or greater
Unemployment	The Census county level figure for the percent of the population considered unemployed
Median Income	The Census county level figure for median household income
Gross Sales	The total sales reported by each firm
SPW	The average level of sales per worker in each firm (Gross Sales/ Total Employees)
Government Regulation	The level of threat perceived by producers attributed to existing government regulations
Lack of Management	The level of threat perceived by producers attributed to a lack of management in the industry
Labor Shortage	The level of threat perceived by producers attributed to a labor shortage in the industry
Federal Funding	Respondents' level of support regarding a prospective federal program to fund the increased hiring of local workers
IMR	Variable representing the Inverse Mill's Ratio to test for sample selection bias

Table 2. Initial Survey Descriptive Statistics, 2002

Variable	*Mean*	*Std.Dev.*	*Minimum*	*Maximum*	*Observations*
Lawn and Landscape	0.59	1,456	0.00	1.00	321
Nursery and Greenhouse	0.36	1,455	0.00	1.00	321
Turfgrass and Sod	0.05	1,455	0.00	1.00	321
Percent Migrant	10.03	1,577	0.00	100.00	291
SPT Wage	9.24	2,781	0.00	69.44	117
FT Wage	9.76	2,756	0.00	43.27	119
Total Employees	9.50	1,745	1.00	110.00	251
BPW	1,171	4,151	0.00	10,000	251
Education	76.85	1,654	59.50	86.80	298
Unemployment	3.65	1,541	2.10	6.40	298
Median Income	35,737	56,823	16,646.00	55,440	298
Gross Sales	655,877	3,709,420	2,000.00	60,000,000	302
SPW	53,696	112,691	0.00	645,161	251
Government Regulation	3.33	1,460	1.00	5.00	321
Lack of Management	3.22	1,459	1.00	5.00	321
Labor Shortage	3.28	1,459	1.00	5.00	321
Labor Cost	3.49	1,460	1.00	5.00	321

Table 3. Estimated Labor Sample Descriptive Statistics, 2002

Variable	*Mean*	*Std.Dev.*	*Minimum*	*Maximum*	*Observations*
Lawn and Landscape	0.60	0.49	0.00	1.00	218
Nursery and Greenhouse	0.34	0.47	0.00	1.00	218
Turfgrass and Sod	0.06	0.24	0.00	1.00	218
Percent Migrant	13.82	25.24	1.00	100.00	218
Federal Funding	2.77	1.10	1.00	5.00	218
SPT Wage	9.58	6.19	3.52	69.44	218
FT Wage	10.08	3.42	4.34	41.67	218
Total Employees	9.43	12.99	1.00	93.00	218
BPW	1,107	1,734	0.00	11,046	218
IMR	1.77	0.13	1.21	2.05	218
Education	76.95	6.26	60.50	86.80	218
Unemployment	3.68	0.79	2.10	6.30	218
Median Income	35,670	5,975	19,819	55,440	218
Gross Sales	808,705	4,131,640	4,500	60,000,000	218
SPW	56,717	65,208	1,400	64,5161	218
Government Regulation	3.46	1.07	1.00	5.00	218
Lack of Management	3.26	1.15	1.00	5.00	218
Labor Shortage	3.43	1.22	1.00	5.00	218
Labor Cost	3.71	1.11	1.00	5.00	218

Appendix C

Estimation Results

Table 1. Sample Selection Probit Results

Variable	*Coefficient*	*Std. Error*	*Test Statistic*	*P[|Z|>z]*
Constant	-2.256	0.529	-4.264	0.000
Education	0.000	0.011	-0.039	0.969
Unemployment	0.151	0.062	2.461	0.014
Median Income	0.000	0.000	0.864	0.387
Turfgrass and Sod	0.515	0.196	2.629	0.009
Lawn and Landscape	0.036	0.079	0.450	0.652
Chi-Squared	13.952			
Degrees of Freedom	5			
Observations	2284			

Table 2. Log-Linear Estimates for Percent Migrant in Alabama's Horticulture Industry, 2002

Variable	*Coefficient*	*Std. Error*	*Test Statistic*	*P[|Z|>z]*
Constant	4.148	2.127	1.950	0.051
Lawn and Landscape	-0.701	0.227	-3.085	0.002
Turfgrass and Sod	-1.634	0.846	-1.932	0.053
LN Federal Funding	-0.044	0.133	-0.332	0.740
LN Total Employees	0.430	0.067	6.408	0.000
LN IMR	-4.632	2.731	-1.696	0.090
LN Unemployment	-1.098	0.494	-2.221	0.026
LN Labor Shortage	0.619	0.193	3.212	0.001
F-Statistic	6.54			
Probability Value	0.000			

Table 3. Log-Linear Estimates for Seasonal and Part Time Wages in Alabama's Horticulture Industry, 2002

Variable	*Coefficient*	*Std. Error*	*Test Statistic*	*P[|Z|>z]*
Constant	2.947	1.441	2.045	0.041
Lawn and Landscape	-0.090	0.065	-1.374	0.169
Turfgrass and Sod	0.088	0.205	0.431	0.667
LN Percent Migrant	-0.119	0.014	-8.211	0.000
LN IMR	0.107	0.611	0.175	0.861
LN Education	-0.194	0.308	-0.631	0.528
LN Labor Shortage	0.156	0.057	2.755	0.006

Table 4. Log-Linear Estimates for Full Time Wages in Alabama's Horticulture Industry, 2002

Variable	*Coefficient*	*Std. Error*	*Test Statistic*	*P[|Z|>z]*
Constant	0.104	1.116	0.094	0.925
Lawn and Landscape	-0.241	0.051	-4.700	0.000
Turfgrass and Sod	-0.396	0.161	-2.454	0.014
LN Percent Migrant	-0.163	0.011	-14.653	0.000
LN BPW	0.016	0.003	6.079	0.000
LN IMR	-0.902	0.479	-1.881	0.060
LN Education	0.660	0.238	2.775	0.006
LN Labor Shortage	0.064	0.027	2.368	0.018

Table 5. Log-Linear Estimates for Sales Per Worker in Alabama's Horticulture Industry, 2002

Variable	*Coefficient*	*Std. Error*	*Test Statistic*	*P[|Z|>z]*
Constant	-0.010	6.918	-0.001	0.999
Lawn and Landscape	1.068	0.305	3.499	0.001
Turfgrass and Sod	1.634	0.957	1.707	0.088
LN Percent Migrant	0.804	0.072	11.194	0.000
LN SPT Wage	1.967	0.160	12.293	0.000
LN FT Wage	5.368	0.206	26.016	0.000
LN Total Employees	0.077	0.063	1.216	0.224
LN IMR	2.175	2.843	0.765	0.444
LN Education	-2.026	1.473	-1.375	0.169

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