

EVALUATING NURSERY LABOR PRODUCTIVITY¹

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Abstract. Production, income and cost data are collected annually from foliage and container nurseries participating in the nursery business analysis (NBA) program. Labor costs, as a proportion of growing costs, ranged from 36% for the 3 most productive foliage nurseries to 46% for the 3 least productive container nurseries. Break-even sales required per employee can be calculated when labor costs and total production costs are known.

Labor is the largest single cost item for most ornamental nurseries. Increasing output per unit of labor can enhance returns above total costs for most nurserymen. Generally, more profitable nurseries have higher output per unit of labor.

Working conditions, supervision, nursery layout, production practices, and support equipment influence labor productivity. Labor output should be continually monitored to identify symptoms of possible problems. The nurseryman must then seek the problem. For example, he may identify a task where adding a new piece of equipment could increase labor output. However, to increase nursery profits, the labor costs saved must be greater than the added owning and operating costs on the equipment.

This paper shows how to calculate some nursery labor productivity measures. If a nurseryman calculates his labor productivity, he can immediately compare his productivity measures with those calculated for a group of similar nurseries in the NBA (1, 2). Then, as productivity measures are calculated over a number of years, the nurseryman can identify shifts in labor productivity over time. Production per employee required to break even can be calculated from total labor costs.

Nursery Business Analysis Labor Productivity Measures

Table 1 summarizes labor productivity measures from production and accounting records for nurseries in the 1975 Florida container (1) and foliage (2) nursery business analysis. Average values for the 3 nurseries having the highest and the 3 nurseries with the lowest inventory adjusted sales per employee are shown for each type nursery.

The nurseryman must understand the components of each labor productivity measure and draw conclusions cautiously. Calculating productivity measures from "total" figures risks overstating the importance of a single production input. For example, the help could be doing a great job, but disease or poor marketing practices could result in low labor productivity measures.

A. Square feet in production per employee. The square feet in production per employee indicate the average amount of space maintained by each employee. Among similar type nurseries, those with higher square feet in

Table 1. Nursery labor efficiency measures, 1975.

Measure	Type of Nursery			
	Container		Foliage	
	Avg. 3 most productive*	Avg. 3 least productive	Avg. 3 most productive	Avg. 3 least productive
Sq. ft. in production per employee	30,399	31,757	6,658	5,017
Sq. ft. in propagating & growing per employee	—	—	4,802	2,494
Sq. ft. equivalents of own plants sold per employee	9,089	8,109	—	—
Value of own plants sold per employee (\$)	18,404	10,726	32,679	13,719
Value of own plants sold per employee adjusted for plant inventory changes (\$)	30,438	12,608	35,489	12,618

*Evaluated on the basis of value of own plants sold per employee adjusted for plant inventory changes.

production per employee are likely getting more output per unit of labor than those with lower values for this measure.

Square feet in production per employee are calculated by dividing total square feet in production by the annual employment. Total square feet in nursery should include both stock plant areas and space in which plants are being grown for sale. Aisles, roads, and beds or benches that are never in production should be excluded from the total production area. Production space should also be adjusted for seasonal utilization. For example, if a grower has 100,000 square feet in production September through June, 10/12 or 83,333 square feet are utilized on an annual basis.

The annual employment should represent full-time annual manhours. A full-time employee, for this report, is defined as an employee working 40 hours per week for 52 weeks. A convenient way to calculate the number of full-time employee equivalents is to divide the total annual payroll hours plus any unpaid labor hours by 2080.

Foliage operations have less production space per employee than container nurseries. Foliage nurserymen, particularly growers of small material, turn their production space over faster than container operators. Therefore, foliage growers use more labor per square foot for tasks like potting and moving plants than container nurserymen use.

B. Square feet in propagating and growing space per employee. Many foliage nurseries have large areas in stock plants. Subtracting areas in stock plants from total production space and dividing by number of employees gives square feet in propagating and growing space per employee. The more productive foliage nurseries had 4,802 square feet in propagating and growing space per employee, while the less productive nurseries had 2,494. Propagating and growing space was 72% of the total bed and bench space for the more productive nurseries and 50% for the less pro-

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ductive nurseries. Having too much area in stock plants can reduce productivity and profits.

C. *Square foot equivalents sold per employee.* The physical output per employee for the container nurseries is measured in square foot equivalents of own plants sold. Container size determines the square foot requirements for each plant. Multiplying square feet per plant by number of each size plant and summing for all plants sold gives total square foot equivalents sold. Dividing the total square foot equivalents by the number of employees gives square foot equivalents sold per employee. Space requirements for alternative container sizes in container nurseries are shown in Table 2.

The square foot equivalents of own plants sold were 9,089 for the 3 most productive container nurseries, almost 1,000 square foot equivalents greater than the 3 least productive nurseries at 8,109 per employee.

Square foot equivalents sold measure physical output. Two measures, value of plants sold per employee and value of plants sold per employee adjusted for inventory changes, give dollar return.

D. *Value of plants sold per employee.* The value of own plants sold per employee is calculated by dividing the total

value of own plants sold by the number of employees. The most productive container nurseries generated \$18,404 in sales per employee, about half the \$32,679 sales per employee for the most productive foliage nurseries. The low productivity container and foliage nurseries had comparable sales with \$10,726 and \$13,719 per employee, respectively.

E. *Value of plants sold per employee adjusted for inventory changes.* Sales do not measure total value of plant production. The total value of plant production equals total value of plants sold plus changes in plant inventory value during the accounting period. Subtracting beginning inventory from the ending inventory value gives net inventory change, then adding the net inventory change to plant sales gives inventory adjusted sales or total value of plants produced. Price and quantity changes comprise total inventory change. Increasing quantity must come from physical production, but increasing price may indicate financial improvement without corresponding growth of physical output.

The most productive container and foliage nurseries and the least productive container nurseries all increased plant inventory while the least productive foliage nurseries decreased plant inventory \$1,101 per employee. Although the most productive foliage operations had far greater own plants sold per employee than the most productive container nurseries, the most productive container nurseries increased inventory \$12,034 per employee giving inventory adjusted sales or production of \$30,438 per employee, comparable to \$35,489 inventory adjusted sales for the high productivity foliage operations.

Strong plant demand at good prices is an incentive for growers to reduce inventory. When this happens, inventory adjusted sales (production) will be less than value of plants sold. However, during the construction slow-down in 1974-75, container nurserymen experienced inventory increases because landscape material was not selling.

Nursery Business Analysis Sales and Costs

Analyzing total sales and costs further identifies labor's role in nursery production. Table 3 shows the average sales

Table 2. Square foot requirements for various sizes of containers.*

Container	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

*Developed by Drs. E. W. Cake and E. W. McElwee (3).

Table 3. Sales and costs for 3 highest and 3 lowest inventory adjusted sales per employee for container and foliage nurseries, 1975.

Item	Type of Nursery			
	Container		Foliage	
	Avg. 3 most productive*	Avg. 3 least productive	Avg. 3 most productive	Avg. least productive
Dollars				
Revenue				
Sales	388,139	202,301	398,360	753,742
Plant inventory changes	253,808	35,493	34,256	(60,523)
Inventory adjusted sales	641,947	237,794	432,616	693,219
Cash costs				
Wages	155,459(37.1) ^y	125,321(45.7) ^y	121,510(36.1) ^y	301,869(39.4) ^y
Plants to grow on	50,111(11.9)	12,576 (4.6)	48,692(14.4)	55,428 (7.2)
Containers	52,800(12.6)	14,113 (5.1)	21,879 (6.5)	39,436 (5.2)
Other production materials	44,104(10.5)	14,285 (5.2)	50,762(15.1)	142,165(18.6)
Other cash costs	63,934(15.2)	52,367(19.1)	49,618(14.7)	144,683(18.9)
Total cash costs	366,408	218,662	292,461	683,581
Non-cash costs				
Depreciation	15,886 (3.9)	15,699 (5.7)	19,232 (5.7)	38,879 (5.1)
Interest on capital investment	37,052 (8.8)	40,042(14.6)	25,257 (7.5)	42,747 (5.6)
Total non-cash costs	52,938	55,741	44,489	81,626
Total costs	419,346	274,403	336,950	765,207

*Evaluated on the basis of value of own plants sold adjusted for plant inventory changes.

^yData in parentheses are percentages of total costs.

and costs for the 3 highest and 3 lowest inventory adjusted sales per employee nurseries.

Inventory adjusted sales were above production costs for the most productive container and foliage nurseries. However, costs exceeded inventory adjusted sales for the least productive container and foliage nurseries. The most productive container nurseries had greater total sales than the least productive container nurseries. The higher productivity foliage operations had less total sales than the lower productivity foliage nurseries. This indicates labor was less productive in foliage operations with higher sales.

Labor is the largest single cost for both types of nurseries. The wage bill ranged from 36% of total costs for the most productive foliage nurseries to 46% for the least productive container nurseries. Thus, the most productive foliage nurseries spent 36 cents of each production dollar on labor, while the least productive container nurseries spent 46 cents of each production dollar.

For the most productive container nurseries, labor cost was 37% of total costs, 9% less than the least productive container nurseries, and only 1% higher than the most productive foliage operations. In the least productive foliage nurseries, labor costs accounted for 39% of the total cost, 3% above the most productive foliage firms.

Determining Value of Labor

Relating labor compensation to nursery production is a problem where physical production quotas are difficult to establish and complicated to administer. Labor's value in each operation varies since the wage bill, as a percentage of all costs, varies. That is, values of output from each unit of labor are not equal.

One basis for determining labor value is to establish the value of plant production needed to pay each employee and cover his pro rata share of all other production costs. For the nursery to break even, inventory adjusted sales must cover labor costs and all other costs. In the case of the most productive foliage nurseries, \$1 worth of plants must be produced each time an employee is paid \$.36. Otherwise, the employee is not "earning his keep."

Extending this argument, one can determine plant sales needed to pay the annual wage bill and cover all costs. To do this, divide labor cost by the proportion labor represents of all costs. For example, the most productive foliage nurs-

eries need to produce \$336,950 ($\$121,510 \div .360617$) worth of plants to break even.

Further, dividing an employee's annual wage by the proportion labor represents of all costs gives the inventory adjusted plant sales he must produce to cover his wage. For example, if an employee is paid \$7,500 per year, he must produce \$20,798 ($\$7,500 \div .360617$) worth of plants to cover his wage and his share of other costs. Similarly, other values of plant production required to pay other employees can be determined.

Nursery Applications

First, the nurseryman should calculate some or all of the labor productivity measures listed in Table 1. Comparing these measures with those in Table 1 shows the nurseryman his labor performance relative to nursery business analysis participants.

Calculating and comparing these measures for several years can identify trends in labor productivity within the nursery and assist in evaluating production adjustments made to improve labor output. Declines in labor productivity over time may be symptoms of problems which can reduce nursery profits.

Some problems may be: poor nursery layout, inexperienced employees, poor worker attitude, disorganized flow of supplies and materials through the nursery, obsolete, inadequate, or poorly maintained equipment, lack of supervision, too much supervision, or improper production practices. No labor problem is easy to solve. However, some can be solved by readjusting employee work habits or motivation. Others may require capital expenditures to redesign nursery facilities. Identifying the problem, determining corrective action, implementing a change, and evaluating the outcome are often difficult.

Literature Cited

1. Gunter, Dan L. 1976. Business analysis of container nurseries in Florida, 1975. *Univ. of Fla. Institute of Food and Agricultural Sciences, Economic Information Report 63.*
2. -----, 1976. Business analysis of foliage nurseries in Florida, 1975. *Univ. of Fla. Institute of Food and Agricultural Sciences, Economic Information Report 60.*
3. Florida Cooperative Extension Service, Univ. of Fla. Institute of Food and Agricultural Sciences, Thirty Wholesale Container Nurseries, Producing Woody Ornamental Nursery Plants in Florida. Business Analysis for 1970.

Proc. Fla. State Hort. Soc. 90:292-294. 1977.

DEVELOPING YOUR OWN MARKETING PROGRAM¹

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Abstract. Established marketing channels and marketing systems are available for most commodities grown in the United States. However, many growers of many commodities prefer to develop their own marketing program for a part or all of their production. Alternatives for nurserymen include grower retailing operations at the nursery, at curbside, through roadside stands, with flea markets or in farmers'

markets; developing arrangements with local retail outlets; and developing an independent sales staff and sales organization. Some advantages and disadvantages of each are outlined in this paper.

Established marketing channels and marketing systems are available for most agricultural commodities produced in the United States including ornamental horticultural commodities. However, many producers prefer to develop their own marketing program for a part or all of their production. This may be because established marketing systems are relatively inaccessible to these producers, because costs associated with established systems are too high, or because returns are too low.

Alternatives available to producers of ornamental horti-

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