ABSTRACT

WEDDINGTON, MEGAN. Economic and cost analysis of the floriculture industry differentiated by market segment. (Under the direction of John M. Dole.)

Data were collected from bedding and potted plant growers serving the wholesale and retail markets to determine business characteristics, average annual gross sales, average fixed and variable costs, costs per square foot per week ($/ft^2/wk) or costs per square foot per year ($/ft^2/yr) and utilization of space. Business size, including greenhouse area, outdoor pads, fields and supplemental buildings, ranged from 85,337 ft^2 to 222,336 ft^2. Greenhouses were the primary production area for bedding and potted plant growers, while cut flower growers primarily used field production. Bedding and potted plant growers averaged sales of $896,519 compared to sales of $45,423 for cut flower growers. Wholesale markets had higher sales than retail markets for bedding and potted plant businesses and cut flower businesses. Labor was the greatest expense for all market segments. Correlation analysis indicated a positive association between advertising costs and sales in the wholesale markets. Positive associations in the retail markets were found between employee compensation and sales and conference/travel expense and sales.

Financial data collected from bedding and potted plant growers serving the wholesale and retail markets was used to determine space utilization and fixed costs per square foot per week ($/ft^2/wk). Calculation of this cost included adjustments for space and time utilization. Wholesale bedding and potted plant growers were determined to have fixed costs of $0.236/ft^2/wk and retail bedding and potted plant growers had a cost of $0.334/ft^2/wk for greenhouse production area. Financial data collected from wholesale

and retail cut flower growers were used to determine space utilization and costs per square foot per year ($/ft^2/yr). The wholesale cut flower businesses were determined to have a fixed cost of $1.220/ft^2/yr, while the retail cut flower businesses yielded a cost of $0.787/ft^2/yr for field production. Businesses can compare their own costs to these industry averages. Costs per square foot per week and costs per square foot per year are valuable tools for business management and efficiency analysis.

Monthly space utilization differentiated by production area was determined for each market segment. Bedding and potted plant growers primarily used greenhouses for production with some production on outdoor pads. Peak greenhouse usage for wholesale bedding and potted plant growers occurred in April (95.5%), and retail bedding and potted plant growers' greenhouses were most utilized in April and May (87.5%). Cut flower growers primarily used field production though some also utilized greenhouse space. Field production peaked in June (85%) for wholesale cut flower growers and in July (88%) for retail cut flower growers.

ECONOMIC AND COST ANALYSIS OF THE FLORICULTURE INDUSTRY DIFFERENTIATED BY MARKET SEGMENT

by
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DEDICATION

I would like to dedicate this body of work to my parents and my fiancé.

Dad, you instilled in me a love of horticulture. You taught me to always pursue that which makes me happy and to be reflective in thought and decisive in action. Mom, you instilled in me a love of learning. You taught me to always try my best and make the best of every situation—even if it's not what I expected. Together, you have demonstrated the value of hard work and the importance of upholding my beliefs. I am most grateful for your endless support and encouragement throughout my academic journey, throughout my life.

Andy, you've been the source of my relief when the rigors of study seemed overwhelming. Your sense of humor, your reassurance, your concern and your devoted friendship reaches across the miles—129 miles, to be exact—to support me daily.

It is with the greatest love and utmost gratitude that I dedicate this culmination of my studies to John and Alice Weddington and Andrew Bame.

BIOGRAPHY

Megan Weddington was born on February 13, 1979 in Salisbury, NC. She received her elementary and secondary education in China Grove, NC and graduated from South Rowan High School in 1997.

She attended North Carolina State University where she participated in the Thomas Jefferson Scholars, a dual degree program. She received a Bachelor of Science degree in horticultural science and a Bachelor of Arts degree in multi-disciplinary studies with a concentration in science journalism. Megan was recognized as a Class of 2001 Valedictorian.

Megan is the daughter of John and Alice Weddington of China Grove, North Carolina.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

The floriculture industry has become a significant contributor to the total agricultural economy. The 1997 United States Census of Agriculture reported floriculture sales greater than $4.4 billion (United States Department of Agriculture, 2000). In North Carolina, the 2000 estimate for total wholesale value of all floriculture crops was $160.8 million (North Carolina Department of Agriculture & Consumer Services, 2002). With advanced breeding techniques, the diversity of plant material continues to grow in a direction guided by consumer desires and production needs.

While the industry is strong and growing, several concerns exist. Many small retailers find themselves competing with "big box" stores (mass marketers) whose large budgets and diverse product lines allow them to sell a higher volume of product at a lower profit margin. Some growers supplying mass marketers are faced with the task of merchandising their products, increasing labor needs beyond traditional production inputs and subsequently increasing labor costs. The cut flower industry faces increased international competition as the quality of imported cut flowers has increased while the prices have remained low. Also, the rising cost of fuel has forced many growers to alter their production schedules or product selection. As plant suppliers invest in research to develop superior plant material, i.e. well branched with plentiful flowers, disease resistance or specific flower colors—they patent and license their product to recoup their research and development costs through royalties paid by the grower. The increase in the cost of plant material means growers must pass this cost onto the consumers. Reluctant markets may require education and promotional activities to increase the consumers' perceived value of these crops.

To overcome the challenges facing today's grower, good management practices are essential. Members of the floriculture industry are primarily plantsmen and the management of the business is a secondary concern. As plantsmen, growers are interested in producing a quality crop. However, to maintain a successful business, to distribute that quality crop to the gardening public, growers must also consider costs of production to ensure a return on their investments of time and money.

This research offers growers a management tool that can be used to identify areas of inefficiency by comparing their firm's costs with the average costs of other firms in similar market channels. Most firms currently have little idea how their business compares to others in the industry. Since cut flower growers and bedding and potted plant growers have different significant costs, separate analyses were done for each of these industry segments.

Production decisions are often based on intuition or previous experience with little regard to economic impact. To maximize efficiency in an increasingly competitive market, firms must determine the most cost effective production method. To compare possible methods, growers can calculate the total cost of producing a crop using the cost per square foot per week ($/ft^2/wk) or cost per square foot per year ($/ft^2/yr) method. This figure is important because it incorporates crop timing with fixed and variable costs. For best management, each greenhouse business should perform a yearly cost analysis to account for production changes.

Cost accounting budgets can and should be used to establish a minimum selling price based on accurate production costs. A final selling price should include a fair return on the investment to yield a profit. Many producers, especially small and recently

established businesses, rely solely on competitive pricing. This is poor financial management since the competitor's production costs are likely different (perhaps even less), and their prices may not be based on their production costs. However, in the market-driven economy, the producer must be sensitive to the consumer's valuation. By understanding the market value of a product, the producer can determine if he/she can provide that product at a lower cost to ensure a profit. Another pricing "strategy" is to increase all prices a given percentage periodically. This method is flawed since it fails to reflect changes in production costs. Over time, cost changes will occur, but it is unlikely that all crops will be affected in the same way. Cost analysis is the key to evaluating business alternatives and developing an effective pricing strategy.

Literature Review

In 1980, Brumfield et al. (1982) analyzed fixed costs of greenhouse firms differentiated by size of firm and market channel. Since then, however, little comprehensive work has been done in the greenhouse industry that would yield a current cost per square foot per week figure. Brumfield's focus on fixed costs allowed managers to evaluate the effects of changes in firm size, machine replacement or market channel. Expenses are most commonly calculated on a square foot basis in the greenhouse industry, which allows managers to compute expenses involved in production of various sized merchandise units.

Cavins and Dole (2001) incorporated $\$/ft^2/wk$ into experiments which evaluated the affects of photoperiod, juvenility and light intensity on the production and economics of cut *Campanula* stems. The $\$/ft^2/wk$ calculation from Brumfield et al. (1982) for small

growers serving floral shops was used and adjusted using the consumer price index. A current $/ft^2/wk figure would yield a more accurate analysis of profitability and would not rely on a non-industry measure for an updated figure.

Jenkins and Brumfield (1987) analyzed costs to determine whether plug or seedling production is more cost effective. Their analysis also differentiated between size of firm and the presence or absence of automation for plug production. Jenkins and Brumfield analyzed per unit costs and found that most firms had lower costs using plug production rather than seedling production. This type of analysis should be employed by greenhouse business according to their production alternatives.

Brumfield and Sim (1987) took a closer look at automation by analyzing technology use in Pennsylvania floriculture production. They determined that nine statistical clusters, based on 32 technologies, described the state of automation in the industry. Distinguishing factors included media preparation techniques, watering and fertilizing systems, product transport systems, environmental control systems, and management and marketing techniques.

Prince et al. (1987) surveyed growers throughout the United States to determine how the industry is segmented by product mix, marketing season and channel of distribution. They found that six segments exist, some specializing in specific pot sizes, marketing seasons and channels of distribution, while other segments tend to diversify their production and marketing behavior. This variability raises questions concerning management strategies of production, marketing and finance of the firms. Greater diversity within a firm results in a more complex cost analysis.

Economic analyses are also used to show the importance of the greenhouse industry to a state's economy. Uva (1991) and Uva and Richards (2003) analyzed the economic dimensions of the greenhouse industry in New York by surveying businesses and researching USDA census information. They determined the contribution of sales, business size and employment to New York's economy. Industry sales were found to vary significantly depending on the business size and market outlets.

Individual commodity groups within the floriculture industry have offered financial management advice as well. Gunter and Otte (1978) approximated foliage plant costs using existing records. Additionally, they related the costs to market prices and profits. The bedding plant growers have been given similar means to measure profitability of their operations (Strain, 1981).

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Economic Analysis of the Floriculture Industry Differentiated by Market Segment

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Additional index words. Cost accounting, wholesale, retail, greenhouse, cut flowers, expenses, sales, business parameters.

Abstract. Data was collected from bedding and potted plant growers and cut flower growers serving the wholesale and retail markets to determine business characteristics and fixed and variable costs. Business size, including greenhouse area, outdoor pads, fields and supplemental buildings, ranged from 10,400 ft^2 to 463,400 ft^2. Greenhouses were the primary production area for bedding and potted plant growers, while cut flower growers primarily used field production. Bedding and potted plant growers averaged sales of $896,519 compared to average sales of $45,425 for cut flower growers. Wholesale markets had higher sales than retail markets for bedding and potted plant and cut flower businesses. Labor was the greatest expense for all market segments.

Correlation analysis indicated positive associations in the retail markets between employee compensation and sales and conference/travel expense and sales.

Introduction

Good management practices are essential to overcome the challenges facing today's grower. Members of the floriculture industry are often plantsmen first; while the role of businessmen is usually secondary. As plantsmen, growers are interested in producing a quality crop. However, to maintain a successful business, growers must also consider costs of production to ensure a return on their investments of time and money.

Growers require management tools that can be used to identify areas of inefficiency by comparing their firm's costs with the average costs of other firms in similar market channels. Most firms currently have little idea how their business compares to others in the industry. The expenses of cut flower growers and bedding and potted plant growers differ so separate tools are required for each of these industry sectors.

Bedding and potted plant growers and cut flower growers produce their crops in greenhouses, outdoors or both locations. Whether a business uses greenhouses, and to what extent, affects its costs of production. Heat and utilities, typically required greenhouse costs, are minimal in outdoor production. However, heating and cooling allows crop seasons to be extended, earlier and later than natural occurrence, creating the opportunity for multiple "turns"—producing more than one crop in the same space. If the market is available, multiple turns may result in increased sales to counterbalance the increased heating or cooling expense. In addition, the shorter the crop time, the more turns possible in a space.

While some businesses have a diverse market, most are managed according to the needs of their primary market—wholesale or retail. For example, a wholesale business is

more likely to deliver its products to retail centers so its vehicle expenses might be greater than a retail business'; however, a retail business typically requires more employees than a wholesale business to meet customer service needs. In either market, the costs of production should be the primary management concern. If an expense category is significantly greater than the average, perhaps an alternative production practice should be considered to lower costs and ultimately increase profits. To utilize this information, individual firms must have accurate records.

The objective of this research was to compile a summary of fixed and variable costs incurred by six sectors of the floriculture industry based on product type and market channel.

Materials and Methods

Potential survey participants (160) were initially contacted to discuss the purpose of the survey and secure their cooperation. A comprehensive survey (Appendix A) was mailed or faxed to each willing participant (120). Floriculture firms were pre-selected based on the market channels: 1) wholesale bedding and potted plant growers selling primarily to mass marketers, 2) wholesale bedding and potted plant growers selling primarily to garden centers and landscapers, 3) retail bedding and potted plant growers, 4) wholesale cut flower growers selling primarily to mass marketers, 5) wholesale cut flower growers selling primarily to florists and specialty grocers, and 6) retail cut flower growers. Twenty-nine surveys were returned with sufficient information provided for analysis. The survey participants were primarily from North Carolina and the southeastern United States.

The survey provided data in the following areas: distribution of sales by market, business size, product itemization, distribution of sales by production area, distribution of expenses by production area, revenue and overall expenses. The data was categorically averaged for each of the defined market channels. Response means were determined based on the number of responses for each category and overall means were determined based on the number of surveys returned for each market segment. Data were analyzed using means and correlations in SAS® Version 8 (SAS Institute, Inc., Cary, N.C.).

Results and Discussion

Of the 120 surveys distributed, 41 responses were received (34.2%). Nine participants did not have the time or resources to contribute to this research, resulting in 32 completed surveys (26.7%). This may seem low relative to the number of floriculture operations in North Carolina; however, previous studies had a similar response when attempting to collect financial data. Uva and Richards (2003) collected data from 45 greenhouse businesses, Brumfield (1980) surveyed 32 businesses, and 31 businesses responded to a survey conducted by Brumfield and the Ohio Florists' Association (1994). Surveys focusing on non-financial business characteristics have yielded greater response rates of 64 to 68% (Prince et al., 1987, Scoggins et al., 2003).

Despite repeated contacts to obtain sufficient survey data from each market channel, there were insufficient responses in the categories of wholesale bedding and potted plant growers selling primarily to mass marketers and wholesale cut flower growers selling primarily to mass marketers; therefore, these market segments were eliminated from the study resulting in 29 analyzed surveys. Though the mass market

suppliers account for the greatest sales volume, they represent the smallest market segment by number of businesses. Ten wholesale bedding and potted plant growers selling primarily to garden centers and/or landscapers returned completed surveys, and four retail bedding and potted plant growers participated. Seven surveys represented the wholesale cut flower growers selling primarily to florists and specialty grocers, and eight surveys were analyzed for the retail cut flower growers category. Twenty-one respondents were from North Carolina, three from Virginia, two from Maryland and one from South Carolina. In addition to these east coast firms, one survey response from Oklahoma and Idaho were solicited and received.

Financial data collected from each firm was analyzed by market segment to determine mean itemized costs. Using the data collected, two means were determined. The response mean was calculated based on the number of responses for each category of data. Since all participants did not respond to every category, the divisor may have been less than the total number of surveys returned for the market segment. The response mean is useful for evaluating the occurrence of an expense and comparing an expense of an individual firm to the average of those incurring that expense. The overall mean was determined by using the total number of surveys returned in a given market segment as the divisor for each category. The overall mean creates a representative firm allowing for categorical industry averages. Unless otherwise noted, all means reported in the text refer to overall means.

Wholesale bedding and potted plant growers selling primarily to garden centers and landscapers

Business parameters. These businesses, though selling primarily to garden centers and landscapers, have a diverse market (Table 1). Thirty percent of the businesses surveyed also sell to mass marketers and 30% service retail customers. Greenhouse production space averaged 51,094 ft^2 and outdoor production space (pads/benches) averaged 30,700 ft^2. Hanging baskets occupied an additional 7,708 ft^2 of greenhouse space. The total business size including non-production area and supplemental buildings was 109,987 ft^2. Brumfield et al. (1982) defined small, medium and large firms as 20,000 ft^2, 100,000 ft^2 and 400,000 ft^2, respectively. More recently, an analysis of the Virginia greenhouse industry categorized size based on heated space as small (<10,000 ft^2), medium (10,000 ft^2 to 29,999 ft^2) and large (>30,000 ft^2) (Scoggins et al., 2003). Thus the businesses in this study would be characterized as medium to large firms with greenhouse space ranging from 21,000 ft^2 to 135,000 ft^2 and additional outdoor space of 10,000 ft^2 to 107,000 ft^2.

Though the area of greenhouse and outdoor production was similar, 86% of sales and 92% of expenses were attributed to the greenhouse, compared to 14% of sales and 8% of expenses attributed to outdoor production. This discrepancy between size and financial input and output may be attributed to the environmental control in the greenhouse which allows for more turns throughout the year and to the additional revenue of layered plant material, such as hanging baskets produced above or shade plants grown underneath greenhouse benches. Of course, the greenhouse would be assigned the majority of the expenses due to heating costs and labor. In the bedding and

potted plant segment of the industry, labor is more intensive in the greenhouse than for outdoor crops grown on pads.

These businesses primarily sold wholesale finished plants. No plug or cutting sales were reported and the amount of pre-finished plant material sold was insignificant. Flowering potted plants yielded the highest average grossing product category ($394,635). Bedding plants, including hanging baskets for outdoor use, earned only slightly less with a reported average value of $388,289. Both were distantly followed by potted foliage which averaged gross sales of $48,920.

Revenue and expenses. The mean sales of wholesale bedding and potted plant growers selling primarily to garden centers and landscapers was $962,769 (Table 2). The minimum response was $247,000 and the maximum sales reported was $2,632,178.

The detailed expense data revealed that labor was the greatest cost (Table 3). Labor, including owner and employee compensation, totaled an average of $309,168, or 33.4% of the expenses. While many small business owners consider the net income their compensation, all business owners in this market segment reported a salary, averaging $83,436. Employee compensation, consisting of a base wage or salary, required payroll expenses and fringe benefits, averaged $225,732. The businesses in this market segment averaged seven full-time employees and five part-time or seasonal employees (Table 1). The minimum number of employees was one full-time and two part-time workers in addition to the owner.

Plants and seeds ($283,319) and materials and supplies ($123,194) were the next highest expense categories. Patented, royalty-bearing plant material and premium pots and labels are becoming more common. Due to the higher value placed on these plants

these cost categories have potential to increase in the next few years. While facilities rent ($46,284) was the next greatest expenses, this cost was only incurred by 60% of the businesses. Heating fuel and utilities, expenses incurred by all greenhouse businesses, averaged $49,592, accounting for 5.4% of total expenses. The top five expenses account for 87.6% of the mean total costs, $926,712.

The average net income for wholesale bedding and potted plant growers selling primarily to garden centers and landscapers was $38,246. Since the owners' salaries have already been allocated as an expense, this represents income that can be reinvested in the business or awarded as bonus compensation.

Costs correlations. Correlational analysis indicated several strong associations between data categories (Table 4). Though correlation does not indicate causation, these associations may indicate cost relationships not previously considered. Total employee compensation, and more specifically, employee benefits were strongly associated with sales. Since this is a wholesale market, employees do not directly affect sales volume through customer service, as would be the case in the retail market. Benefits are usually reserved for returning seasonal and full-time employees. These individuals are more likely to be committed to task efficiency and producing a quality product.

Not surprising, total expenses were strongly associated with sales. Though owner compensation was associated with sales, net income was not. This may indicate that as the business grows financially, the owner compensation is increased rather than the net income. Also, advertising and conference and travel expenses were strongly associated with sales for this market segment. The question remains whether businesses that advertise have greater sales, or if businesses with a greater budget advertise more. The

same question can be asked about the relationship between sales and the knowledge gained by attending conferences.

Retail bedding and potted plant growers

Business parameters. Retail bedding and potted plant growers sold only eight percent of their product to wholesale outlets with the remainder sold to consumers in the direct retail market (Table 5). The average business size was 98,092 ft^2 with 60,222 ft^2 devoted to production. Greenhouse production area was 35,870 ft^2 and hanging baskets utilized an additional 13,450 ft^2 of greenhouse space. Outdoor pads and benches contributed 20,352 ft^2 to the production area.

The majority of sales (84%) and expenses (89%) were attributed to the greenhouse. Only 16% of sales and 11% of expenses were reported from outdoor production. Retail sales of bedding plants averaged $215,500, potted plants generated $115,019 and foliage accounted for $29,250 in average gross sales.

Revenue and expenses. Total sales for this market segment averaged $830,269 with a minimum of $271,077 and a maximum of $1,900,000 (Table 2). Labor was the greatest expense with an average total employee compensation of $267,101 and owner compensation of $56,320 (Table 6). All owners in this market segment earned an expensed salary. Combined, labor costs accounted for 43.4% of the total expenses. The next greatest expenses were plants and seeds ($112,060) and materials and supplies ($68,150). Other significant expenses reported by all survey respondents were heating fuel ($29,575), utilities ($20,550) and advertising ($23,500). Total expenses for retail bedding and potted plant growers were $744,919.

Cost correlations. Employees play a major role in the retail market. This research found that sales was strongly associated with employee compensation (Table 7). A further consideration might be determining if there is a relationship between employee compensation and horticultural background (education or experience). Perhaps those employees more highly compensated can provide hesitant customers with information and reassurance to make purchases and thereby increase sales. The association between sales and conference and travel expense may already support this theory. Certainly the knowledge gained at conferences can be utilized in the retail setting and passed along to consumers. Interestingly, advertising in the retail market was not associated with sales. Not surprising, sales were positively associated with total expenses. Labor expenses—owner and employee compensation—were negatively associated with net income.

Wholesale cut flower growers selling primarily to florists and specialty grocers

Business parameters. The wholesale cut flower growers tend to focus only on the wholesale market. Only one out of seven growers sold wholesale to mass marketers or sold direct retail (Table 8). While all used field beds as the primary production area, 57% also used greenhouses for production. The average field space used in production was 56,792 ft^2 (1.3 acres) and greenhouse space averaged 1,920 ft^2. Seventy-one percent of the growers reported supplemental buildings averaging 706 ft^2. Many cut flower growers have coolers to refrigerate and store their fresh-cut product, though supplemental buildings may also include packing and equipment storage facilities. The total average size of wholesale cut flower businesses selling primarily to florists and specialty grocers was 86,948 ft^2 with a minimum of 10,400 ft^2 and a maximum of 275,040 ft^2 reported.

Field grown cut flowers accounted for 89% ($41,196) of sales while 11% ($5,092) of sales were attributed to plants produced in greenhouses. Ninety-two percent of the total expenses were related to field costs ($44,092). Greenhouse costs ($3,834) were relatively low in comparison, though greenhouse area accounted for only 2.2% of total business size. Most cut flower growers need only minimal heat in the winter and some growers only use greenhouses to start field crop transplants, resulting in lower labor input in the greenhouses.

Revenue and expenses. Total mean sales for wholesale cut flower growers selling primarily to florists and specialty grocers was $46,288 with a minimum of $12,874 and a maximum of $103,352 (Table 2). Labor was the greatest expense at $19,092 (Table 9). This expense, including owner and employee compensation, accounts for 39.8% of the total expenses ($47,926). Owner compensation was allocated in various ways in this market segment. Some owners were paid a pre-determined salary and others considered the year-end net income their compensation. By consolidating these methods, the average owner compensation was determined to be $9,288, ranging from $0 to $32,895. Employee compensation was the single greatest expense ($9,804), but interestingly, no survey participant reported any fringe benefits for their employees. This may be due to the predominately part-time status of the employees in this market segment. Fifty-seven percent of surveyed firms reported employing two to nine part-time or seasonal employees, with an average of six (Table 8). Only one out of seven had a full-time employee in addition to the owner.

The next greatest expense reported by all firms was plants and seeds ($5,628), followed by materials and supplies ($3,522). Interest expense reported by 57% of the

firms averaged $3,220; however, no outstanding mortgages were reported. Heating fuel and utilities costs, reported by those businesses with greenhouse structures, totaled $2,921. These top five expenses account for 71.8 % of the total expenses ($47,926) for this market segment.

The mean net income was determined to be -$549. The lack of net income may be attributed to the method of owner compensation. If the owner receives the total net income as compensation, the net income for the business will be $0. Conversely, if the business does not yield a positive net income, the owner will not be compensated. He/she may have to personally contribute financial assistance to the business to pay outstanding debt. Net income-as-owner compensation was the predominant method used by these businesses, explaining the reported net income of less than $0.

Cost correlations. Business size and total expenses were strongly associated with wholesale cut flower sales (Table 10). These businesses appear to be utilizing their area and resources efficiently. Not surprisingly, total size was also strongly associated with total expenses suggesting the larger a business, the more costly it is to operate.

Retail cut flower growers

Business parameters. Half of the cut flower businesses that primarily sell directly to retail customers also sell wholesale to other retail establishments (Table 11). Twenty-five percent of these businesses had greenhouse production space. All used field beds as their primary production area with a minimum of 10,000 ft^2 and an average of 102,158 ft^2 (2.3 acres). The total business size for retail cut flower growers was 221,287 ft^2.

Field crops yielded 97% of sales ($43,226) while the remaining 3% came from greenhouse-produced crops. The majority of the expenses ($43,638, 98%) were also attributed to field production.

Revenue and expenses. Total sales for retail cut flower growers was $44,562 (Table 2). Labor was the greatest expense accounting for 47.8% of the total expenses (Table 12). Labor costs included owner and employee compensation. Unlike the other market segments, retail cut flower growers have greater owner compensation ($14,001) than employee compensation ($7,262). This is likely due to the fact that only part-time or seasonal employees supplement the owner's labor (Table 11). Sixty-three percent of the businesses surveyed employed an average of six part-time or seasonal workers.

Plants and seeds and materials and supplies were the next greatest expenses with averages of $3,130 and $3,254, respectively. Vehicle and equipment costs accounted for 13% of the total expenses with an average of $5,783. Professional services were not utilized by all businesses, but with an average of $1,852 account for 4.2% of the expenses. These top five costs account for 79.2% of total expenses ($44,529).

The average net income was determined to be $54 with a minimum of -$191 and a maximum of $561 reported. As with wholesale cut flower businesses, many retail firms do not allocate a salary for the owner. Net income is returned to the owner as his/her compensation, leaving $0 for reinvestment in the business.

Cost correlations. Sales was strongly associated with total expense (Table 13). Interestingly though, while employee compensation was also strongly associated with total expense and sales, owner compensation was not associated with either. In this market segment, advertising was not associated with sales; however, conference and

travel expenses were. While more advertising dollars are spent in the retail market to attract customers, the correlations suggest that customer service provided by employees has a stronger relationship to sales.

Summary

Several overarching conclusions can be made from the economic analysis of these four market segments. First, labor remains the greatest expense in every market segment. Goodrich (1968), surveying New York floriculture firms, and Brumfield (1982), surveying North Carolina firms, both found labor to be the greatest expense. This survey did not consider the contribution of unpaid family labor—a common occurrence in small and newly established businesses. Despite the availability of "labor-saving" technologies, the businesses surveyed either are not investing in these technologies or have implemented these technologies, only to increase labor demand for other tasks. Most agricultural enterprises, floriculture included, are subject to seasonal peaks in product demand. The labor input required to meet that demand is also seasonal resulting in few full-time employees. While part-time and seasonal employees may be financially appealing (wage-based compensation and limited benefits), the number of returning employees may vary and the time and effort required to train new employees drastically affects efficiency at a time when task management must be optimized to meet production demands.

The methods of owner compensation had a major impact on net income, particularly for the cut flower markets. Sales by wholesale and retail cut flower businesses were less than sales by their bedding and potted plant counterparts. Size of

business seemed to be less of a determining factor of owner compensation than sales. The field cut flower business requires less initial financial input—no requirement for greenhouses or the energy costs associated with greenhouses—allowing gardeners and hobbyist to slowly grow a business enterprise. The entrepreneur usually starts selling flowers as supplemental income, considering their labor "free," but pocketing any profits. Transitioning this hobby approach to a business mindset takes confidence that an enjoyable hobby can produce a sustainable income. Until these businesses are confident their sales can consistently exceed other expenses, the owner will consider any profit sufficient payment for the opportunity to garden full-time. However, if the owner is dependent on income from the cut flower business, a salary-type compensation may be determined sooner. Goodrich (1968) also observed that owners/growers at larger operations drew a higher salary compared to smaller growers who relied heavily on the net income of the business.

Interestingly, advertising costs were associated with sales for the wholesale operations, but no association was present for the retail operations. Retail businesses spend more on advertising than wholesale operations, but perhaps wholesale advertisements are more targeted to their audience, such as sending a direct mail flyer to existing customers, resulting in a higher response rate. Retail operations often advertise to a much wider audience through many media outlets such as the local newspaper or on-site promotional signage. Noting that employee compensation was associated with sales in the retail markets, these businesses should consider whether their dollars are best spent on broadcast advertisements or employee training and education. Conference and travel expenses were also correlated with sales in the retail markets suggesting that retailers are

making an effort to inform their employees and/or themselves and that effort is literally paying off.

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Table 1. Summary of business parameters for wholesale bedding and potted plant growers selling primarily to garden centers and landscapers.

	Response mean (N=Response)[Z]		Overall mean (N=10)	Minimum[Y]	Maximum
Market Division (%)					
Wholesale to Mass Market	8	(3)	3	5	10
Wholesale to Garden Centers	86	(9)	77	45	100
Wholesale to Landscapers	35	(4)	14	5	70
Direct Retail	22	(3)	6	15	30
Business Size (ft^2)					
Greenhouse Production	51,094	(10)	51,094	18,240	110,000
Greenhouse Non-production	9,809	(10)	9,809	2,760	25,000
Greenhouse Hanging Baskets	8,565	(9)	7,708	2,360	18,000
Outdoor Pads/Benches	51,167	(6)	30,700	10,000	107,000
Outdoor Fields	0	(0)	0	0	0
Outdoor Non-production	11,055	(3)	3,317	3,000	25,000
Supplemental Buildings	7,360	(10)	7,360	1,200	20,000
Total Production Area	---	---	*81,794*	*29,320*	*167,000*
Total Business Size	---	---	*109,987*	*47,592*	*204,400*
Distribution of Sales (%)					
Greenhouse	86	(10)	86	60	100
Outdoor Pads/Benches	24	(6)	14	5	40
Outdoor Fields	0	(0)	0	0	0
Distribution of Expenses (%)					
Greenhouse	92	(10)	92	75	100
Outdoor Pads/Benches	13	(6)	8	5	25
Outdoor Fields	0	(0)	0	0	0
Product Division by Sales ($)					
Plugs	0	(0)	0	0	0
Cuttings	0	(0)	0	0	0
Pre-finished Plant Material	20,000	(1)	2,000	20,000	20,000
Wholesale Flowering Potted	394,635	(10)	394,635	66,000	982,163
Wholesale Bedding Plants	485,361	(8)	388,289	62,000	1,100,000
Wholesale Foliage	97,839	(5)	48,920	51,693	200,000
Wholesale Cut Flowers	1,500	(1)	150	1,500	1,500
Wholesale Other	8,951	(1)	895	8,951	8,951
Retail Flowering Potted Plants	92,347	(3)	27,704	21,000	200,000
Retail Bedding Plants	165,380	(2)	33,076	130,760	200,000
Retail Foliage	75,000	(1)	7,500	75,000	75,000
Retail Cut Flowers	0	(0)	0	0	0
Retail Other	325,000	(1)	32,500	325,000	325,000
Labor (#)					
Full-time Employees	7	(10)	7	1	22
Part-time or Seasonal Employees	5	(10)	5	2	9

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] The value listed is the minimum of those businesses reporting the respective category. Minimum for categories with fewer than 10 responses, as indicated under response mean, is understood to be 0.

Table 2. Revenue ($) by market segment.

	Response mean (N=Responses)[Z]		Overall mean[Y]	Minimum[X]	Maximum
Wholesale Bedding/Potted Plants			**(N=10)**		
Sales	962,769	(10)	962,769	247,000	2,632,178
Interest Income	1,058	(6)	635	40	2,000
Other Income	5,180	(3)	1,554	441	14,568
Total Revenue	---	---	*964,958*	*247,040*	*2,646,746*
Retail Bedding/Potted Plants			**(N=4)**		
Sales	830,269	(4)	830,269	271,077	1,900,000
Interest Income	7,500	(3)	5,625	2,200	15,300
Other Income	11,387	(1)	2,847	11,387	11,387
Total Revenue	---	---	*838,741*	*271,077*	*1,926,687*
Wholesale Cut Flowers			**(N=7)**		
Sales	46,288	(7)	46,288	12,874	103,352
Interest Income	0	(0)	0	0	0
Other Income	3,810	(2)	1,089	1,620	6,000
Total Revenue	---	---	*47,376*	*12,874*	*104,972*
Retail Cut Flowers			**(N=8)**		
Sales	44,562	(8)	44,562	890	142,500
Interest Income	64	(1)	8	64	64
Other Income	100	(1)	12	100	100
Total Revenue	---	---	*44,583*	*890*	*142,500*

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] Overall mean was determined using the number of responses in each market segment.
[X] The value listed is the minimum of those businesses reporting the respective revenue. Minimum for categories with fewer than N responses is understood to be 0.

Table 3. Fixed and variable expenses ($) for wholesale bedding and potted plant growers selling primarily to garden centers and landscapers.

	Response mean (N=Responses)[Z]		Overall mean (N=10)	% of Total[Y]	Minimum[X]	Maximum
FIXED						
Compensation to Owner(s)	83,436	(10)	83,436	9.00	10,202	192,000
Compensation to Employees						
Wages and Salaries	183,597	(10)	183,597	19.81	47,826	431,660
Required Payroll Expenses	23,519	(10)	23,519	2.54	17,244	52,712
Benefits	23,270	(8)	18,616	2.01	12,087	46,895
Total	---	---	*225,732*	*24.36*	---	---
Energy Costs						
Heating Fuel	36,232	(10)	36,262	3.91	4,325	75,375
Utilities	13,330	(10)	13,330	1.44	5,800	31,000
Total	---	---	*49,592*	*5.35*	---	---
Facilities						
Repairs and Maintenance	131,801	(10)	13,180	1.42	2,427	41,000
Rent	77,139	(6)	46,284	4.99	1,746	430,000
Mortgage	52,500	(2)	10,500	1.13	23,000	82,000
Property Taxes	2,550	(10)	2,550	0.28	664	5,812
Total	---	---	*72,514*	*7.82*	---	---
Vehicles and Equipment						
Ownership Costs	21,833	(8)	17,467	1.88	13,854	5,000
Operating Costs	15,767	(10)	15,767	1.70	10,488	5,250
Total	---	---	*33,234*	*3.58*	---	---
Other						
Other Taxes and Licenses	2,041	(7)	1,429	0.15	20	8,770
Insurance	12,049	(7)	8,434	0.91	482	21,180
Professional Services	2,682	(10)	2,682	0.29	245	5,361
Bank Charges	2,734	(8)	2,187	0.24	45	18,716
Interest	11,452	(8)	9,162	0.99	200	33,360
Bad Debt	1,402	(7)	981	0.11	49	4,512
Advertising and Promotion	10,226	(6)	6,136	0.66	500	40,428
Office Expense	5,812	(10)	5,812	0.63	322	25,516
Membership Dues, Subscriptions	721	(10)	721	0.08	70	2,379
Conference and Travel	2,711	(9)	2,440	0.26	87	9,355
Donations	1,413	(7)	989	0.11	200	3,800
Miscellaneous	29,440	(5)	14,720	1.59	580	88,827
Total	---	---	*55,693*	*6.02*	---	---
Total Fixed	---	---	*520,199*	*56.13*	---	---
VARIABLE						
Plants and Seeds	283,319	(10)	283,319	30.57	20,954	650,028
Materials and Supplies	123,194	(10)	123,194	13.29	29,000	454,249
Total Variable	---	---	*406,513*	*43.86*	---	---
TOTAL COSTS	---	---	*926,712*	*99.99*[W]	*178,789*	*2,516,409*

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] % of total expenses based on mean (N=10).
[X] The value listed is the minimum of those businesses reporting the respective expense. Minimum for categories with fewer than 10 responses, as indicated under response mean, is understood to be 0.
[W] The sum of percentages does not equal 100 due to rounding error.

Table 4. Selected correlations for wholesale bedding and potted plant growers who sell primarily to garden centers and landscapers based on overall mean.

	Sales	*Owner Compensation*	*Employee Compensation*	*Employee Benefits*	*Advertising*	*Conference and Travel*	*Total Expenses*	*Net Income*
Sales	1.000	0.7385[Z] (0.0147)[Y]	0.8415 (0.0023)	0.7889 (0.0067)	0.8331 (0.0028)	0.7786 (0.0080)	0.9963 (<0.0001)	NS
Owner Compensation	0.7385 (0.0147)	1.000	NS	NS	NS	NS	0.7495 (0.0126)	NS
Employee Compensation	0.8415 (0.0023)	NS	1.000	0.7001 (0.0242)	0.8550 (0.0016)	0.8172 (0.0039)	0.8726 (0.0010)	NS
Employee Benefits	0.7889 (0.0067)	NS	0.7001 (0.0242)	1.000	NS	NS	0.7799 (0.0078)	NS
Advertising	0.8331 (0.0028)	NS	0.8550 (0.0016)	NS	1.000	0.8000 (0.0055)	0.8399 (0.0024)	NS
Conference and Travel	0.7786 (0.0080)	NS	0.8172 (0.0039)	NS	0.8000 (0.0055)	1.000	0.7805 (0.0077)	NS
Total Expenses	0.9963 (<0.0001)	0.7495 (0.0126)	0.8726 (0.0010)	0.7799 (0.0078)	0.8399 (0.0024)	0.7805 (0.0077)	1.000	NS
Net Income	NS	NS	NS	NS	NS	NS	NS	NS

[Z]R^2
[Y]$P \leq$ indicated value.
NS Nonsignificant at $P \geq 0.05$.

Table 5. Summary of business parameters for retail bedding and potted plant growers.

	Response mean (N=Responses)[Z]		Overall mean (N=4)	Minimum[Y]	Maximum
Market Division (%)					
Wholesale to Mass Market	0	(0)	0	0	0
Wholesale to Garden Centers	8	(2)	4	5	10
Wholesale to Landscapers	5	(3)	4	5	6
Direct Retail	92	(4)	92	85	100
Business Size (ft^2)					
Greenhouse Production	35,870	(4)	35,870	12,880	57,600
Greenhouse Non-production	8,075	(4)	8,075	1,000	19,000
Greenhouse Hanging Baskets	13,450	(4)	13,450	2,400	41,000
Outdoor Pads/Benches	20,352	(4)	20,352	4,608	50,000
Outdoor Fields	8,000	(2)	4,000	1,000	15,000
Outdoor Non-production	17,500	(2)	8,750	10,000	25,000
Supplemental Buildings	7,595	(4)	7,595	1,200	22,800
Total Production Area	---	---	*60,222*	*32,680*	*91,000*
Total Business Size	---	---	*98,092*	*74,280*	*117,380*
Distribution of Sales (%)					
Greenhouse	84	(4)	84	80	95
Outdoor Pads/Benches	13	(4)	13	5	20
Outdoor Fields	7	(2)	3	4	10
Distribution of Expenses (%)					
Greenhouse	89	(4)	89	80	95
Outdoor Pads/Benches	9	(4)	9	5	20
Outdoor Fields	5	(2)	2	5	5
Product Division ($)					
Plugs	37,600	(2)	18,800	1,000	74,200
Cuttings	1,000	(1)	250	1,000	1,000
Pre-finished Plant Material	1,000	(1)	250	1,000	1,000
Wholesale Flowering Potted Plants	303,500	(2)	151,750	2,000	605,000
Wholesale Bedding Plants	20,000	(1)	5,000	20,000	20,000
Wholesale Foliage	2,000	(2)	1,000	1,000	3,000
Wholesale Cut Flowers	1,000	(1)	250	1,000	1,000
Wholesale Other	0	(0)	0	0	0
Retail Flowering Potted Plants	115,019	(4)	115,019	10,000	212,000
Retail Bedding Plants	215,500	(4)	215,500	20,000	500,000
Retail Foliage	29,000	(2)	14,500	1,000	57,000
Retail Cut Flowers	0	(0)	0	0	0
Retail Other	58,500	(2)	29,250	10,000	107,000
Labor (#)					
Full-time Employees	23	(2)	11	15	30
Part-time or Seasonal Employees	42	(2)	31	20	60

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] The value listed is the minimum of those businesses reporting the respective category. Minimum for categories with fewer than 4 responses, as indicated under response mean, is understood to be 0.

Table 6. Fixed and variable expenses ($) for retail bedding and potted plant growers.

	Response mean (N=Responses)[Z]		Overall mean (N=4)	% of Total[Y]	Minimum[X]	Maximum
FIXED						
Compensation to Owner(s)	56,320	(4)	56,320	7.56	14,400	120,000
Compensation to Employees						
Wages and Salaries	229,138	(4)	229,138	30.76	28,553	59,400
Required Payroll Expenses	23,463	(4)	23,463	3.15	6,853	57,000
Benefits	19,333	(3)	14,500	1.95	3,000	45,000
Total	---	---	*267,101*	*35.86*	---	---
Energy Costs						
Heating Fuel	29,575	(4)	29,575	3.97	16,300	60,000
Utilities	20,550	(4)	20,550	2.76	5,200	35,000
Total	---	---	*50,125*	*6.73*	---	---
Facilities						
Repairs and Maintenance	12,667	(4)	12,667	1.70	1,668	29,000
Rent	50,000	(1)	12,500	1.68	50,000	50,000
Mortgage	11,100	(1)	2,775	0.37	11,100	11,100
Property Taxes	3,800	(4)	3,800	0.51	1,200	6,000
Total	---	---	*31,742*	*4.26*	---	---
Vehicles and Equipment						
Ownership Costs	43,900	(3)	32,925	4.42	500	129,000
Operating Costs	6,925	(4)	6,925	0.93	1,000	11,000
Total	---	---	*39,850*	*5.35*	---	---
Other						
Other Taxes and Licenses	2,945	(4)	2,945	0.40	378	8,000
Insurance	14,350	(4)	14,350	1.93	2,700	45,000
Professional Services	14,675	(4)	14,675	1.97	1,500	52,000
Bank Charges	10,169	(4)	10,169	1.37	100	30,000
Interest	5,226	(4)	5,226	0.70	1,404	15,500
Bad Debt	2,003	(2)	1,001	0.13	5	4,000
Advertising and Promotion	23,500	(4)	23,500	3.15	5,500	50,000
Office Expense	8,870	(4)	8,870	1.19	1,200	27,500
Membership Dues, Subscriptions	1,218	(4)	1,218	0.16	300	2,400
Conference and Travel	4,580	(3)	3,435	0.46	500	10,000
Donations	4,922	(4)	4,922	0.66	500	17,000
Miscellaneous	39,013	(3)	29,260	3.93	1,200	810,000
Total	---	---	*119,571*	*16.05*	---	---
Total Fixed	---	---	*564,709*	*75.81*	---	---
VARIABLE						
Plants and Seeds	112,060	(4)	112,060	15.04	60,000	180,000
Materials and Supplies	90,867	(3)	68,150	9.15	52,600	120,000
Total Variable	---	---	*180,210*	*24.19*	---	---
TOTAL COSTS	---	---	*744,919*	*100.00*	*257,154*	*2,192,600*

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] % of total expenses based on mean (N=4).
[X] The value listed is the minimum of those businesses reporting the respective expense. Minimum for categories with fewer than 4 responses is understood to be 0.

Table 7. Selected correlations for retail bedding and potted plant growers based on overall mean.

	Sales	*Owner Compensation*	*Employee Compensation*	*Advertising*	*Conference and Travel*	*Total Expenses*	*Net Income*
Sales	1.00	NS	0.9997[Z] (0.0003)[Y]	NS	0.9756 (0.0244)	0.9990 (0.0010)	-0.9574 (0.0426)
Owner Compensation	NS	1.00	NS	0.9610 (0.0390)	0.9741 (0.0259)	0.9543 (0.0457)	-0.9911 (0.0089)
Employee Compensation	0.9997 (0.0003)	NS	1.00	NS	0.9771 (0.0229)	0.9994 (0.0006)	-0.9613 (0.0387)
Advertising	NS	0.9610 (0.0390)	NS	1.00	0.9887 (0.0113)	NS	-0.9880 (0.0120)
Conference and Travel	0.9756 (0.0244)	0.9741 (0.0259)	0.99771 (0.0229)	0.9887 (0.0113)	1.00	0.9840 (0.0160)	-0.9942 (0.0058)
Total Expenses	0.9990 (0.0010)	0.9543 (0.0457)	0.9994 (0.0006)	NS	0.9840 (0.0160)	1.00	-0.9694 (0.0306)
Net Income	-0.9574 (0.0426)	-0.9911 (0.0089)	-0.9613 (0.0387)	-0.9880 (0.0120)	-0.9942 (0.0058)	0.9694 (0.0306)	1.00

[Z]R^2

[Y]$P \leq$ indicated value.

NS Nonsignificant at $P \geq 0.05$.

Table 8. Summary of business parameters for wholesale cut flower growers selling primarily to florists and specialty grocers.

	Response mean (N=Responses)[Z]		Overall mean (N=7)	Minimum[Y]	Maximum
Market Division (%)					
Wholesale to Mass Market	13	(1)	2	13	13
Wholesale to Florists	97.9	(7)	98	87	100
Direct Retail	2	(1)	0	2	2
Business Size (ft^2)					
Greenhouse Production	3,360	(4)	1,920	1,120	5,796
Greenhouse Non-production	2,761	(4)	1,578	704	5,484
Greenhouse Hanging Baskets	0	(0)	0	0	0
Outdoor Pads/Benches	2,146	(2)	613	600	3,692
Outdoor Fields	56,792	(7)	56,792	6,900	130,680
Outdoor Non-production	44,345	(4)	25,340	3,200	130,680
Supplemental Buildings	988	(5)	706	80	2,400
Total Production Area	---	---	*59,325*	*6,900*	*136,476*
Total Business Size	---	---	*86,948*	*10,400*	*275,040*
Distribution of Sales (%)					
Greenhouse	25	(3)	11	16	42
Outdoor Pads/Benches	0	(0)	0	0	0
Outdoor Fields	89.3	(7)	89	58	100
Distribution of Expenses (%)					
Greenhouse	13.3	(4)	8	1	25
Outdoor Pads/Benches	1	(1)	0	1	1
Outdoor Fields	92.3	(7)	92	75	100
Product Division ($)					
Plugs	0	(0)	0	0	0
Cuttings	0	(0)	0	0	0
Pre-finished Plant Material	0	(0)	0	0	0
Wholesale Flowering Potted Plants	2,095	(1)	299	2,095	2,095
Wholesale Bedding Plants	0	(0)	0	0	0
Wholesale Foliage	0	(0)	0	0	0
Wholesale Cut Flowers	45,463	(7)	45,463	12,874	105,000
Wholesale Other	0	(0)	0	0	0
Retail Flowering Potted Plants	0	(0)	0	0	0
Retail Bedding Plants	0	(0)	0	0	0
Retail Foliage	0	(0)	0	0	0
Retail Cut Flowers	275	(1)	39	275	275
Retail Other	50	(1)	7	50	50
Labor (#)					
Full-time Employees	1	(1)	0	1	1
Part-time or Seasonal Employees	6	(4)	3	2	9

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] The value listed is the minimum of those businesses reporting the respective category. Minimum for categories with fewer than 7 responses, as indicated under response mean, is understood to be 0.

Table 9. Fixed and variable expenses ($) for wholesale cut flower growers selling primarily to florists and specialty grocers.

	Response mean (N=Responses)[Z]		Overall mean (N=7)	% of Total[Y]	Minimum[X]	Maximum
FIXED						
Compensation to Owner(s)	10,837	(6)	9,288	19.38	1,830	32,895
Compensation to Employees						
Wages and Salaries	14,565	(4)	8,323	17.37	7,031	33,000
Required Payroll Expenses	3,455	(3)	1,481	3.09	1,565	7,000
Benefits	0	(0)	0	0	0	0
Total	---	---	*9,804*	*20.46*	---	---
Energy Costs						
Heating Fuel	3,254	(4)	1,859	3.88	318	6,960
Utilities	1,859	(4)	1,062	2.22	496	4,938
Total	---	---	*2,921*	*6.10*	---	---
Facilities						
Repairs and Maintenance	2,786	(5)	1,990	4.15	712	5,375
Rent	700	(2)	200	0.42	600	800
Mortgage	0	(0)	0	0	0	0
Property Taxes	957	(4)	547	1.14	184	2,000
Total	---	---	*2,737*	*5.71*	---	---
Vehicles and Equipment						
Ownership Costs	2,104	(5)	1,503	3.14	356	4,290
Operating Costs	2,528	(6)	2,167	4.52	610	8,250
Total	---	---	*3,670*	*7.66*	---	---
Other						
Other Taxes and Licenses	350	(6)	300	0.63	6	1,662
Insurance	1,322	(6)	1,133	2.36	192	3,119
Professional Services	1,478	(5)	1,056	2.20	50	4,030
Bank Charges	112	(3)	48	0.10	91	132
Interest	5,635	(4)	3,220	6.72	1,000	15,777
Bad Debt	500	(1)	71	0.15	500	500
Advertising and Promotion	162	(4)	92	0.19	60	333
Office Expense	622	(7)	622	1.30	46	1,500
Membership Dues, Subscriptions	450	(7)	450	0.94	125	1,347
Conference and Travel	501	(7)	501	1.05	98	1,034
Donations	750	(3)	321	0.67	400	1,350
Miscellaneous	4,447	(4)	2,540	5.30	131	13,572
Total	---	---	*10,354*	*21.61*	---	---
Total Fixed	---	---	*38,774*	*80.92*	---	---
VARIABLE						
Plants and Seeds	5,628	(7)	5,628	11.74	693	15,142
Materials and Supplies	3,522	(7)	3,522	7.35	2,000	9,333
Total Variable	---	---	*9,150*	*19.09*	---	---
TOTAL COSTS	---	---	*47,926*	*100.01*[W]		

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] % of total expenses based on mean (N=7).
[X] The value listed is the minimum of those businesses reporting the respective expense. Minimum for categories with fewer than 7 responses, as indicated under response mean, is understood to be 0.
[W] The sum of percentages does not equal 100 due to rounding error.

Table 10. Selected correlations for wholesale cut flower growers selling primarily to florists and specialty grocers based on overall mean.

	Sales	*Business Size*	*Employee Compensation*	*Heating Fuel*	*Advertising*	*Total Expenses*
Sales	1.00	0.8200[Z] (0.0239)[Y]	0.8107 (0.0270)	0.9140 (0.0040)	NS	0.9982 (<0.0001)
Business Size	0.8200 (0.0239)	1.00	0.9399 (0.0016)	0.8100 (0.0272)	NS	0.8163 (0.0251)
Employee Compensation	0.8107 (0.0270)	0.9399 (0.0016)	1.00	0.8416 (0.0176)	NS	0.8071 (0.0282)
Heating Fuel	0.9140 (0.0040)	0.8100 (0.0272)	0.8416 (0.0176)	1.00	NS	0.8953 0.0064
Advertising	NS	NS	NS	NS	1.00	NS
Total Expenses	0.9982 (<0.0001)	0.8163 (0.0251)	NS	0.8953 0.0064	NS	1.00

[Z]R^2

[Y]$P \leq$ indicated value.

NS Nonsignificant at $P \geq 0.05$.

Table 11. Summary of business parameters for retail cut flower growers.

	Response mean (N=Responses)[Z]		Overall mean (N=8)	Minimum[Y]	Maximum
Market Division (%)					
Wholesale to Mass Market	0	(0)	0	0	0
Wholesale to Florists	31.3	(4)	16	17	49
Direct Retail	84.4	(8)	84	51	100
Business Size (ft^2)					
Greenhouse Production	1,197	(2)	529	1,000	1,394
Greenhouse Non-production	1,502	(1)	319	1,502	1,502
Greenhouse Hanging Baskets	0	(0)	0	0	0
Outdoor Pads/Benches	1,000	(1)	125	1,000	1,000
Outdoor Fields	102,158	(8)	102,158	10,000	210,000
Outdoor Non-production	170,910	(5)	106,819	40,000	217,800
Supplemental Buildings	15,117	(6)	11,338	150	84,000
Total Production Area	---	---	*102,812*	*11,000*	*211,000*
Total Business Size	---	---	*221,287*	*15,000*	*463,000*
Distribution of Sales (%)					
Greenhouse	10	(2)	3	4	16
Outdoor Pads/Benches	0	(0)	0	0	0
Outdoor Fields	97.5	(8)	97	84	100
Distribution of Expenses (%)					
Greenhouse	6.5	(2)	2	3	10
Outdoor Pads/Benches	0	(0)	0	0	0
Outdoor Fields	98.4	(8)	98	90	100
Product Division ($)					
Plugs	0	(0)	0	0	0
Cuttings	0	(0)	0	0	0
Pre-finished Plant Material	0	(0)	0	0	0
Wholesale Flowering Potted Plants	0	(0)	0	0	0
Wholesale Bedding Plants	0	(0)	0	0	0
Wholesale Foliage	0	(0)	0	0	0
Wholesale Cut Flowers	23,665	(4)	11,832	200	70,500
Wholesale Other	2,083	(1)	260	2,083	2,083
Retail Flowering Potted Plants	8,300	(1)	1,038	8,300	8,300
Retail Bedding Plants	0	(0)	0	0	0
Retail Foliage	0	(0)	0	0	0
Retail Cut Flowers	30,753	(8)	30,753	690	63,700
Retail Other	2,748	(2)	687	1,160	4,335
Labor (#)					
Full-time Employees	0	(0)	0	0	0
Part-time or Seasonal Employees	6	(5)	4	2	11

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] The value listed is the minimum of those businesses reporting the respective category. Minimum for categories with fewer than 8 responses, as indicated under response mean, is understood to be 0.

Table 12. Fixed and variable expenses ($) for retail cut flower growers.

	Response mean (N=Responses)[Z]		Overall mean (N=8)	% of Total[Y]	Minimum[X]	Maximum
FIXED						
Compensation to Owner(s)	14,001	(8)	14,001	31.44	35	37,270
Compensation to Employees						
Wages and Salaries	10,682	(5)	6,676	14.99	3,100	33,889
Required Payroll Expenses	1,541	(3)	578	1.30	891	2,470
Benefits	62	(1)	8	0.02	62	62
Total			*7,262*	*16.31*		
Energy Costs						
Heating Fuel	1,127	(2)	282	0.63	20	2,233
Utilities	987	(5)	617	1.39	66	2,334
Total			*899*	*2.02*		
Facilities						
Repairs and Maintenance	1,758	(3)	659	1.48	395	4,080
Rent	2,551	(1)	319	0.72	2,551	2,551
Mortgage	6,000	(2)	1,500	3.37	2,176	9,823
Property Taxes	724	(5)	453	1.02	200	1,165
Total			*2,931*	*6.59*		
Vehicles and Equipment						
Ownership Costs	4,376	(7)	3,829	8.60	165	25,381
Operating Costs	2,234	(7)	1,954	4.39	416	6,713
Total			*5,783*	*12.99*		
Other						
Other Taxes and Licenses	4,475	(2)	1,119	2.51	1,702	7,247
Insurance	277	(5)	361	0.81	47	911
Professional Services	4,940	(3)	1,852	4.16	418	13,770
Bank Charges	228	(1)	29	0.07	228	228
Interest	317	(2)	79	0.18	100	533
Bad Debt	0	(0)	0	0	0	0
Advertising and Promotion	699	(3)	262	0.59	356	1,000
Office Expense	1,106	(4)	553	1.24	47	3,285
Membership Dues, Subscriptions	269	(8)	269	0.60	45	554
Conference and Travel	1,225	(7)	1,072	2.41	120	4,877
Donations	927	(3)	348	0.78	25	2,535
Miscellaneous	2,654	(4)	1,325	2.98	237	7,180
Total			*7,269*	*16.33*		
Total Fixed			*43,117*	*85.68*		
VARIABLE						
Plants and Seeds	3,130	(8)	3,130	7.03	230	10,664
Materials and Supplies	3,254	(8)	3,254	7.31	140	15,388
Total Variable			*6,384*	*14.34*		
TOTAL COSTS			*44,529*	*100.02*[W]		

[Z] The number of responses for each category is given in parentheses following the response mean.
[Y] % of total expenses based on mean (N=8).
[X] The value listed is the minimum of those businesses reporting the respective expense. Minimum for categories with fewer than 8 responses, as indicated under response mean, is understood to be 0.
[W] The sum of percentages does not equal 100 due to rounding error.

Table 13. Selected correlations for retail cut flower growers based on overall mean.

	Sales	*Owner Compensation*	*Employee Compensation*	*Heating Fuel*	*Advertising*	*Conference and Travel*	*Total Expenses*
Sales	1.00	NS	0.9384[Z] (0.0006)[Y]	0.8571 (0.0065)	NS	0.8616 (0.0060)	0.9999 (<0.0001)
Owner Compensation	NS	1.00	NS	NS	NS	NS	NS
Employee Compensation	0.9384 (0.0006)	NS	1.00	0.9624 (0.0001)	NS	0.9319 (0.0007)	0.9383 (0.0006)
Heating Fuel	0.8571 (0.0065)	NS	0.9624 (0.0001)	1.00	NS	0.9330 (0.0007)	0.8578 (0.0064)
Advertising	NS	NS	NS	NS	1.00	NS	NS
Conference and Travel	0.8616 (0.0060)	NS	0.9319 (0.0007)	0.9330 (0.0007)	NS	1.00	0.8629 (0.0058)
Total Expenses	0.9999 (<0.0001)	NS	0.9383 (0.0006)	0.8578 (0.0064)	NS	0.8629 (0.0058)	1.00

[Z]R^2

[Y]$P \leq$ indicated value.

NS Nonsignificant at $P \geq 0.05$.

Cost Analysis of the Floriculture Industry Differentiated by Market Segment

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Additional index words. Cost accounting, wholesale, retail, greenhouse, cut flowers, fixed costs, utilization, costs per square foot per week, costs per square foot per year.

Abstract. Financial data was collected from bedding and potted plant growers serving the wholesale and retail markets to determine space utilization and fixed costs per square foot per week ($/ft^2/wk). Calculation of this cost included adjustments for space and time utilization. Wholesale bedding and potted plant growers were determined to have fixed costs of $0.236/ft^2/wk and retail bedding and potted plant growers had a cost of $0.334/ft^2/wk for greenhouse production area. Financial data collected from wholesale and retail cut flower growers were used to determine space utilization and costs per square foot per year ($/ft^2/yr). The wholesale cut flower businesses were determined to have a fixed cost of $1.220/ft^2/yr, while the retail cut flower businesses yielded a cost of $0.787/ft^2/yr for field production. Businesses can compare their own costs to these

industry averages. Costs per square foot per week and costs per square foot per year are valuable tools for business management and efficiency analysis.

Monthly space utilization differentiated by production area was determined for each market segment. Bedding and potted plant growers primarily used greenhouses for production with some production on outdoor pads. Peak greenhouse usage for wholesale bedding and potted plant growers occurred in April (95.5%), and retail bedding and potted plant growers' greenhouses were most utilized in April and May (87.5%). Cut flower growers primarily used field production though some also utilized greenhouse space. Field production peaked in June (85%) for wholesale cut flower growers and in July (88%) for retail cut flower growers.

Introduction

Production decisions are often based on intuition or previous experience with little regard to economic impact. To maximize efficiency in an increasingly competitive market, firms must use the most cost effective production methods. To compare production systems growers can estimate the total cost of producing a crop using cost per square foot per week ($/ft^2/wk) for greenhouse production or cost per square foot per year ($/ft^2/yr) for field production.

When evaluating the production expenses of individual crops, fixed and variable costs must be determined. Fixed costs are those incurred regardless of whether or not crops are being produced, or those costs that cannot be allocated to a specific crop. Variable costs include crop-specific costs such as containers, medium and plant material. Product prices must include fixed costs, variable costs and a profit margin to maintain a successful business.

Cost accounting budgets can and should be used to establish a minimum selling price based on accurate production costs. A final selling price should include a fair return on the investment to yield a profit. Many producers, especially small and recently established businesses, rely solely on competitive pricing. This is poor financial management since the competitor's production costs are likely different (perhaps even less), and their prices also may not be based on their production costs. However, in the market-driven economy, the producer must be sensitive to the consumer's valuation of the product. By understanding the market value of a product, the producer can determine if he/she can provide that product at a lower cost to ensure a profit. Another pricing "strategy" is to increase all prices a given percentage periodically. This method is flawed

since it fails to reflect changes in production costs among crops and consumer valuation of crops.

In 1980, Brumfield et al. (1982) analyzed fixed costs of greenhouse firms differentiated by size of firm and market channel. Since then, however, little comprehensive work has been done in the greenhouse industry that would yield a current $/ft^2/wk figure. Brumfield's figure has been utilized in recent research by adjusting it using the Producer Price Indices and Employment Cost Indices (Brumfield, 1994) or the Consumer Price Indices (Cavins and Dole, 2001). Brumfield's focus on fixed costs allowed managers to evaluate the effects of changes in firm size, machine replacement or market channel. Expenses are most commonly calculated on a square foot basis in the greenhouse industry, which allows managers to compute expenses involved in production of various sized merchandise units.

Though it would be economically ideal to utilize 100% space throughout the year, it is not realistic. For example, in a bedding and potted plant business, production space may be near 100% full in November as poinsettias are finished, but January may be relatively empty since areas once filled by poinsettias have yet to be fully replenished by spring crops. Though fixed costs are incurred whether production space is fully utilized or not, an accurate assessment of production costs requires a utilization analysis. Of course, all greenhouses differ and each greenhouse business should perform a yearly cost analysis to account for production changes.

The objective of this research was to calculate a current $/ft^2/wk or $/ft^2/yr figure for floriculture firms belonging to six market channels. An accurate $/ft^2/wk or $/ft^2/yr

can be used to 1) compare different products, 2) consider variable amounts of production space utilization and 3) allocate costs to a specific crop.

Materials and Methods

Potential survey participants (160) were initially contacted to discuss the purpose of the survey and secure their cooperation. A comprehensive survey (Appendix A) was mailed or faxed to each willing participant (120). Floriculture firms were pre-selected based on the market channels: 1) wholesale bedding and potted plant growers selling primarily to mass marketers, 2) wholesale bedding and potted plant growers selling primarily to garden centers and landscapers, 3) retail bedding and potted plant growers, 4) wholesale cut flower growers selling primarily to mass marketers, 5) wholesale cut flower growers selling primarily to florists and specialty grocers, and 6) retail cut flower growers. Twenty-nine surveys were returned with sufficient information provided for analysis. The survey participants were primarily from North Carolina and the southeastern United States.

The survey provided data in the following areas: distribution of sales by market, business size, product itemization, revenue, distribution of sales by production area, distribution of expenses by production area and overall expenses. An estimated percentage of monthly space utilization was also obtained.

52-week method. Two calculations were performed to determine $/ft^2/wk. Following Brumfield (1980), the average annual fixed cost was divided by average production area, consisting of bench and floor space, to obtain $/ft^2/yr (Equation 1). This

value was then divided by 52 weeks per year to determine the $/ft^2/wk for each market segment (Equation 2).

Eqn 1. $/ft^2/yr = Annual fixed costs / Production area

Eqn 2. $/ft^2/wk = Annual fixed costs / Production area / 52 weeks

Space adjusted method. This calculation included the space utilization data and allowed separate cost calculations for greenhouse and outdoor production areas. The percentage distribution of expenses to greenhouse and outdoor production areas were applied to the average annual fixed cost to estimate costs for the different production areas (Tables 1 and 2). The average monthly percent utilization was applied to the average production area for each market segment (Appendix B). Production area of the greenhouse included bench and floor space as well as area occupied by hanging baskets. This adjusted production area for each month was then multiplied by the number of weeks per month to yield total space usage for each month. The number of weeks in a given month were determined by dividing days per month by 7 days per week. The fixed cost was divided by the sum of the monthly space usage for a $/ft^2/wk value (Equation 3). Cost per square foot per year was determined for the cut flower growers by altering the time adjustment. Rather than multiplying the adjusted production area by the number of weeks per month, the sum of the adjusted production area for each month was divided by 12 months per year (Equation 4).

Eqn 3: Adj. $/ft^2/wk = $\dfrac{\text{Fixed costs (\$)}}{\sum_{m=1}^{12}[\text{Production area (ft}^2\text{)} * \text{Utilization (\%)} * \text{Weeks}]}$

where:

m is the month of the year (1=January, …, 12=December)

Eqn 4: Adj. $/ft^2/yr = $\frac{\text{Fixed costs (\$)}}{\{\sum_{m=1}^{12}[\text{Production area (ft}^2\text{)} * \text{Utilization (\%)}]\}/12}$

where:

m is the month of the year (1=January, …, 12=December)

The data was categorically averaged for each of the defined market channels. Data were analyzed using means in SAS® Version 8 (SAS Institute, Inc., Cary, N.C.).

Results and Discussion

Of the 120 surveys distributed, 41 responses were received. Nine participants did not have the time or resources to contribute to this research, resulting in 32 completed surveys. Though this may seem low relative to the number of floriculture operations in North Carolina, previous studies have had a similar response when attempting to collect financial data. Uva and Richards (2003) collected data from 45 greenhouse businesses; Brumfield (1980) surveyed 32 businesses, and 31 businesses responded to a survey conducted by Brumfield and the Ohio Florists' Association (1994). Surveys focusing on non-financial business characteristics yielded greater response rates of 64 to 68% (Prince et al., 1987; Scoggins et al., 2003). However, when Scoggins et al. (2003) requested minimal financial data (i.e. gross revenues), 35.8% of respondents declined to provide the information.

Despite repeated contacts to obtain sufficient survey data from each market channel, insufficient responses were obtained in the categories of wholesale bedding and potted plant growers selling primarily to mass marketers and wholesale cut flower growers selling primarily to mass marketers; therefore, these market segments were eliminated from the study. Ten wholesale bedding and potted plant growers selling

primarily to garden centers and/or landscapers returned completed surveys, and four retail bedding and potted plant growers participated. Seven surveys represented the wholesale cut flower growers selling primarily to florists and specialty grocers, and eight surveys were analyzed for the retail cut flower growers category. Twenty-one respondents were from North Carolina, three from Virginia, two from Maryland and one from South Carolina. In addition to these east coast firms, one survey response from Oklahoma and Idaho were solicited and received.

Expenses were categorized as either fixed or variable (Table 3). Variable costs consisted of those costs reported as plants and seed and materials and supplies. One significant fixed cost not specifically requested was depreciation. Due to the various depreciation methods and the survey participants' varying levels of financial knowledge, fixed costs were determined without this factor. However, depreciation may have been included in the costs reported for vehicle and equipment expenses and several respondents listed depreciation in the miscellaneous category, which was included in fixed costs.

All labor expenses were also included in fixed costs. Though it might be argued that wage labor is a variable expense, White (2002) found that it is nearly as accurate to treat all labor as a fixed cost as it is to separate variable and fixed labor costs. It is time consuming and costly to track variable labor inputs for individual crops. However, if a business is attempting to determine the cost effectiveness of adding a "labor-saving" technology, the step-wise labor inputs should be considered.

In the 52-week method, hanging baskets were not included to allow comparison with Brumfield (1980). However, hanging baskets are a significant crop for most bedding

and potted plant businesses and there are two approaches to cost allocation regarding hanging baskets. One view is that hanging baskets have no fixed costs unless no crop is grown underneath the baskets. The crop occupying bench or floor space is allocated fixed costs presumably for the production area shared by that crop and the hanging baskets. Therefore, in this scenario the only costs allocated to the hanging baskets are variable costs. This method accentuates the profitability of hanging baskets and fails to consider the "cost" of reduced light on the crop below. Reduced light quality is a real cost as it affects plant quality and crop time. The second, more accurate approach distributes fixed costs among all units produced, effectively decreasing the fixed cost per unit as more units are grown. This study used utilized square feet for cost allocation of hanging baskets. In addition to greenhouse production area (including floor and bench space), respondents were asked to supply production area used by hanging baskets.

Financial data collected from each firm was analyzed by market segment to determine mean $/ft^2/wk or $/ft^2/yr for greenhouse and outdoor production (pads or fields). Costs were analyzed using the 52-week method and the space adjusted method, which accounted for space and time utilized. The greenhouse is not 100% utilized 52 weeks of the year; therefore, the adjusted calculation more accurately considers varied space utilization throughout the year. The data from the utilization chart was also analyzed by market segment to determine use of production areas (greenhouse, pads and fields) by month.

Wholesale bedding and potted plant growers selling primarily to garden centers and landscapers

Utilization. All businesses surveyed in this market segment used their greenhouses year-round (Fig. 1). In April, all respondents were using greenhouses at 91% to 100% capacity. In the southeastern United States, likelihood of plant damaging frost decreases in April and gardeners are eager to buy flowers and vegetable transplants. May, just after the spring peak, and October, when greenhouses are full of young poinsettias, pansies and chrysanthemums, were tied behind April with the facilities 89% full. Greenhouses were least utilized in January (31%), a time between poinsettias and spring production. July (35%) represented what is traditionally referred to as the "summer lull"—a time period when most bedding plants have been sold and fall crops and poinsettias are in the early production stages requiring little space.

Fifty percent of the surveyed businesses used outdoor production pads in addition to greenhouses (Fig. 1). September and October were the peak months for container pad usage (81% and 89% capacity, respectively). This time period coincides with garden chrysanthemum production and other fall crops such as pansies and ornamental cabbage and kale. Many wholesale bedding and potted plant producers are adding perennial plants to their production selection. Perennials most often grown by bedding and potted plant growers are herbaceous "tender" perennials—implying they may or may not be hardy through the winter. Since most perennials are produced according to nursery practices, more outdoor pad space may be devoted to perennial production in the future. From November through February less than 20% of the available outdoor pad area was in use.

Cost per square foot per week. Total fixed costs for this market segment was $520,199 (Table 4). Ninety-two percent ($478,583) of the total fixed costs was allocated to greenhouse production and 8% ($41,616) was allocated to outdoor pads.

Using the 52-week method, a cost of $0.157/ft^2/wk was determined for greenhouse production area and $0.026/ft^2/wk for outdoor production (Table 5, Equation 2). The space adjusted method resulted in a greenhouse cost of $0.236/ft^2/wk and an outdoor cost of $0.060/ft^2/wk (Equation 3, Appendix B).

Retail bedding and potted plant growers

Utilization. All businesses surveyed in this market segment also used their greenhouses year-round (Fig. 2). April and May were peak months with 87.5% utilization each month. These spring months represent the height of garden center sales. Also, Mother's Day occurs during this period and though cut flowers may be a more traditional gift, mixed containers and hanging baskets are commonly given. November and December were the next most utilized months with the greenhouses 85% full. While wholesale businesses have a sparse poinsettia inventory by December, retailers sell poinsettias for home décor and as a last minute gift through December 24. At 20%, January was the least utilized month.

Outdoor pads were used by 75% of the retail bedding and potted plant growers surveyed (Fig. 2). The pads were utilized over 80% during the months of July, August and September. This time period corresponds to chrysanthemum production and sales. January and February were the months when the pads were least used at 10% and 13%, respectively. Respondents reported that the pads were used 62% to 75% from April to June indicating some space utilization for spring sales.

Cost per square foot per week. The average fixed costs for retail bedding and potted plant growers was $564,709 (Table 4). Using the 52-week method, a cost of $0.196/ft^2/wk was determined for greenhouse production area and $0.059 for outdoor production (Table 5, Equation 2). The space adjusted method resulted in a greenhouse cost of $0.334/ft^2/wk and an outdoor cost of $0.101/ft^2/wk (Equation 3, Appendix B).

This market segment is analogous to the "Flower Shops" segment analyzed in Brumfield et al. (1982). Brumfield differentiated firms by business size: small (<20,000 ft^2), medium (100,000 ft^2) and large (400,000 ft^2). The respondents of this research are medium-sized according to these specifications. Comparatively, the costs incurred by medium-sized flower shops in 1980 were $0.128/ft^2/wk (Brumfield et al., 1982). Brumfield specified costs of floor and bench space, so we assume hanging baskets were not taken into account. Thus, fixed costs of retail flower shops or garden centers have apparently increased by $0.068/ft^2/wk over the past 22 years.

This current survey-based value allows comparison to the currently used estimated values, which were based on Brumfield's data from 1980 and adjusted using national indices (Fig. 3). This study suggests a 53.1% increase in $/ft^2/wk for medium-sized retail businesses. In 1994, Brumfield updated the 1980 figure for small greenhouse businesses producing for the mass market ($0.110/ft^2 bench area/wk) by using the Producer Price Indices and Employment Cost Indices. The updated value was $0.20/ft^2 bench area/wk, an 81.8% increase. Cavins and Dole (2001) adjusted Brumfield's 1980 figure for small greenhouse businesses servicing floral shops ($0.126) using the Consumer Price Index. The updated value was determined to be $0.209/ft^2 bench area/wk, a 65.9% increase. Both estimated values of fixed costs, evaluated as a

percentage increase over time, were greater than the rate of cost increase this research found.

The estimated values were based on synthesized costs (of a standardized business) determined by the production systems used and technologies available in 1980. Considering the lower rate of cost increase as determined by this study, costs incurred by floriculture businesses may not have increased proportionally to inflation. One reason may be an increased efficiency by the industry. This efficiency may be attributed to production practices, making direct purchases rather than carrying debt or simply implying ingenuity—especially with regard to increasing technology. Some businesses that closely monitor costs and sales have eliminated traditional mainstay crops, such as poinsettias or Easter lilies, if they are not profitable. Since the fixed costs of the business must be allocated whether or not a crop is produced, the other crops grown must absorb a greater fixed cost. A company that decides to stop producing poinsettias may chose to introduce a higher-valued (or premium) product to maintain or increase profit potential.

Uva and Richards (2003) analyzed a sampling of New York's greenhouse businesses and found a fixed cost of $\$0.14/ft^2/wk$ for small retail businesses (less than 20,000 ft^2 greenhouse area), and $\$0.08/ft^2/wk$ for large retail businesses (more than 20,000 ft^2 greenhouse area). These findings, also based on actual business records, support the idea that the values estimated by general economic indices may be inflated. While some may argue that it is best to err on the side of caution, by assuming the costs are greater than reality, it is possible that production practices evaluated for their affect on costs were incorrectly discarded based on an inflated estimate.

Wholesale cut flower growers selling primarily to florists and specialty grocers

Utilization. Though some growers used fields year-round, others left field area fallow from October through March. May through July were peak periods of field use with a maximum of 85% used in June (Fig. 4). The cut flower field season remained strong through September with 70.7% field use before tapering off in October (51%). The field season, being weather dependent, may be longer in the southeast than in cooler climates.

Fifty-seven percent of respondents also had greenhouse facilities. While many cut flower farms use unheated cold frames, the "greenhouse" was specifically defined as a heated structure. These were utilized at 95% during the months of February through April, which may be attributed to starting field transplants and production of finished flowers for spring holidays. Cut flower greenhouses were least used October through January.

Cost per square foot per year. Due to the emphasis on field production, cut flower growers require a $/ft^2/year calculation for outdoor production, rather than $/ft^2/week. The mean fixed expenses were $38,774 resulting an average cost of $0.624/ft^2/yr for outdoor field production and $1.616/ft^2/yr for greenhouse production using the 52-week calculation (Table 5, Equation 1). The space adjusted method resulted in a greenhouse cost of $2.157/ft^2/yr and an outdoor cost of $1.220/ft^2/yr (Equation 4, Appendix B).

Retail cut flower growers

Utilization. The peak season was slightly later for retail cut flower growers compared to wholesale growers (Fig. 5). During the months of June through August, fields were utilized 86% to 88%. The retail season appears to last slightly longer than the

wholesale cut flower businesses' with field use at near 60% in October. Though some growers did not use the fields from November through March, those that did used less than 30% during the winter months.

Though only 37.5% of retail cut flower businesses surveyed have greenhouse facilities, all fully utilized (91 to 100%) the greenhouses during the months of April and May. September marked the least utilized time of year (15%). Interestingly, the greenhouses were utilized at 42% during December. Since these are retail floriculture businesses, it is likely that they are selling poinsettias for the holidays or have started crops for Valentine's Day sales.

Cost per square foot per year. As with wholesale cut flower growers, the $/ft^2/year calculation was used. The mean fixed expenses were $43,117. The cost per square foot per year was determined to be $0.416 for outdoor field production and $1.612/ft^2/yr for greenhouse production using the 52-week method (Equation 1). The space adjusted method yields an outdoor cost of $0.787/ft^2/yr and a greenhouse cost of $3.159/ft^2/yr (Equation 4, Appendix E).

Application

This research has produced averages that are useful for comparison of an individual business to the industry. Averages are also useful for research purposes since most research is conducted at the university level rather than by commercial firms. University researchers are restricted to small, less efficient facilities than most commercial businesses. To perform meaningful cost analysis on the production practices

their research has shown to be more (or less) effective, they must rely on industry averages.

Averages, however, should not be used for an individual business' cost analysis. Every business has unique costs based on variation in size, location, market channel, heating system, labor efficiency, production units and outstanding debt. Calculation of $/ft^2/wk is one management tool that can be obtained by careful financial record keeping. The operating statement is a good starting point for newly established businesses or those that have failed to maintain financial records in the past. The operating statement summarizes income received, expenses incurred and net income during a given period. The financial information requested from the survey used in this research was based on an annual operating statement (Appendix A).

For cost analysis, the operating statement can be used to identify fixed and variable costs. It is important to distinguish all costs as fixed or variable. While there are numerous degrees of accuracy depending on the level of record keeping, a consistent, thorough analysis is more important than accounting for every penny.

Pricing. The $/ft^2/wk value can be allocated to all crops as a partial determinant for pricing. The use of area allows each business to analyze various sizes of containers. For example, if a crop requires 416 ft^2 of bench space (i.e. 300 10 x 20-in bedding flats) for 6 weeks, the costs should be multiplied by the area utilized by the period of utilization ($0.11/ft^2/wk * 416 ft^2 * 6 wks = $274.56). The fixed costs associated with the 300 flats would be $274.56, or $0.92 per flat. The sum of the variable costs, often determined by unit (pots/flats), added to the fixed cost per unit yields the breakeven price. The breakeven price is the amount required to cover the cost of producing the product. Any

amount greater than the breakeven price results in a net gain and prices lower than the breakeven result in a net loss. To ensure a price that results in a profit, a business may include the desired annual return on the investment in the fixed costs. A common return used for this purpose is the estimated interest rate on capital if it were invested elsewhere (Gunter and Otte, 1978).

Comparing production practices. Fixed costs are accumulated 52 weeks of the year, independent of whether production area is being utilized. Fixed costs must be allocated to every crop; however, the fixed costs allocated to a crop is dependent on space and time. Perhaps the most well understood concept regarding the use of fixed costs as a management tool is that fixed costs per unit decreases as more units are produced. While this is true, it is difficult to surmise directly since the costs are allocated over area instead of by unit. In the case of bedding flats, increasing units produced results in increased area; however, the number of pots produced might be increased by using closer spacing within the same given area.

The duration of the crop is another production factor that will determine the fixed costs attributed to a crop. Grower manipulation of the greenhouse environment can promote plant growth. By utilizing controlled temperature differences, supplemental lighting or chemical plant growth regulators, plants may reach the marketable stage earlier, decreasing the fixed costs and creating empty bench space for another turn.

Comparing fixed alternatives. Comparing categorical expenses can indicate areas of competitive advantage and areas of relative excessive costs where adjustments might be made. Fixed costs per square foot per week may also be used to evaluate changes in specific fixed expense categories. Such changes include, but are not limited to, increasing

owner or employee compensation, adding a staff member, refinancing outstanding debt (such as a mortgage), or purchasing and implementing new technologies. It is important to analyze the affect of each of these business changes before they occur since the fixed costs incurred by every product will consequently increase or decrease.

Summary

Many owners/managers avoid detailed cost accounting for fear of possible negative results or because they believe the task will be overwhelming—a result of failing to allocate adequate time and resources to maintaining sufficient records. As with plant production, cost accounting is a manual process that requires diligence and attention to detail. Just as growers manage plant nutrition to yield quality plants, the owner/manager must manage the business finances to yield a healthy profit. Products must be sold at a price that covers costs but does not exceed expected market value. Since the market is consumer driven, individual businesses can exert little control over the market value. However, businesses can control their costs. The $\$/ft^2/wk$ or $\$/ft^2/yr$ figures provide one tool that can be utilized for cost analysis in the floriculture industry.

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Table 1. Percent (%) utilization of production areas for bedding and potted plant growers.

	Wholesale		Retail	
	Greenhouse	Outdoor	Greenhouse	Outdoor
Month	N=10	N=5	N=4	N=4
January	31	4	20	10
February	57	12	33	13
March	86	33	60	48
April	95	49	88	62
May	89	39	88	75
June	49	59	52	65
July	35	65	25	85
August	53	65	25	88
September	78	81	58	88
October	89	89	83	75
November	83	18	85	62
December	50	2	85	23

Table 2. Percent (%) utilization of production areas for cut flower growers.

	Wholesale		Retail	
	Greenhouse	Outdoor	Greenhouse	Outdoor
Month	N=4	N=7	N=2	N=8
January	61	21	38	16
February	95	21	48	19
March	95	27	88	29
April	95	49	95	54
May	88	84	95	79
June	83	85	68	86
July	80	82	32	88
August	80	79	22	86
September	78	71	15	78
October	46	51	38	59
November	49	27	38	21
December	49	21	42	16

Table 3. List of fixed costs.

Compensation to Owner(s)
All compensation paid to the owners who are actively engaged in the business

Compensation to Employees

Wages and Salaries
Payments made on an hourly or fixed basis for employee labor

Required Payroll Expenses
Includes payroll taxes (federal, state, local, FICA, unemployment), and worker's compensation

Benefits
Bonuses, company retirement contributions, profit sharing, group medical, disability, life insurance costs

Energy Costs

Heating Fuel
Fuel purchased for the purpose of heating production area

Utilities
Gas, water and electric cost (excluding heating costs)

Facilities

Repairs and Maintenance
Costs associated with building upkeep

Rent
A regular payment by a tenant to a landlord for use of some property

Mortgage
A legal agreement that uses property as collateral to secure payment of a debt

Property Taxes
Taxes levy by a state or local government on real estate

Vehicles and Equipment

Ownership Costs
Depreciation, interest, tax, insurance, license and title

Operating Costs
Fuel, lubricants, repairs and maintenance

Other Taxes and Licenses
Pesticide application license, etc.

Insurance
Federal crop insurance, liability and blanket policies that provide more than 1 year coverage

Professional Services
Costs of disease testing, consultant fees, soil and tissue testing, legal services, accountant and tax preparation

Bank Charges
Charges levied by the bank

Interest
Interest expense paid on credit cards, commercial accounts and miscellaneous loans

Bad Debt
Money owed to the business that cannot be collected

Advertising and Promotion
Costs for newspaper ads, television, radio, catalogs, direct mail, circulars, mailing list maintenance, ad agency fees, and advertising related postage and printing costs

Office Expense
Includes stationery, postage not included in advertising, business forms, depreciation of office equipment, and copier, telephone, FAX and computer equipment expense

Membership Dues, Subscriptions
Local, state, national and international organizational dues, scientific and trade journal subscription costs

Conference and Travel
Registration costs, transportation, lodging, and entertainment costs associated with business travel

Donations
Contributions maid to charitable organizations/causes

Miscellaneous
Other costs not previously accounted for

Table 4. Overall mean fixed costs ($), distribution of expenses (%) and distribution of space (ft^2) for each market segment.

		Distribution of Expenses (%)		Distribution of Space (ft^2)	
Market Segment	**Fixed Costs ($)**	**Greenhouse**	**Outdoor**	**Greenhouse**	**Outdoor**
Bedding/Potted					
Wholesale	520,199	92	8	58,802	30,700
Retail	564,709	89	11	49,320	20,352
Cut Flowers					
Wholesale	38,774	8	92	1,920	56,792
Retail	43,117	2	98	529	102,158

Table 5. Costs ($) per square foot per week for bedding/potted plant growers and costs ($) per square foot per year for cut flower growers. Costs were calculated using the 52-week method and the adjusted method accounting for utilization.

	52-Week	Adjusted
		$/ft^2/wk
Wholesale Bedding/Potted		
Greenhouse	0.157	0.236
Outdoor	0.026	0.060
Retail Bedding/Potted		
Greenhouse	0.196	0.334
Outdoor	0.059	0.101
		$/ft^2/yr
Wholesale Cut Flowers		
Greenhouse	1.616	2.157
Outdoor	0.624	1.220
Retail Cut Flowers		
Greenhouse	1.612	3.159
Outdoor	0.416	0.787

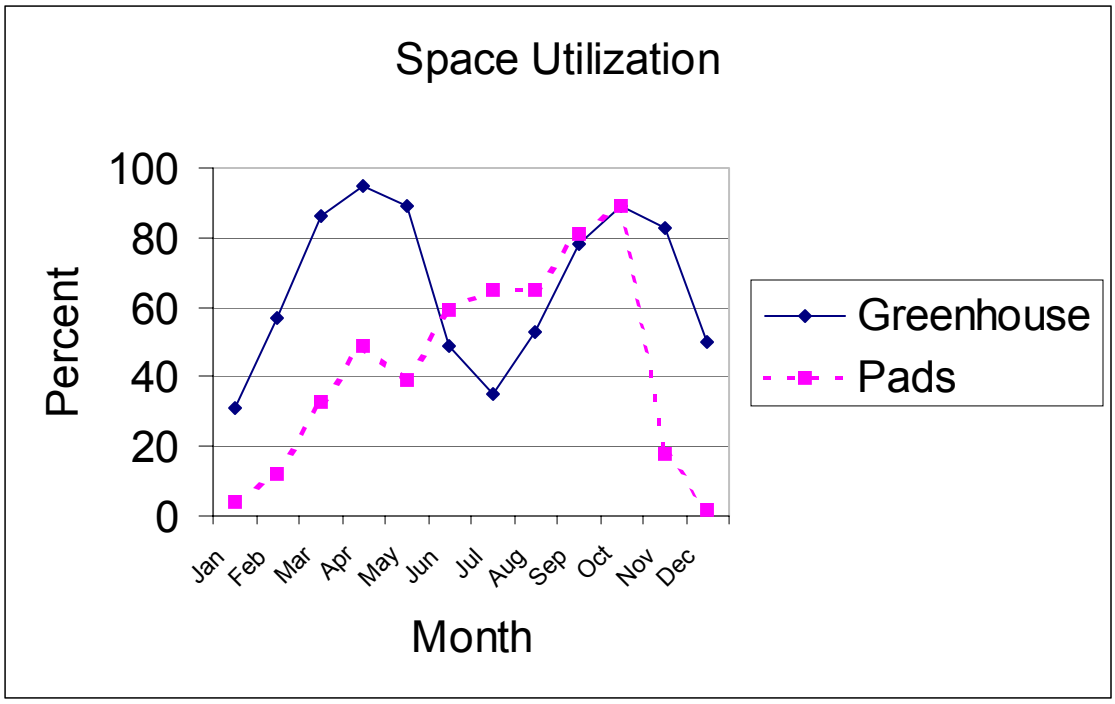

Fig. 1. Utilization of production areas for wholesale bedding and potted plant growers.

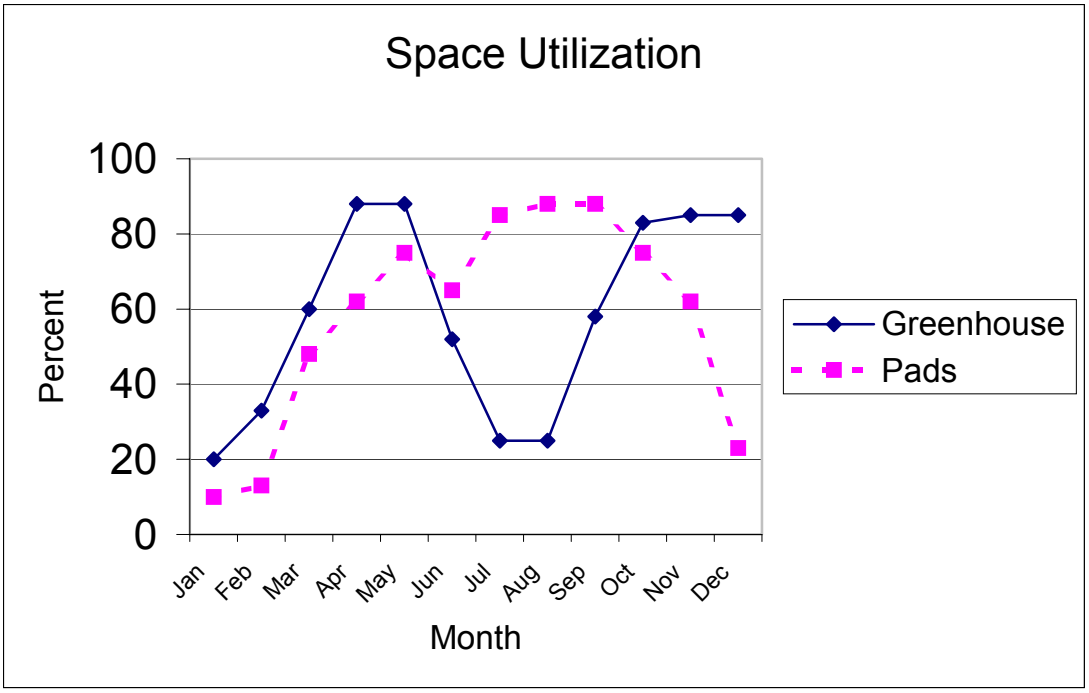

Fig. 2.Utilization of production areas for retail bedding and potted plant growers.

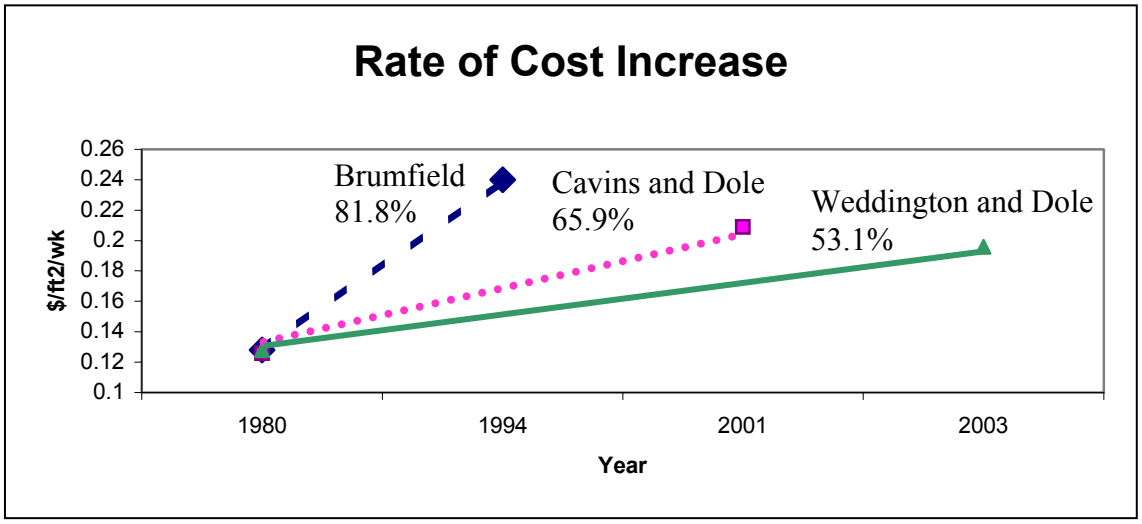

Fig. 3. Rate of cost increase over time comparing the results of this research to estimations using economic indices in 1994 and 2001.

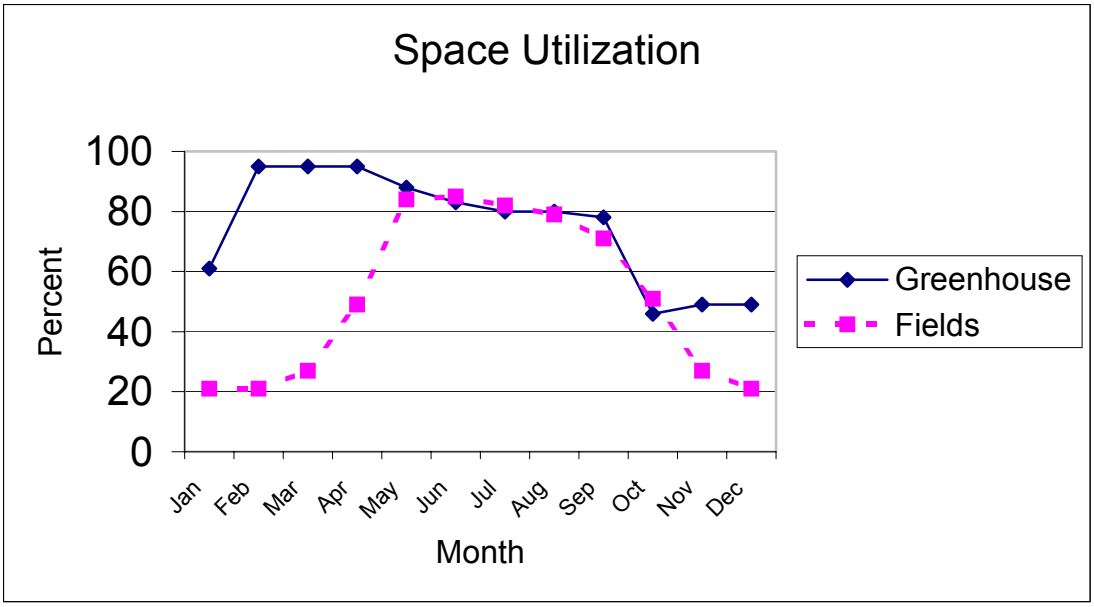

Fig. 4. Utilization of production areas for wholesale cut flower growers.

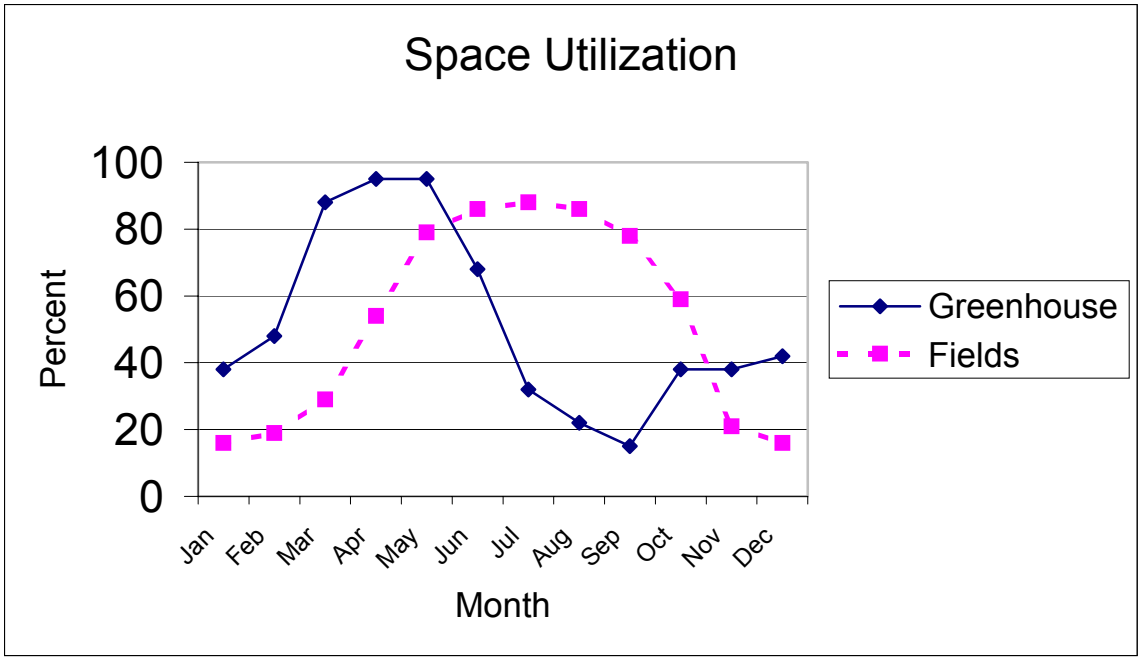

Fig. 5.Utilization of production areas for retail cut flower growers.

APPENDIX A

Floriculture Cost Efficiency Analysis Survey

May 29, 2002

Dear Sir or Madam:

At North Carolina State University we are conducting a research project on cost efficiency in the floriculture industry. We would like you to participate. The data collected will be analyzed so that we can offer floriculture businesses a management tool with the potential to increase profits. From the results, you will be able to determine how your business compares with the overall industry average, which will allow you to determine where your costs may be excessive and take appropriate actions. Additionally, your current dollars per square foot per week ($/ft^2/wk) will be calculated and that figure can be used for the cost analysis of individual crops. This measure of production costs can be utilized when growers are faced with various production options and need to determine which is the most economically efficient. Dr. Robin Brumfield conducted a similar study in 1981; however, over the past 20 years the floriculture industry has seen remarkable growth and updated figures are necessary.

It is important that the survey enclosed is completed with as much accuracy as possible. The financial information from individual firms will remain confidential – only averages will be released after analysis and only Dr. John Dole and I will see individual surveys. If questions arise, feel free to contact me or John Dole for clarification or additional information. Please return your completed survey by July 15, 2002. A stamped envelope has been included for your convenience.

Upon completion of the study, you will receive a summary of the results. For your cooperation, we will also compile a summary comparing your business to the industry average. Thank you for your time and contribution to this research. We would also like to thank the North Carolina Commercial Flower Growers' Association for their financial support of this project. A summary of this report will be published in a future issue of the North Carolina Flower Growers' Bulletin.

Sincerely,

Megan Weddington
Graduate Assistant
919-515-1220
mweddin@unity.ncsu.edu

Dr. John Dole
Professor of Floriculture
919-515-3537
FAX 919-515-7747
john_dole@nscu.edu

NC STATE UNIVERSITY

Floriculture Cost Efficiency Analysis

Company Name _____

Address _____

_____

Phone _____ FAX _____

Owner _____

Survey Respondent _____

E-mail _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please return completed surveys to:

Megan Weddington
Department of Horticultural Science
NCSU Box 7609
Raleigh, NC 27695-7609
FAX: 919-515-7747

Survey Instructions

1. Enter your figures for the last complete fiscal year. Indicate year end date on survey. Full-year data is required.

2. Be as complete as possible. If it is impossible for you to obtain the detailed line items, you may estimate or mark the blank "N/A." The income and expense categories you use in your business may be different from the survey categories. Please adjust your figures for the closest match to the survey. Keep in mind that all data is helpful and valuable to this study and consistency will provide the most useful results.

3. Some of the expense categories (page 5) include an additional survey area where you should record your total expenses (greenhouse + outdoor production) and also estimate the portion of these expenses which are attributed to outdoor production. Outdoor production expenses include costs associated with fields and pads. This division of expenses will assist in calculating the most accurate $\$/ft^2/wk$. If your business does not incur a specific outdoor expense, mark the blank "N/A." Please note that expense categories found on page 6 request only combined expenses.

4. Dollar amounts should be rounded to the nearest dollar—eliminate cents.

5. Enclose all negative figures in parentheses.

6. Questions should be directed to:

Megan Weddington
mweddin@unity.ncsu.edu
704/798-5178
FAX 919/515-7747

Dr. John Dole
john_dole@ncsu.edu
919/515-3537

7. Survey should be returned to:

Megan Weddington
Department of Horticultural Science
NCSU Box 7609
Raleigh, NC 27695-7609
FAX 919/515-7747

Floriculture Cost Efficiency Analysis

Fiscal Year End: (Month)_____ (Year)_____

Distribution of Sales (%)

(1) Wholesale Sales to Growers as % of Sales 1 _____
(2) Wholesale Sales to Retailers as % of Sales 2 _____
(3) Wholesale Sales to Landscapers as % of Sales 3 _____
(4) Retail Sales as % of Sales 4 _____

Business Size (ft^2)

(5) Greenhouse Area
- (a) Production 5 a _____
  Bench/floor growing area.
- (b) Non-Production 5 b _____
  Aisles, potting bench, etc.
- (c) Hanging Baskets 5 c _____
  Area used by mature hanging baskets, not including space between baskets.

(6) Outdoor Production Area
- (a) Pads, benches, etc. 6 a _____
- (b) Field cut ground beds/row culture 6 b _____
- (c) Non-Production 6 c _____
  Roads, aisles, and areas not in production in the given year.

(7) Supplemental Buildings 7 _____
Headhouse, storage areas, and display areas.

TOTAL _____

Product Itemization ($)

(8) Net Young Plant Sales
- (a) Plugs 8 a _____
- (b) Cuttings 8 b _____
- (c) Prefinished plant material 8 c _____

TOTAL _____

(9) Net Wholesale Sales
- (a) Flowering potted plants 9 a _____
- (b) Bedding plants 9 b _____
  Including hanging baskets for outdoor consumer use
- (c) Foliage 9 c _____
  Including hanging baskets for indoor consumer use
- (d) Cut flowers 9 d _____
- (e) Other _____ 9 e _____

TOTAL _____

(10) Net Retail Sales
- (a) Flowering potted plants 10 a _____
- (b) Bedding plants 10 b _____
- (c) Foliage 10 c _____
- (d) Cut flowers 10 d _____
- (e) Other _____ 10 e _____

TOTAL _____

Revenues ($)

(11) Sales 11 _____
Total sales for the fiscal year minus sales tax.

(12) Interest Income 12 _____
Interest earned on investments.

(13) Other Income 13 _____
*State type:*_____
_____
_____

TOTAL _____

Distribution of Sales by Production Area (%)

(14) Greenhouse production 14 _____
(15) Outdoor pads, benches, etc. 15 _____
(16) Outdoor field production 16 _____
TOTAL _____

Distribution of Expenses by Production Area (%)

**You may wish to complete the expenses portion of the survey before estimating your distribution of expenses.*

(17) Greenhouse production 17 _____
(18) Outdoor pads, benches, etc. 18 _____
(19) Outdoor field production 19 _____
TOTAL _____

Hanging Baskets (Number Grown)

Hanging baskets create an additional dimension of production area that must be considered to calculate an accurate cost per square foot. To facilitate this calculation, please fill out the following items.

(20) 8-inch baskets 20 _____
(21) 10-inch baskets 21 _____
(22) 12-inch baskets 22 _____
(23) Other sizes _____ 23 _____

			Total	Outdoor
Expenses ($) *Refer to Survey Instructions (3) .*				
(24)	Compensation to Owner(s) *All compensation paid to the owners who are actively engaged in the business.* Indicate: ___Salary ___Other *If "other" please elaborate in the comments section.* Type of Ownership: _____ Number of Owners: _____	24	_____	_____
(25)	Compensation to Employees Total Number of Employees: _____ Full Time: _____ Part Time/Seasonal: _____			
	(a) Wages and Salaries	25 a	_____	_____
	(b) Other Required Payroll Expenses *Includes payroll taxes (federal, state, local, FICA, unemployment), and worker's compensation.*	25 b	_____	_____
	(c) Employee Benefits *Bonuses, company retirement plan contributions, profit sharing, group medical, disability, life insurance costs and deferred compensation expense.*	25 c	_____	_____
(26)	Plants and Seeds *Propagated materials.*	26	_____	_____
(27)	Materials and Supplies *Non-plant materials including media, containers, fertilizer, pesticides, freight and delivery, etc.*	27	_____	_____
(28)	Energy Costs			
	(a) Heating Fuel *Type(s)*_____	28 a	_____	_____
	(b) Utilities *Gas, water and electric cost (excluding heating costs).*	28 b	_____	_____
(29)	Facilities			
	(a) Repairs and Maintenance	29 a	_____	_____
	(b) Rent (land and buildings)	29 b	_____	_____
	(c) Mortgage	29 c	_____	_____
	(d) Property taxes	29 d	_____	_____
(30)	Vehicles and Equipment			
	(a) Ownership Costs *Depreciation, interest, tax, insurance, license and title.*	30 a	_____	_____
	(b) Operating Costs *Fuel, lubricants, repairs, and maintenance.*	30 b	_____	_____
		SUBTOTAL	_____	_____

Total

Expenses ($)

(31) Other Taxes and Licenses 31_____
Pesticide application license, etc.

(32) Insurance 32_____
Federal crop insurance, liability and blanket policies that provide more than 1 year coverage.

(33) Professional Services 33_____
Costs of disease testing, consultant fees, soil and tissue testing, legal services, accountant, and tax preparation.

(34) Bank Charges 34_____
Charges levied by the bank.

(35) Interest
35_____
Interest expense paid on credit cards, commercial accounts, and miscellaneous loans.

(36) Bad Debt 36_____
Money owed to the business that cannot be collected.

(37) Advertising and Promotion 37_____
Costs for newspaper ads, television, radio, catalogs, direct mail, circulars, mailing list maintenance, ad agency fees, and advertising related postage and printing costs.

(38) Office Expense 38_____
Includes stationery, supplies, postage not included in advertising, business forms, depreciation of office equipment, copier expense, telephone, FAX, and computer equipment expense.

(39) Membership Dues, Publication Subscriptions 39_____
Local, state, national, and international organizational dues, scientific and trade journal subscription costs.

(40) Conference and Travel 40_____
Registration costs, transportation, lodging, and Entertainment costs associated with business travel.

(41) Donations 41_____
Contributions made to charitable organizations/causes.

(42) Miscellaneous Expenses 42_____
Please list: _____
_____
_____
_____
_____
_____

TOTAL _____

(43) Net Income 43_____
Total Revenue – Total Expenses

Please take a moment to note any additional comments on the survey cover page.

Utilization (%)

Though it would be economically ideal to utilize 100% space throughout the year, it is not realistic. For example, November may have near 100% utilization as poinsettias are finished, but January may have a low utilization percentage since areas once filled by poinsettias have yet to be fully replenished. Please estimate the percentage of space used during the given month in the designated areas (Greenhouse, Pads, and Fields). Indicate by checking the box under the appropriate range.

Greenhouse

Month	% Used									
	0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Jan											
Feb											
Mar											
Apr											
May											
Jun											
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											

Pads

Month	% Used									
	0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Jan											
Feb											
Mar											
Apr											
May											
Jun											
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											

Fields

Month	% Used									
	0	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Jan											
Feb											
Mar											
Apr											
May											
Jun											
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											

APPENDIX B

Inputs for Adjusted Cost Calculations

Table 1. Inputs used for the calculation of $/ft^2/wk for wholesale bedding and potted plant growers.

	Production Area (ft^2)	Utilization (%)	Weeks/ Month	Adjusted Area (ft^2•wk)
		Greenhouse		
January	58,802	31	4.42	80,570.500
February	58,802	57	4.00	134,068.560
March	58,802	86	4.42	223,518.162
April	58,802	95	4.28	239,088.932
May	58,802	89	4.42	231,135.308
June	58,802	49	4.28	123,319.554
July	58,802	35	4.42	90,966.694
August	58,802	53	4.42	137,749.565
September	58,802	78	4.28	196,304.597
October	58,802	89	4.42	231,315.308
November	58,802	83	4.28	208,888.225
December	58,802	50	4.42	129,952.420
Total				*2,027,057.830*
Fixed Costs				*$478,583*
Adjusted $/ft^2/wk				*0.236*[Z]
		Outdoor		
January	30,700	4	4.42	5,427.760
February	30,700	12	4.00	14,736.000
March	30,700	33	4.42	44,779.020
April	30,700	49	4.28	64,384.040
May	30,700	39	4.42	52,920.660
June	30,700	59	4.28	77,523.640
July	30,700	65	4.42	88,201.100
August	30,700	65	4.42	88,201.100
September	30,700	81	4.28	106,430.760
October	30,700	89	4.42	120,767.660
November	30,700	18	4.28	23,651.280
December	30,700	2	4.42	2,713.880
Total				*689,736.90*
Fixed Costs				*$41,616*
Adjusted $/ft^2/wk				*0.060*[Z]

[Z] Adjusted $/ft^2/wk determined by dividing fixed costs by total adjusted area

Table 2. Inputs used for the calculation of $/ft^2/wk for retail bedding and potted plant growers.

	Production Area (ft^2)	Utilization (%)	Weeks/ Month	Adjusted Area (ft^2•wk)
		Greenhouse		
January	49,320	20	4.42	43,598.880
February	49,320	33	4.00	65,102.400
March	49,320	60	4.42	130,796.640
April	49,320	88	4.28	185,758.848
May	49,320	88	4.42	191,835.072
June	49,320	52	4.28	109,766.592
July	49,320	25	4.42	54,498.600
August	49,320	25	4.42	54,498.600
September	49,320	58	4.28	122,431.968
October	49,320	83	4.42	180,935.352
November	49,320	85	4.28	179,426.160
December	49,320	85	4.42	185,295.240
Total				*1,503,944.350*
Fixed Costs				*$502,593*
Adjusted $/ft^2/wk				*0.334* [Z]
		Outdoor		
January	20,352	10	4.42	8,995.584
February	20,352	13	4.00	10,583.040
March	20,352	48	4.42	43,178.803
April	20,352	62	4.28	54,006.067
May	20,352	75	4.42	67,466.880
June	20,352	65	4.28	56,619.264
July	20,352	85	4.42	76,462.464
August	20,352	88	4.42	79,161.139
September	20,352	88	4.28	76,653.773
October	20,352	75	4.42	67,466.880
November	20,352	62	4.28	54,006.067
December	20,352	23	4.42	20,689.843
Total				*615,289.800*
Fixed Costs				*$62,118*
Adjusted $/ft^2/wk				*0.101* [Z]

[Z] Adjusted $/ft^2/wk determined by dividing fixed costs by total adjusted area

Table 3. Inputs used for the calculation of $/ft^2/yr for wholesale cut flower growers.

	Production Area (ft^2)	Utilization (%)	Adjusted Area (ft^2)
	Greenhouse		
January	1,920	61	1,171.200
February	1,920	95	1,824.000
March	1,920	95	1,824.000
April	1,920	95	1,824.000
May	1,920	88	1,689.600
June	1,920	83	1,593.600
July	1,920	80	1,536.000
August	1,920	80	1,536.000
September	1,920	78	1,497.600
October	1,920	46	883.200
November	1,920	49	940.800
December	1,920	49	940.800
Total / 12			*1,438.400*
Fixed Costs			*$3,102*
Adjusted $/ft^2/yr			*2.157*[Z]
	Outdoor		
January	56,792	21	11,926.320
February	56,792	21	11,926.320
March	56,792	27	15,333.840
April	56,792	49	27,828.080
May	56,792	84	47,705.280
June	56,792	85	48,273.200
July	56,792	82	46,569.440
August	56,792	79	44,865.680
September	56,792	71	40,322.320
October	56,792	51	28,963.920
November	56,792	27	15,333.840
December	56,792	21	11,926.320
Total / 12			*29,247.880*
Fixed Costs			*$35,672*
Adjusted $/ft^2/yr			*1.220*[Z]

[Z] Adjusted $/ft^2/yr determined by dividing fixed costs by total adjusted area

Table 4. Inputs used for the calculation of $/ft^2/yr for retail cut flower growers.

	Production Area (ft^2)	Utilization (%)	Adjusted Area (ft^2)
	Greenhouse		
January	529	38	201.020
February	529	48	253.920
March	529	88	465.520
April	529	95	502.550
May	529	95	502.550
June	529	68	359.720
July	529	32	169.280
August	529	22	116.380
September	529	15	79.350
October	529	38	201.020
November	529	38	201.020
December	529	42	222.180
Total / 12			*272.876*
Fixed Costs			*$862*
Adjusted $/ft^2/yr			*3.159*[Z]
	Outdoor		
January	102,158	16	16,345.280
February	102,158	19	19,410.020
March	102,158	29	29,625.820
April	102,158	54	55,165.320
May	102,158	79	80,704.820
June	102,158	86	87,855.880
July	102,158	88	89,899.040
August	102,158	86	87,855.880
September	102,158	78	79,683.240
October	102,158	59	60,273.220
November	102,158	21	21,453.180
December	102,158	16	16,345.280
Total / 12			*53,718.082*
Fixed Costs			*$42,255*
Adjusted $/ft^2/yr			*0.787*[Z]

[Z] Adjusted $/ft^2/yr determined by dividing fixed costs by total adjusted area