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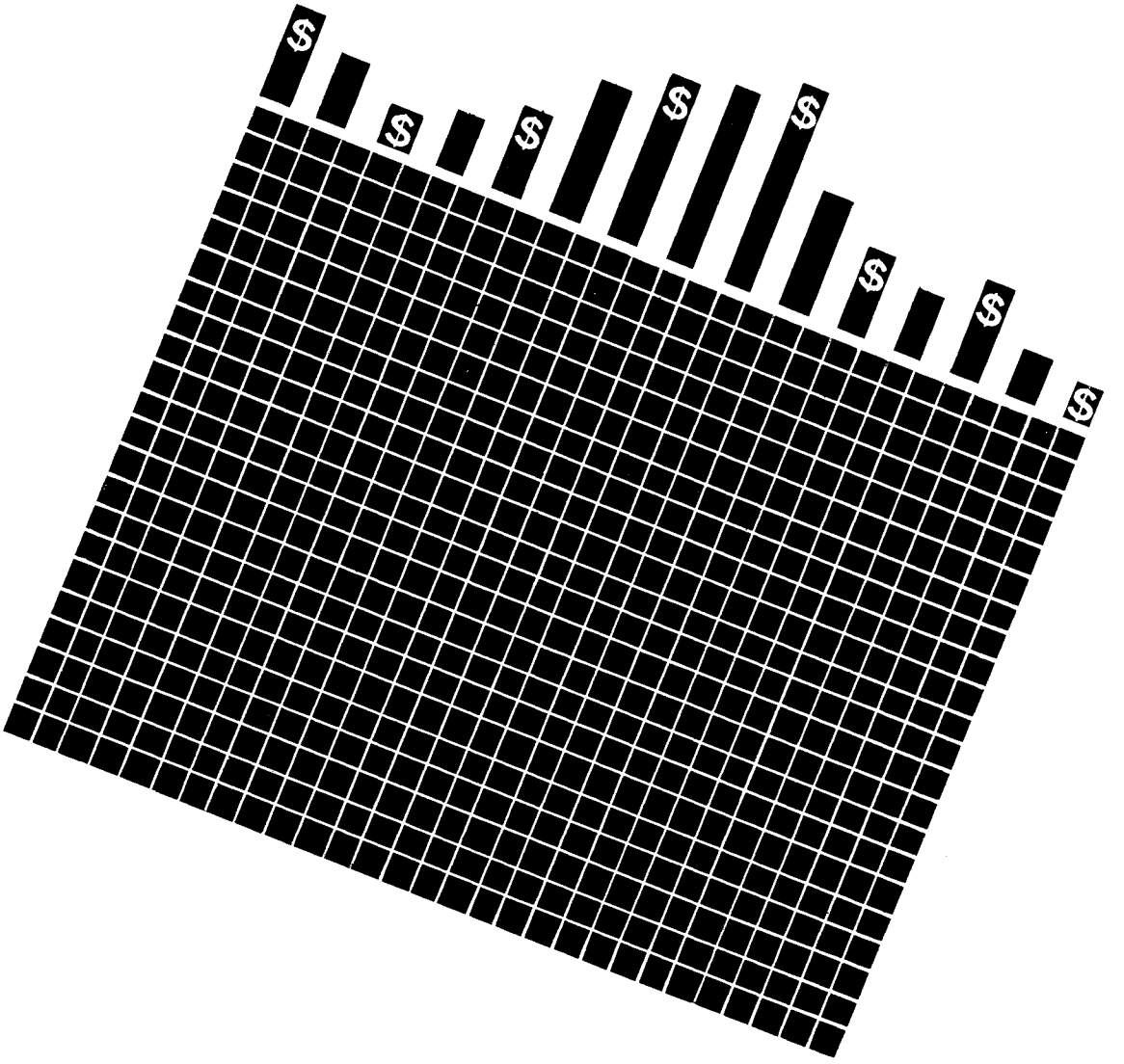

A WORKSHEET FOR NURSERY COST OF PRODUCTION

Stuart T. Nakamoto and PingSun Leung

This paper presents a worksheet for estimating the cost of production for nursery products. The operations where the worksheet will be helpful are characterized by a fairly large number of products, with each product having different input requirements. With such characteristics, the operator needs a method for estimating the cost of producing a specific plant, as opposed to the cost of running the entire operation. Costs of production and his or her knowledge of the market then enable the manager to do things such as:

1. determine the product mix to produce via knowing which plants are most profitable to the operation;

2. determine whether to produce a plant or buy a plant for resale, and;

3. determine how much to charge for a product.

In the future, this worksheet might be adapted for use on a computer, but this paper describes a product that is intended to be completed by hand. This focus is partly because there seems to be a belief that computers provide instant solutions. We want to emphasize that the computer does NOT do magic, but is just one of often several alternatives for accomplishing a task. In this case, the worksheet we will be completing by hand might also be done on a computer, or with an adding machine or a calculator. Perhaps more importantly, many or most nurserymen do not own or have access to a computer. With these considerations in mind, we decided to provide something that is useful whether or not a computer is used. This worksheet can be completed by hand, or put on a machine. Some remarks on computers are presented below.

DESCRIPTION

The procedure to be presented is called the "Rental Approach to Nursery Cost of Production." It is adapted from work at the University of Florida (Gunter) and several presentations in Hawaii (Ching, Nakamoto). We emphasize that the figures to be obtained are estimates. More accurate figures can be found with a method that keeps detailed records for each product, but these methods involve a lot of time and cost. The rental method gives up some accuracy for less time, and uses information that most nurserymen already have.

With the rental approach, nursery growing space is rented to plants. It might be helpful to picture yourself as a hotel manager, with guests (plants) using your rooms (nursery space). The problem is to determine how much each guest is costing you, so you know how much to charge each person at check out time.

There are five types of costs to consider in determining the rental rate.

1. Allocated cash costs. These are out-of-pocket expenses where we know exactly how much each guest used, for example, telephone calls or room service. For the nursery, this category often includes a container cost, potting media, and cost of the stock plant.

2. Unallocated cash costs. These are also out-of-pocket expenses, but in this case it is often difficult to tell how much each guest used. For example, it is difficult to keep track of how often a guest took a shower and how much hot water was used, or how much of the front desk's time was used. For the nursery, most out-of-pocket costs fall into this category unless very detailed records have been kept.

3. Unallocated non-cash costs. This category consists primarily of depreciation. If the accrual system of accounting is used, changes in inventory are also included.
4. Return on investment (or opportunity cost). This category recognizes that the funds being used in the operation could be earning money elsewhere. For example, the money used to build the hotel or nursery could have instead been put into a savings account to earn interest.
5. Losses. For the hotel, these might be guests who leave without paying, or bad check writers. For a nursery, some percentage of the initial planting often cannot be sold for one reason or another.

EXAMPLE

An example as well as a blank form are attached. For the example, we stress that the approach being presented is important, not the figures themselves (in fact, many of the numbers presented are made up). For your computations, the intended data sources are existing documents such as tax returns, financial statements and a map or layout of the operation, and your knowledge.

The worksheet itself consists of seven sections. Sections A to D need be completed only once for the entire nursery, while E and F must be completed for each product. The last section is a summary that allows a comparison of Section F for several products. Each figure in the worksheet is referenced by a two-part label consisting of a character suffix for each section, and a number for the specific item within the section.

The figures for **Section A** come from a map or layout of the nursery. The important number in estimating cost of production is A.1, the Propagating and Finishing Area measured in square feet (sqft). This figure represents the area directly involved in production. In our example, there were 50,000 sqft directly producing a product. With 15,000 sqft of stock plants and 16,250 sqft of other areas, the example nursery has a total area of 81,250 sqft. Items A.2 through A.4 aren't used elsewhere in the worksheet, but they may give an idea of how the nursery land is used. For the example, about 62% of the land is in direct production.

Section B is used to estimate the cost called "return to investment" or "return on owner's equity." Items B.1 to B.4 are used to compute item B.5, the total amount of owner's equity, or the amount of capital invested in the operation by the owner. The first column for B.1 to B.5, for the amounts from all sources including loans and owners equity, is for information only so need not be filled in. The second column is only for funds from equity.

There are several alternatives for calculating the equity capital in the operation, including net book value less outstanding loan balances, actual cash paid in, and market value less loan balances. The method with the largest figures will give the safest or most conservative cost estimate, in the sense that it would be better to overestimate cost an end up with extra net returns, rather than pay out-of-pocket for an underestimate. In most instances the difference in item B.11 between the different methods will be very small. In our hypothetical operation, the nurseryman owns the land outright and used mostly borrowed funds for buildings and improvements. Since that information is not required for the worksheet, the totals for items B.3 and B.4 were not entered. The equity invested totalled nearly $232 thousand.

Items B.6 and B.7 express the desired return on the capital invested in percentage and dollar terms. The percentage return will vary from person to person, and should represent what the owner's equity could be earning if it was not tied up in the nursery. Dividing the dollar return on investment (item B.7) by the production area (item A.1) gives the desired return per square foot on an annual basis (item B.9). Finally, dividing this

annual figure by 52 weeks per year gives the desired return per week for each square foot (item B.11). This figure will be used later in item F.6.

Ten percent was selected as the desired return, which totalled $23,164 for the year. This was equivalent to 46-1/3 cents/sqft per year (item B.9) or less than a penny per week (item B.11) that each of the 50,000 sqft of production area must earn to make the desired return on investment. A product occupying one square foot for 10 weeks therefore must earn ($.0089/week * 10 weeks) or almost 9 cents to cover its share of return on investment.

Section C estimates unallocated non-cash costs, which consist of depreciation and, if the accrual method of accounting is used, changes in the inventory of supplies during the year. A decrease in inventory means that more pots, fertilizer, media, and other supplies were used in production during the year than were purchased. Costs are increased by the value of the supplies that were used, so the decrease in inventory is entered as a positive number. Similarly, an increase in inventory should be indicated by a negative figure. In this case, the negative number corrects for cash outlays on supplies that were not used in the year.

In the example, depreciation and a decrease in supplies totalled $17,433 (item C.4) for the year over the entire operation. Dividing by the production area from item A.1 gives the unallocated non-cash costs per sqft per year (item C.6), which is then converted to a cost per sqft per week (item C.8). In the example, dividing $17,433 by 50,000 sqft gives an annual noncash cost of nearly $0.35/sqft. On a weekly basis, this amounts to 2/3 of a cent for each square foot.

Section D involves all cash costs except those that can be directly allocated to a product (to be considered in Section F). These unallocated cash costs are divided into labor, materials, machinery and equipment, and for everything else, a category called "overhead." A salary for the operator is included for the purposes of estimating cost of production. This salary should be what would be paid if someone were hired to do the operator's job, or what the operator could earn if he or she were employed elsewhere.

The total of all unallocated cash costs, item D.20, is divided by the production area (item A.1) for an annual cost per sqft (item D.22). Dividing D.22 by 52 gives the unallocated cash cost per sqft per week, item D.24. This figure is later used in item F.2

In the example, all the cash costs that could be allocated to each product were first deducted, then the remaining costs were listed in the various categories of Section D. Note that the nurseryman did not keep separate repair and maintenance accounts for machinery versus buildings, so all R&M is lumped under overhead. All unallocated cash costs totalled $165,555 for the year (item D.20). This was equivalent to $3.31/year for each of the 50,000 sqft of production space (item D.22), or about 6.4 cents/sqft per week (item D.24).

The figures in Sections A to D are the same for all products of the operation, but Sections E and F will differ from product to product. **Section E** requires information for a single product, starting with the plant name in item E.1. The example uses an Alexander Palm grown in a 4-inch pot. Item E.2 will be used to compute the amount of production space used by each palm. If the container or ground area is rectangular, then the length and width are entered. If the container is circular, then the diameter is entered twice. Since we have a 4-inch container, "4" is put in E.2a and E.2b.

The measurements are then used to compute the square inches (item E.3) and square feet (item E.5) occupied by the product. The production area used and the number of weeks the plant occupies the space are multiplied to get a "cost allocation factor" for the plant in item E.7. This cost allocation factor is used in Section F to find this particular plant's share of the costs we estimated earlier for the entire nursery.

The palm in the example occupies (4 * 4) or 16 square inches, which is equivalent to (16 / 144) or .111 square foot (item E.5). The palm is grown for 36 weeks, so the cost

allocation factor is (.111 * 36) or 4 in item E.7. Thus, if some cost were calculated earlier at $0.10/sqft per week, the amount allocated to this palm is (4 * $0.10) or $0.40. To see what the allocation factor does, if our palm used an entire square foot, it would be charged $3.60 (= 36 weeks * $0.10/sqft per week) for using the space for that time. Since each pot actually uses only .111 sqft, we charge it (.111 * $3.60), or $0.40, the same figure we obtained above.

If the allocated cash costs in items E.11 to E.14 are known for a single unit, then the number of containers or units originally grown (item E.8) is not needed. Otherwise, E.8 is used to convert costs to a per unit basis. If not known, the percentage of estimated plant losses, item E.9, is found by dividing the number of units lost by the original number of units (item E.8). For each product, the cash costs in items E.11 to E.14 should be entered only if they are known. Otherwise, the costs should be included in Section D, unallocated cash costs. Finally, the total cash cost per unit is computed in E.15, and copied to F.1.

Our hypothetical nurseryman knows the cost figures for each pot for all the items listed, so item E.8 and the totals in items E.11 to E.14 are not needed. About 5% of the palms originally potted cannot be sold (item E.9), and each palm has $.70 in costs that can be allocated (item E.15).

Note that other items can be added if they are known. Also, the value for item E.12--stock, might be the estimated production cost for another plant. For example, our palm might later be repotted into an 8-inch container. The $1.07 we will compute below as the total cost for the 4-inch palm (item F.9) would then be entered as the stock cost for the 8-inch palm.

Section F brings together all the results from the previous sections. Items F.2, F.4, and F.6 use the allocation factor and the costs per sqft per week to calculate a cost for each unit. Item F.3 (F.1 + F.2) is the total <u>cash</u> cost per plant. The other costs are then added in with each of the following steps: unallocated noncash cost per plant (item F.4), return on investment for the plant (item F.6), and an allowance for losses (item F.8). The grand total in item F.9 can then be compared to the unit sales price (item F.10) to get a profit or loss for each plant (item F.11).

For the example, the allocated cash cost per plant (item F.1) is $0.70, from item E.15. Items F.2, F.4, and F.6 require the respective costs/sqft/week (from D.24, C.8, and B.11) and the cost allocation factor of 4.0 (from item E.7). For F.2, multiplying the weekly unallocated cash cost per sqft of $0.0637 by the allocation factor gives us a cost per plant of about 25-1/2 cents. The total cash cost per plant is then $0.9548 (= $.70 + $.2548). Similarly, item F.4, the unallocated noncash cost per plant, is $0.0268 (= .0067 * 4), and the total cost per plant (item F.5) is $0.9816 (= .9546 + .0268). The same process is applied to item F.6, return on investment, to get $0.0356, and item F.7, the total cost plus return on investment = $1.0172.

The final cost item to be included is the allowance for losses (item F.8), which is obtained by multiplying the total cost to this point, $1.0172, by .05, the percentage of losses in decimal form from item E.10. The cost of plant losses of $0.0509 is then included to get a grand total--total cost per plant plus return on investment adjusted for plant losses--of $1.0681 in item F.9.

Our grower can sell all his 4-inch Alexander Palms at $2.00, so the expected profit per container is $0.9319 (item F.11). As an alternative to growing the product, however, the nurseryman could purchase the palm from another grower at $1.10/pot, and resell it to his customers. Comparing his production cost (item F.12) and purchase price (item F.13), we see that our nurseryman expects to make about 3.2 cents more per container by growing the palm rather than buying it from elsewhere (item F.14). Looking at it another way, each palm that is purchased and resold will earn $0.90 profit, but each palm that is grown will make $0.9319, or about 3.2 cents more per pot.

The worksheet as described so far would be sufficient for a nursery with only one product, but for such an operation, it would be simpler to take total annual costs and divide by the total number of units sold to get a production cost. For most other cases, we must compare the different products that might be grown. This process is facilitated by **Section G**, the comparative analysis, which is a summary of the analyses for several products. This section is the same as laying Section F for each product side by side on a large table.

Before continuing, however, it is again emphasized that the intent of this worksheet is to estimate production costs, and that it is only a tool to help in the decision-making process. The grower needs to use this worksheet together with his knowledge and information of the market, of future demand for his products, and of a variety of other factors. With this in mind, let's look at several ways in which the worksheet could be useful via some examples from the hypothetical nursery.

In addition to the 4-inch palm, the example now includes a 6-inch palm and some projections for producing home garden starter pots. Thus, the worksheet could be used for estimating future or projected costs, as well as actual costs of production.

We've already been introduced to how the analysis could tell us whether or not a particular product will be profitable, and whether it is better to grow or purchase the product. Looking at the grow or purchase decision first, products should be purchased if prices are less than production cost and if they can be sold at a profit. However, a nurseryman might ask why another grower can sell at lower cost. For instance, could the operation be improved, or could different materials/techniques be used? Perhaps the other grower is not fully covering all costs, or maybe he or she is satisfied with a lower rate of return?

Similar questions might be asked when considering expected profits or losses. For one, any positive number is <u>profit</u>, over and above all costs including a desired return on money that is tied up in the operation. As such, it will pay to grow a product as long as profit is at least zero. In our example, the nurseryman might consider his or her pricing policy--could anything be gained by selling at a higher or lower price? The quantity sold will probably decrease with a higher price, but the total dollar amount may either increase or decrease. Higher profits also would tend to attract competitors. On the other hand, a lower price would mean less per unit profits, but it might discourage competitors from entering the market, or enable the grower to sell more. In the case of the third example, the starter, is the product underpriced? How accurate or realistic are the cost projections?

Other factors that are not specifically addressed by the worksheet should also be considered. For example, the worksheet is assuming that the entire 50,000 square feet of production area is going to be in use during the entire year. What if a decision to purchase a product results in production space being idle? That empty space will be costing money! In addition, Section G shows that 6-inch pots are more profitable than 4-inch pots, but this is only on a per unit basis. Consider an area of 100 sqft of space, and assume that both container sizes will need the same growing period. The 100 sqft could be used for 900 4-inch pots, or 400 6-inch pots. Assuming they were all sold, the smaller pots will make $800 profit, while the larger pots will make $675, so the 4-inch containers will actually bring in more money!

Thus, the worksheet will help estimate costs of production, but taking the figures themselves beyond their intended use could cause problems. The worksheet provides information that, <u>with other information and the nurseryman's knowledge</u>, could be very useful in decision-making.

A FEW REMARKS ON COMPUTERS

As compared to completing the worksheet by hand, using a computer for evaluating the cost of nursery production has several advantages and disadvantages. The advantages include speed, accuracy, ease of making changes, and, as a result, more work being done in less time. Disadvantages often cited include the investment in time and money, non-existing software, and the lack of support.

Although the worksheet is relatively simple to do by hand, it can be quite tedious and time-consuming when many products are involved, and it is common for nurseries to carry dozens or even several hundred different products. A computer can perform the same calculations that took hours or even days by hand, in a few minutes. This could represent a significant savings in time freed for other activities.

Further, making computations by hand always introduces the element of human error in reading or writing figures and in the computations themselves. Computers, on the other hand (and barring a malfunction), will always give an answer that is correct, based on the figures entered and the program itself.

Finally, changing a single figure will often require a lot of recalculations with a manual system. For example, if the wrong propagation and finishing area was used, almost all of the calculations in each worksheet for each product would have to be redone. With a computer, the correction could be as simple as changing one number, pressing a key, and watching the results come out. This capability also allows users to do sensitivity or "what-if" analysis. What if more area were put into production? What if the cost of water were to increase? With a computer and the right program, the effects of these and similar concerns can be quickly and easily analyzed.

However, using a computer is not as rosy as it sounds. First of all, a computer system costs time and money. Although prices are going down, hardware (equipment) and software (program) costs can be substantial. The investment in time to learn to use a system is also costly, whether the time is your own or of someone you hire.

Second, there are a lot of general-purpose software, for example spreadsheets or data base managers, and many packages for general business. However, there are relatively few programs written specifically for agriculture and even less for nurseries. It is possible to write your own software, but this requires a further investment in time.

Third, there can be a problem with support once a system is acquired. It may be difficult to find a good vendor for equipment repairs and maintenance, or to get answers/solutions for questions or problems with software.

The decision on whether to computerize is one that requires a lot of background research. The advantages and disadvantages for estimating costs of production add another dimension to the final decision.

PARTING COMMENTS

The rental approach to estimating nursery costs of production has several advantages and disadvantages. It is oriented to the individual operation, so could be very useful to nursery owners/managers. The disadvantage with this is that it is difficult to get industry-wide figures.

Although some time and effort is involved, having at least ballpark cost estimates should be a vast improvement over having nothing. The method is relatively easy to conceptualize and apply, it involves simple calculations, and the data requirements are not very detailed. However, this also means that cost estimates will not be as accurate as other approaches that use detailed records. Nevertheless, the approach yields relatively fast results, especially if a computer is used. The speed and ease of use also makes the rental approach a good tool for doing sensitivity or "what if..." analysis.

To summarize, this paper presented a method for estimating nursery costs of production using the rental approach. We briefly defined the five groups of costs included in the approach, then went through a worksheet for a hypothetical nursery. We then discussed some areas in which knowing cost of production might help in a nurseryman's overall decision-making, and ended with some comments about computers.

REFERENCES

Ching, C.T.K. "Landscape Nurseries - Cost of Production," in *Fifth Annual Ornamentals Short Course Proceedings*, January 12-13, 1982, Makaha, Oahu, Hawaii. HITAHR Research Extension Series 043, CTAHR, University of Hawaii. June 1984.

Gunter, Dan L. *User's Guide for the University of Florida Plant Cost Estimation Program.* Economic Report 92, University of Florida, Gainesville. March 1978.

Nakamoto, Stuart T. Notes from presentation to Hawaii Association of Nurserymen 1986 Conference and Trade Show, November 3-5, 1986, Ala Moana Hotel, Honolulu.

A. PRODUCTION SPACE Date: *January 1987*

A.1 Propagating and Finishing Area	*50,000* sqft
A.2 Stock Plant Area	*15,000* sqft
A.3 Aisles, office, roads, etc (non-producing areas)	*16,250* sqft
A.4 Total (A.1 + A.2 + A.3)	*81,250* sqft

B. CAPITAL & INVESTMENT

	total	equity
B.1 Land & Improvements	$ *86,768*	$ *86,768*
B.2 Buildings and improvements	$ *125,000*	$ *15,949*
B.3 Machinery & equipment	$	$ *25,742*
B.4 Inventory and supplies	$	$ *103,180*
B.5 Total (B.1 + B.2 + B.3 + B.4)	$	$ *231,639*
B.6 Desired return on investment = *10* % / 100 =		*.10*
B.7 Desired total return on investment (B.5 * B.6)		$ *23,163.90*
B.8 Production area (from A.1)		*50,000*
B.9 Desired return per sqft per year (B.7 / B.8)		$ *.4633*
B.10 Weeks in year		52
B.11 Desired return per sqft per week (B.9 / B.10)		$ *.0089*

C. UNALLOCATED NON-CASH COSTS, ANNUAL

C.1 Depreciation, buildings	$ *8,045*
C.2 Depreciation, machinery & equipment	$ *6,607*
C.3 Decrease in inventory	$ *2,781*
C.4 Total annual unallocated non-cash costs (C.1 + C.2 + C.3)	$ *17,433*
C.5 Production area (from A.1)	*50,000* sqft
C.6 Unalloc noncash costs/sqft (C.4 / C.5)	$ *.3487*
C.7 Weeks in year	52
C.8 Unallocated noncash cost per sqft per week (C.6 / C.7)	$ *.0067*

D. UNALLOCATED CASH COSTS, ANNUAL

Date: *January 1987*

	Labor	
D.1	Operator salary & benefits	$ *22,141*
D.2	Workers wages & benefits	*69,064*
	Materials	
D.3	Pesticides, herbicides	$ *5,022*
D.4	Fertilizer	*1,371*
D.5	Packing/shipping	*9,304*
D.6	Media, soil amendments	*4,118*
D.7	Water	*3,200*
D.8	Other materials	*0*
	Machinery and Equipment	
D.9	Fuel and oil	$ *3,606*
D.10	Repairs & maintenance	*0*
D.11	Other machinery & equipment cost	*0*
	Overhead	
D.12	Utilities	$ *4,401*
D.13	Insurance	*4,225*
D.14	Repairs & maintenance	*8,030*
D.15	Advertising & promotion	*331*
D.16	Rent	*878*
D.17	Travel & entertainment	*846*
D.18	Interest expense	*28,000*
D.19	Other overhead	*.018*
D.20	Total unallocated cash costs (sum D.1 thru D.19)	$ *165,555*
D.21	Production area (from A.1)	*50,000* sqft
D.22	Unallocated cash costs per sqft (D.20 / D.21)	$ *3.3111*
D.23	Weeks in year	52
D.24	Unallocated cash cost per sqft per week (D.22 / D.23)	$ *.0637*

Date: *January 1987*

E. ALLOCATED CASH COSTS AND PLANT INFORMATION

E.1 Plant name		*Alexander Palm*
E.2 Container Size or Plant Area (enter length and width, or diameter twice)	a.	*4* inch
	b.	*4* inch
E.3 Container area (E.2a * E.2b)		*16* sqin
E.4 Square inches per square foot		144
E.5 Production space used (E.3 / E.4)		*.111* sqft
E.6 Weeks grown		*36*
E.7 Cost allocation factor (E.5 * E.6)		*4.0*
E.8 Containers grown		____
E.9 Estimated plant losses		*5* %
E.10 Plant losses in decimal (E.9 / 100)		*.05*

Allocated Cash Costs (if known) (per unit are total / E.8)	total	per unit
E.11 Container	$ ____	$ *.17*
E.12 Stock	$ ____	$ *.05*
E.13 Media	$ ____	$ *.26*
E.14 Fertilizer	$ ____	$ *.22*
E.15 Cash cost per container (sum E.11 thru E.14)		$ *.70*

F. ANALYSIS

F.1 Allocated cash cost per plant (enter E.15)	$ .70
F.2 Unallocated cash cost per plant (D.24 * E.7) .0637 * 4 =	$ .2548
F.3 Total cash cost per plant (F.1 + F.2)	$ .9548
F.4 Unallocated noncash cost per plant (C.8 * E.7) .0067 * 4 =	$ .0268
F.5 Total cost per plant (F.3 + F.4)	$ .9816
F.6 Return on investment (B.11 * E.7) .0089 * 4 =	$ .0356
F.7 Total cost per plant plus return on investment (F.5 + F.6)	$ 1.0172
F.8 Cost of plant losses (F.7 * E.10) 1.0172 * .05 =	$ .0509
F.9 Total cost per plant plus return on investment adjusted for plant losses (F.7 + F.8)	$ 1.0681
F.10 Sales price per container	$ 2.00
F.11 Expected profit (loss) (F.10 - F.9)	$ .9319

PRODUCE VS BUY

F.12 Total cost per plant plus return on investment adjusted for plant losses (from F.9)	$ 1.0681
F.13 Purchase price per container	$ 1.10
F.14 Gain (loss) from production (F.13 - F.12)	$ 0.0319

A. PRODUCTION SPACE Date: _____

A.1 Propagating and Finishing Area _____ sqft

A.2 Stock Plant Area _____ sqft

A.3 Aisles, office, roads, etc (non-producing areas) _____ sqft

A.4 Total (A.1 + A.2 + A.3) _____ sqft

B. CAPITAL & INVESTMENT total equity

B.1 Land & Improvements $ _____ $ _____

B.2 Buildings and improvements $ _____ $ _____

B.3 Machinery & equipment $ _____ $ _____

B.4 Inventory and supplies $ _____ $ _____

B.5 Total (B.1 + B.2 + B.3 + B.4) $ $ _____

B.6 Desired return on investment = ____% / 100 = _____

B.7 Desired total return on investment (B.5 * B.6) $ _____

B.8 Production area (from A.1) _____

B.9 Desired return per sqft per year (B.7 / B.8) $ _____

B.10 Weeks in year 52

B.11 Desired return per sqft per week (B.9 / B.10) $ _____

C. UNALLOCATED NON-CASH COSTS, ANNUAL

C.1 Depreciation, buildings $ _____

C.2 Depreciation, machinery & equipment $ _____

C.3 Decrease in inventory $ _____

C.4 Total annual unallocated non-cash costs (C.1 + C.2 + C.3) $ _____

C.5 Production area (from A.1) _____ sqft

C.6 Unalloc noncash costs/sqft (C.4 / C.5) $ _____

C.7 Weeks in year 52

C.8 Unallocated noncash cost per sqft per week (C.6 / C.7) $ _____

D. UNALLOCATED CASH COSTS, ANNUAL

Date: _____

Labor	
D.1 Operator salary & benefits	$ _____
D.2 Workers wages & benefits	_____
Materials	
D.3 Pesticides, herbicides	$ _____
D.4 Fertilizer	_____
D.5 Packing/shipping	_____
D.6 Media, soil amendments	_____
D.7 Water	_____
D.8 Other materials	_____
Machinery and Equipment	
D.9 Fuel and oil	$ _____
D.10 Repairs & maintenance	_____
D.11 Other machinery & equipment cost	_____
Overhead	
D.12 Utilities	$ _____
D.13 Insurance	_____
D.14 Repairs & maintenance	_____
D.15 Advertising & promotion	_____
D.16 Rent	_____
D.17 Travel & entertainment	_____
D.18 Interest expense	_____
D.19 Other overhead	_____
D.20 Total unallocated cash costs (sum D.1 thru D.19)	$ _____
D.21 Production area (from A.1)	_____ sqft
D.22 Unallocated cash costs per sqft (D.20 / D.21)	$
D.23 Weeks in year	52
D.24 Unallocated cash cost per sqft per week (D.22 / D.23)	$ _____

Date: ____________

E. ALLOCATED CASH COSTS AND PLANT INFORMATION

E.1 Plant name		______________
E.2 Container Size or Plant Area (enter length and width, or diameter twice)	a.	______ inch
	b.	______ inch
E.3 Container area (E.2a * E.2b)		______ sqin
E.4 Square inches per square foot		144
E.5 Production space used (E.3 / E.4)		______ sqft
E.6 Weeks grown		______
E.7 Cost allocation factor (E.5 * E.6)		______
E.8 Containers grown		______
E.9 Estimated plant losses		______%
E.10 Plant losses in decimal (E.9 / 100)		______

Allocated Cash Costs (if known) (per unit are total / E.8)	total	per unit
E.11 Container	$ __________	$ ______
E.12 Stock	$ __________	$ ______
E.13 Media	$ __________	$ ______
E.14 Fertilizer	$ __________	$ ______
E.15 Cash cost per container (sum E.11 thru E.14)		$ ______

= =

F. ANALYSIS

F.1 Allocated cash cost per plant (enter E.15) $ _____

F.2 Unallocated cash cost per plant
(D.24 * E.7) _____ * _____ = $ _____

F.3 Total cash cost per plant (F.1 + F.2) $ _____

F.4 Unallocated noncash cost per plant
(C.8 * E.7) _____ * _____ = $ _____

F.5 Total cost per plant (F.3 + F.4) $ _____

F.6 Return on investment
(B.11 * E.7) _____ * _____ = $ _____

F.7 Total cost per plant plus
return on investment (F.5 + F.6) $ _____

F.8 Cost of plant losses
(F.7 * E.10) _____ * _____ = $ _____

F.9 Total cost per plant plus return on investment
adjusted for plant losses (F.7 + F.8) $ _____

F.10 Sales price per container $ _____

F.11 Expected profit (loss) (F.10 - F.9) $ _____

PRODUCE VS BUY

F.12 Total cost per plant plus return on investment
adjusted for plant losses (from F.9) $ _____

F.13 Purchase price per container $ _____

F.14 Gain (loss) from production (F.13 - F.12) $ _____

G. COMPARATIVE ANALYSIS

Plant Name	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
Container Size	_____	_____	_____	_____	_____
Allocated cash cost per plant	$ _____	$ _____	$ _____	$ _____	$ _____
Unallocated cash cost per plant	_____	_____	_____	_____	_____
Total cash cost per plant	$ _____	$ _____	$ _____	$ _____	$ _____
Unallocated noncash cost/plant	_____	_____	_____	_____	_____
Total cost per plant	$ _____	$ _____	$ _____	$ _____	$ _____
Return on investment	_____	_____	_____	_____	_____
Total cost per plant plus return on investment	$ _____	$ _____	$ _____	$ _____	$ _____
Cost of plant losses	_____	_____	_____	_____	_____
Total cost per plant plus return on investment adjusted for plant losses	$ _____	$ _____	$ _____	$ _____	$ _____
Sales Price per container	$ _____	$ _____	$ _____	$ _____	$ _____
Expected profit (loss)	_____	_____	_____	_____	_____
Purchase Price	$ _____	$ _____	$ _____	$ _____	$ _____
Gain (loss) from production	_____	_____	_____	_____	_____

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