

THE ECONOMICS OF ORNAMENTAL NURSERY MANAGEMENT

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Abstract. With the very strong demand for ornamental plants that most nurserymen enjoy today, it might appear very easy to operate a profitable nursery. In reality, only those nurseries that employ proven cultural and economic management practices can maintain a profitable business. Continued pressure from inflation and increased competition among nurseries have severely tested the management skills of ornamental nurserymen in Florida. Despite these pressures, 13 nurseries that have been on the nursery business analysis program since 1965 have increased their average level of profit from \$4,906 in 1965 to \$18,183 in 1971. That is an increase of nearly 271 percent.

In the past six years, these same nurseries have made dramatic increases in labor productivity as measured by the value of plants sold per employee. In 1965, the average sales per employee was \$9,402 while in 1971, this figure had increased by over 62 percent to \$15,243. Nurserymen on the business analysis program have learned to keep tuned-in to certain economic management factors. This paper describes some of these key factors and results of the nursery business analysis program.

Introduction

The average sales of ornamental nursery plants by 13 wholesale nurseries in Florida more than doubled from 1965 to 1971. Based on the business analysis records of 13 wholesale nurseries selling ornamental plants in containers, the average sales increased 120 percent from \$67,413 in 1965 to \$148,465 in 1971. At the same time, there was an increase in the percentage return to the capital invested in the business from 10.05 percent in 1965 to 15.37 percent in 1971. Profit, as measured by the net return to the operator for his own labor and capital invested increased 138 percent during this same period. The average profit figures were \$19,157 and \$45,573 for 1965 and 1971, respectively. At least part of the credit for the increase in profit should go to the nursery business

analysis program that these 13 nurseries have been on since 1965. While full credit cannot be claimed, the program has developed some important economic management factors that these nurseries have utilized.

The object of this paper is to delineate and analyze some of the economic management factors that have given ornamental nurseries guidelines by which to make profitable decisions. Emphasis will be given to those factors that apply particularly to wholesale nurseries that produce and market woody ornamental nursery plants in containers in Florida. Many of the factors, however, can be applied with comparable effectiveness to other nursery types in other areas. In brief, this paper is concerned with the efforts of Florida nurserymen, through improved management of their land, labor, and capital, to achieve higher profit.

The Nursery Business Analysis Program

The nursery business analysis program was started in 1964 by Dr. E. W. Cake, now retired, then an extension economist at the University of Florida, Gainesville. Dr. E. W. McElwee, formerly chairman of the Ornamental Horticulture Department, cooperated in the initial development and implementation of the program. In addition, numerous leaders in the ornamental nursery industry have given freely of their time and knowledge in support of the program.

Presently about 70 nurseries, scattered from Monticello to Homestead, are on the program. These nurseries are divided into four nearly equally sized groups depending upon the type of ornamental plants that are being grown and the method of handling them. The four groups are container, field, landscape, and foliage. As the group name implies, ornamental nurseries in the container group produce and market a majority of their plants in containers; it is this group of ornamental nurseries with which this paper is concerned.

The nurseries in the field group physically grow their plants in the ground under open field conditions; whereas, the foliage group is composed primarily of nurseries that grow their plants on raised benches in glass or plastic greenhouses. Another characteristic of the foliage group is that the plants produced are predominately tropical plants used typically for indoor decoration. In the land-

scape group are wholesale ornamental nurseries that have landscaping sales and services as the major component of their total income. Of course, many nurseries do not fall solely into one of these groups, but rather they are a combination of two or three. In these cases, an effort is made to split the total business operation into the suitable groups by allocating costs and revenues as appropriate.

General Characteristics of Analyzed Nurseries

Before becoming involved with the economic management factors, it will be useful to briefly discuss some of the general characteristics of the ornamental nurseries on the business analysis program. Table 1 summarizes some of their basic characteristics. The relatively large increase in sales in relation to the change in acreage is apparent. It can be argued that price increases, combined with the increase in acreage, could have a significant impact on the value of sales. However, if wholesale ornamental plant prices had increased by 5 percent annually from 1965 to 1971, the resulting sales value would have been only \$111,180 in 1971, assuming no other changes except first allowing for the increase in acreage. There were, in fact, price increases during the period in question, but it is unlikely that they would have averaged 5 percent per year. The 1971 average sales level of the 13 nurseries on the program was nearly 34 percent greater than the hypothetical \$111,180 calculated above. Much of

Table 1. General characteristics of 13 wholesale ornamental nurseries in Florida, 1965 and 1971.

Characteristic	1965	1971
Sales (\$)	67,413	148,465
Area (acres)	4.29	5.28
Employees	7.17	9.74
Invested capital: (\$)		
Plants	98,485	158,222
Land (owned)	7,981	5,460
Land (rented)	3,635	9,888
Mach. & equip.	8,255	12,581
Buildings	4,524	12,466
Supplies	1,854	5,407
Total (owned)	121,099	194,136

this difference is probably directly the result of increased productivity on the part of the nurserymen and their employees. Additional capital expenditures for buildings, machinery, and equipment, along with improved management practices, have enabled nurserymen to significantly improve their productivity.

Table 2 is a capsule summary of the average annual expenses incurred during 1965 and 1971 associated with the plant sales mentioned previously. Although the total cost of doing business more than doubled from 1965 to 1971, the magnitude of the increase was less than the corresponding increase in sales; fortunately for the nurserymen concerned, the result was an increase in profit.

Economic Nursery Management Factors

The economic nursery management factors developed for use in the nursery business analysis program can be classified into three groups. The distinguishing characteristics of the groups are the three major production inputs of land, labor, and capital. The three groups will be discussed in

Table 2. Average annual expenses incurred by 13 wholesale ornamental nurseries, 1965 and 1971.

Cost item	1965	1971
Opr. salary	\$ 6,985	\$15,742
Other wages	21,280	42,064
Plants & seeds	5,916	11,636
Containers	7,638	11,736
Peat	1,826	5,289
Fertilizer	1,784	3,569
Pesticides	937	1,393
Other cash exp. ^z	14,703	36,286
Non-cash exp. ^y	10,611	18,065
Total cost	71,680	145,780

^zIncludes utilities, travel repairs, insurance, and other cash expenses.

^yIncludes depreciation on buildings, machinery and equipment and interest on owned capital imputed at 6.0 percent annually.

that order with no implied ranking of importance. In fact, some of the factors are competitive in nature in that improvements in one can be made only at the expense of another, if everything else remains constant.

Land factors. One of the most basic factors that can be used to improve the productivity of land is the percent of production area (or plant) turnover annually. In order to calculate this factor, each different container size has been assigned an equivalent square footage area. Table 3 lists a few common container sizes and their corresponding square foot equivalents. These data were developed by Drs. Cake and McElwee after informally making numerous observations in several nurseries over a period of years. The square foot equivalent is designed to represent the average area that a container of the corresponding size would typically occupy while in use in a nursery. The percent of production area turnover annually is calculated by converting the total number of plants sold during the year to square feet by using the factors in Table 3. Then, the resulting square foot figure is expressed as a percentage of the total area in production.

In 1965, the 13 container nurseries on the business analysis program averaged 35.88 percent plant turnover annually. By 1971, these same nurseries had improved this figure to 47.38 percent. In essence, this factor is an indication of how efficiently the land is being used. Improvements can be made

Table 3. Factors for converting various sizes of nursery containers to square feet.

Container size	Square feet
Quart can	0.5
6 inch pot	0.75
1 gallon	1.0
2 gallon	2.0
3 gallon	2.5
4 gallon	2.5
"Egg can"	2.5
5 gallon	3.0
7.5 gallon	5.0
10 gallon	6.0
20 gallon	10.0
30 gallon	15.0

Source: [1].

in this factor by eliminating vacant spaces in the production area that would normally be occupied by growing plants. By consciously keeping the production area as full as practically possible, an increase in sales will be realized, provided the plants are the type being demanded in the market.

Another manner in which the turnover factor can be improved is by eliminating the slow moving less popular plants from the inventory. But such a procedure should not be carried to an extreme. Profit is not guaranteed merely because of a high turnover rate; each plant should be adding to total profit. If there are losers in the inventory occupying valuable production space that could be growing profitable plants, profit can be increased by phasing out the losers. However, a plant should not be eliminated merely because it is slow growing. A slow growing plant will be profitable if it can command a sufficiently high price to meet all of its cost plus have some left for profit.

In trying to decide between a slow growing plant that yields a relatively high profit and a faster growing plant that yields a lower profit, the amount of profit that can be obtained from both plants in a given amount of time on the same area should be calculated. Then, the one with the greatest calculated profit should be produced. Thus, higher profit should be the nurserymen's goal and not just a higher turnover percentage. Total profit can be increased by increasing the turnover percentage, given that all other conditions are the same. As an indication of the importance of utilizing available space effectively, the 13 nurseries on the program averaged \$0.20 in profit per square foot of production area in 1971.

Another measure of efficient land use is the value of plants sold per acre of production space. The higher this figure, the more total profit obtained, if the profit made per plant can be maintained while increasing sales. In 1965, the 13 wholesale container nurseries on the business analysis program averaged \$15,727 of plant sales per acre of production space. By 1971, the value of sales per acre had increased by over 78 percent to a level of \$28,120. These figures do not include the value of any sales made with plants purchased for immediate resale; thus, they reflect the actual value of production per acre.

Labor factors. Labor is the largest single annual expense item confronting ornamental nurseries. The total labor expense of the 13 nurseries on the program averaged \$28,265 in 1965. This is equivalent to 39.4 percent of the total cost of doing business. By 1971, the average cost of all

labor for these same nurseries had increased by 104 percent to \$57,806. As a percentage of total cost, the 1971 labor figure was 39.6, which was slightly higher than in 1965.

Since labor is such an important expense item, efficient labor utilization can mean the difference between profit and loss. In the nursery business analysis program, two major factors are calculated to measure labor efficiency.

The first labor factor is called the value of own plants sold per employee. It is calculated by dividing total plant sales (less any plants purchased for immediate resale) by the average full-time equivalent number of employees. This factor will give an indication of the average sales producing potential of the nursery's employees. It should not be construed to be a measure of their salesmanship.

Between 1965 and 1971, the average value of own plants sold per employee for the 13 nurseries on the program increased from \$9,402 to \$15,243. Of course, this figure can easily be distorted by the inflationary trend in plant prices. To get a better measurement of the average productivity of labor, a second labor factor is calculated in the business analysis program.

In determining this second labor factor, the total square feet equivalent of sales, calculated earlier, is used to measure labor productivity in physical terms. Total square feet equivalent of own plants sold is divided by the average number of employees. In this factor, as in all factors involving the number of employees, an adjustment is made to the average number of employees to make it represent a full-time equivalent number of employees. Thus, if a particular nursery had two employees working part-time, with one of them one-half time and the other only one-fourth time, these two employees would then be considered equivalent to three-fourths of one full-time employee.

For the 13 nurseries on the program, the average square feet equivalent of own plants sold per employee in 1971 was 11,187. This was 19.7 percent greater than the 1965 average of 9,344. Thus, there was a substantial improvement in the productivity of labor as measured by this factor.

Once again, it should be noted that merely because labor productivity has increased, it does not imply that profit has increased. Increased labor productivity could be the result of increased mechanization that could add significantly to total costs.

Other ways of increasing labor productivity

include adapting new technology and enlarging the volume of business without a comparable increase in the number of employees. Better management and motivation of labor can be used to improve labor efficiency (2).

Another interesting labor analysis factor can be obtained by dividing the total cost of labor by the total value of own plants sold. The result is an indication of the cost of labor per dollar of plant sales. This calculation for the 13 nurseries was 41.93¢ in 1965 and 38.93¢ in 1971. The lower this figure, the better, given everything else remains unchanged.

Capital factors. During the six year period from 1965 to 1971, there was substantial increase in the average amount of total capital invested by the 13 nurseries on the business analysis program. Average investment in 1965 was \$121,099 as compared to \$194,136 in 1971. With this investment level, it becomes very important that the capital be effectively utilized.

The first capital factor is one that is quite common: percent return to capital. It is calculated by subtracting all cost items, except interest, from the total sales plus the increase in plant inventory value. The result is then divided by the total level of capital invested and then multiplied by 100 to convert it into a percentage. Despite the phenomenal increase from 1965 to 1971 in the average value of total capital invested by the 13 nurseries on the program, the percent return on investment increased nearly 53 percent. In 1965, it was 10.05 percent while in 1971, it was 15.37 percent. In general, the higher the return to capital, the more profit being made, if other conditions are held constant. As a goal, it is suggested that the return to capital should be at least twice the annual rate at which money can be borrowed. With other investment alternatives, the rule is to invest in that venture which will return the highest return if the risk is the same for all opportunities.

The second capital factor is the percent annual turnover of capital. It is calculated by dividing total sales by the total capital. Basically, this factor measures the proportion of the total capital invested that is returned to the nursery via sales. The faster it is returned or the larger the proportion returned annually, the more capital will be available for use. In essence, this factor gives an indication of whether or not the capital was invested wisely; the larger the percentage of annual turnover, the wiser the investment.

Considerable progress was made by the program nurseries from 1965 to 1971 as measured

by the percentage of annual turnover of invested capital. In 1965, the rate was 55.67 percent, while in 1971 it was 76.47 percent. Similar to most other agricultural commodities, ornamental nursery plants can be produced in many alternative ways. Each way is apt to utilize a different combination of labor and machinery and equipment. For a given number of the same plants produced, a production process that uses relatively less capital (machinery and equipment) and relatively more labor will have a higher percentage of annual turnover. However, it may not necessarily be more profitable.

The real acid test of a nursery operation, or any other business for that matter, is the level of profit generated. The productivity factors discussed above will not give an indication of how much profit is being made. They will, however, provide some clues as to the potential problem areas if a nursery is not making adequate profit. In addition, they point out the importance of effectively using the three major productive resources employed in ornamental nurseries.

The level of profit obtained per dollar of sales is an excellent indicator of the effectiveness with which the nursery operation is utilizing all of its resources. In making this calculation, the business analysis program gives credit to the nursery for any increase (or decrease) in the inventory value of plants. This results in a more accurate measurement of the productivity of those items represented by the total costs incurred by the nursery. In 1965, the 13 nurseries on the business analysis program averaged 5.39 percent profit. In 1971, this same figure had increased to 10.06 percent. Despite the

onslaught of rising costs, the 13 program nurseries nearly managed to double their profit as a percent of sales. That is rather remarkable. In terms of dollars, the average profit of these same nurseries increased from \$4,906 in 1965 to \$18,183 in 1971. That is an increase of nearly 271 percent.

Summary

The nursery business analysis program has developed some useful measurement factors to judge the efficiency of resource use in ornamental nurseries. A few of the most important factors have been discussed in this paper. It should be pointed out that most factors come in two forms: one calculated with sales adjusted for changes in plant inventory and the other without this adjustment. In the sake of brevity, only one of each form was presented here.

There is nothing magical about the business analysis program nor is there anything magical about being on the program. The growth in sales and profits reported here were made solely by the nurserymen involved. The role of the business analysis program was to make them aware of some economic management factors that could lead to higher profit.

Literature Cited

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THE INFLUENCE OF A-REST UPON GROWTH AND FLOWERING OF IXORA COCCINEA C.V. 'NORA GRANT'

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Abstract. Eighty gallon sized plants of the *Ixora* cultivar Nora Grant were treated with

various rates and combinations of rates of the chemical growth retardant ancymidol (A-Rest)¹. Two applications of material were made 2 weeks apart beginning March 12, 1973. At each application, rates included the following: 0 mg, 1 mg, 3 mg and 6 mg per pot. Five plants were treated with each rate and rate combination. Measurements of shoot elongation and observations of inflorescence development were taken on May 15. Inflorescence development was rated on a scale where 0 = vegetative, up to 4 = inflorescence greater than 1.5 cm across.

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