

How Much Does It Cost To Grow a Greenhouse Crop?

Dr. Robin G. Brumfield

How are independents (wholesale and/or retail) coping with changing customer preferences while at the same time competing with (or profitably selling to) the Big Boxes? In the past two years we have visited over 80 garden centers, nurseries, and greenhouses to collect data and information regarding marketing strategies including maintenance of market share, promotional plans and programs, product mix, value added, agri-entertainment, advertising, demographics, pricing policies, and market channels.

Our objectives were to determine: How is the industry responding to current trends? What can producers learn from our research results? How can they incorporate these results into their existing marketing program?

What happens when a Big Box moves into town?



Figure 1. Home Depot, a "Big Box" with a garden center. Photographer: Lawrence S. Martin

Copyright © 2006, Rutgers, The State University of New Jersey

No part of this material may be reproduced, stored in a retrieval system or transcribed in any form or by any means: electronic, photocopying, recording, or otherwise, without the prior written permission of the author.



Figure 2. Barlow Plant Farm, Inc., Sea Girt, New Jersey. Photographer: Lawrence S. Martin

Big Boxes' low prices are sometimes BELOW break-even costs. The Big Boxes have made producers re-think their marketing strategies. When a Big Box store moves into town producers who succeed compete by focusing on their comparative advantage. Producers who have changed not only stay alive; but also, compete and thrive in the shadow of the Big Boxes.

How much does it cost to grow a crop?

Do you really know for sure whether or not you are making money, or do you wait for your accountant to tell you? Do you know which crops are making money, and which ones are losing money? Or more optimistically, you make money on everything, but which crops make the most?

To answer these questions, we need a little more information:



- 1) What is the selling price of each crop?
- 2) How many square-feet of space does each crop take?
- 3) How many pots or flats of each crop do you produce?
- 4) What percentage of each crop is sold?
- 5) What are the production costs for each crop?

A simple Greenhouse Cost Accounting program, developed in Microsoft Excel and distributed by Rutgers University helps you answer these questions using data you already have. The program lets you determine the costs and returns of each crop that you produce. The program has the following goals:

- 1) Allow greenhouse managers to allocate as many variable costs as possible from the income statement to specific crops. The program will then total the overhead costs and variable costs that cannot be allocated directly to specific crops and will allocate them to each crop on a per square-foot-week basis.
- 2) Allow managers to determine the profit or loss of each crop.
- 3) Provide a tool for use in financial and production management.
- 4) Provide managers with information to reduce costs.
- 5) Provide a planning tool to identify and eliminate unprofitable crops and increase profitable ones.
- 6) Provide necessary cost data for pricing plants.

Even if you don't know the answer to questions number 5, you can still get a rough idea of production costs for each crop by entering the first 4 items. The program can then calculate the total costs based on a per square feet per week allocation of costs to each crop.

To use the Greenhouse Cost Accounting program, first enter all of the costs for a year for the entire greenhouse. This information is typically contained in income statements or Schedule F (or Schedule C for corporations). Next, enter the total square-foot area, the percentage of that area used for production, and the weeks in production. Finally, enter as many direct costs as possible for each individual crop (Table 2).

The program assigns the remaining unallocated costs from the income statement to each crop on a per square-foot-week basis. The program then calculates information on costs and returns per crop, per unit (pot or flat), and per square foot for each crop, as well as an income statement showing total costs, allocated costs, and unallocated costs.

Let's look at a hypothetical 20,000 square-foot greenhouse with simple production schedule of only 5 crops: Petunia flats, Marigold flats, Geraniums in 4-inch pots, and poinsettias in 6-inch pots (Table 1). The most profitable crop is not always the most profitable per square foot. In this example, marigold flats are the most profitable crop per pot (per unit), but geraniums in 4-inch post are the most profitable crop per square-foot. Geraniums in 4-inch pots are sold at the lowest price per unit of any of the crops in the example, but they take up far less space than a flat, and are the most efficient user of space. Geranium flats get the highest price per unit of any of the crops in the example, but they take twice as long to produce as marigold flats, so they make only a third of the profit that marigold flats do. Poinsettias in 6-inch pots were the losers. Each pot lost \$0.18, and the net loss on the poinsettia crop was \$2,605. Of course, all of these figures will change for your individual business, but look how much data you can get from taking information from your Schedule F (or Schedule C if you are a corporation) and some simple cost per crop information.

However, we had some estimates of these costs in our example, so we entered them (Table 3). A look at the results show geraniums in 4-inch pots making the most profit, and poinsettias losing \$0.18 per pot, or \$0.01 per square-foot. But, is it always a smart move to drop an unprofitable crop? Let's see what happens when we drop poinsettias. Without poinsettias, income drops by \$73,855 (Table 2). We drop the variable costs listed in Table 3 from the crop section and the income statement (Tables 2 and 3). We reduce the weeks in production from 29 weeks to 15. We have just eliminated the only unprofitable crop, so we should be making more money, right? Think again. Poinsettias may have been losing money, but each pot was carrying \$4.01 of overhead costs. In addition, they were carrying all but \$0.18 of the variable costs. When they are no longer in the picture, the other crops must carry the overhead costs, and then, every crop becomes unprofitable except for geraniums in 4-inch pots. The entire business is losing over \$45,000 instead of making money as it did when we grew poinsettias. A sounder option might be to look as possibly raising the price of poinsettias. A \$0.20 price increase would make them a slightly profitable crop instead of one which loses money. This example shows that knowledge of the profitability of each crop helps managers make production and marketing decision to improve their businesses. It lets you do some "what if" planning on paper instead of making bigger, real mistakes in the greenhouse.

For more information, contact Dr. Robin G. Brumfield, 55 Dudley Road, Rutgers University, New Brunswick, NJ 08901-8520, phone 732/932-9171 ext. 253, e-mail: Brumfield@aesop.rutgers.edu.

Table 1. An example from the Greenhouse Cost Accounting program of output information per units and per crop.

	Crops					
	Petunia Flats	Marigold flats	Geranium flats	Geraniums (4-inch pots)	Poinsettias (6-inch pots)	Total
Cost per unit						
Total direct costs	\$ 2.27	\$ 2.27	\$ 3.60	\$ 0.48	\$ 0.92	---
Overhead costs	\$ 3.50	\$ 2.63	\$ 5.69	\$ 0.18	\$ 4.01	---
Loss of unsold plants	\$ 0.12	\$ 0.10	\$ 0.19	\$ 0.03	\$ 0.26	---
Total costs	\$ 5.89	\$ 4.99	\$ 9.49	\$ 0.70	\$ 5.18	---
Sales price	\$ 6.50	\$ 6.50	\$ 10.00	\$ 1.20	\$ 5.00	---
Profit (loss)	\$ 0.61	\$ 1.51	\$ 0.52	\$ 0.50	(\$ 0.18)	---
Costs per crop						
Direct costs	\$11,335.50	\$ 6,793.50	\$18,015.00	\$ 4,847.00	\$13,770.00	\$ 54,760
Square foot	8,200	4,920	8,200	1,100	15,000	37,420
Square ft-wk	65,600	29,520	106,600	6,600	225,000	433,320
Overhead per sq. ft-wk	\$ 0.267	\$ 0.267	\$ 0.267	\$ 0.267	\$ 0.267	\$ 0.267
Sales	\$31,850.00	\$19,110.00	\$49,000.00	\$11,400.00	\$71,250.00	\$182,610
Totals costs	\$28,851.66	\$14,680.27	\$46,480.51	\$ 6,609.50	\$73,855.16	\$170,477
Profit (loss) per crop	\$ 2,998.34	\$ 4,429.73	\$ 2,519.49	\$ 4,790.50	(\$ 2,605.16)	\$ 12,133
Profit (loss) per unit	\$ 0.61	\$ 1.51	\$ 0.51	\$ 0.50	\$ (0.18)	---
Profit (loss) per sq. ft-wk	\$ 0.05	\$ 0.15	\$ 0.02	\$ 0.73	\$ (0.01)	---

Table 2. An example of the first input screen, which includes income statement and space usage information, from the Greenhouse Cost Accounting program.

Values from Income Statement (Schedule F or C)		
	<i>Original</i>	<i>Without Poinsettias</i>
Sales	\$182,610	\$108,755
Directs costs		
Seeds, cutting, or plant	\$ 19,092	\$ 10,692
Pots or containers	\$ 9,490	\$ 8,140
Growing medium	\$ 9,150	\$ 7,650
Fertilizer and chemicals	\$ 1,130	\$ 680
Tags	\$ 3,788	\$ 3,788
Other	\$ 0	\$ 0
Overhead salaries (including benefits)	\$ 37,384	\$ 37,384
General wages (including benefits)	\$ 12,111	\$ 10,041
Utilities		
Heating fuel	\$ 20,000	\$ 20,000
Electricity	\$ 3,350	\$ 3,350
Telephone	\$ 1,480	\$ 1,480
Water	\$ 0	\$ 0
Overhead		
Depreciation	\$ 16,750	\$ 16,750
Interest	\$ 16,800	\$ 16,800
Repairs	\$ 3,725	\$ 3,725
Taxes	\$ 550	\$ 550
Insurance	\$ 3,240	\$ 3,240
Advertising	\$ 485	\$ 485
Dues and subscriptions	\$ 100	\$ 100
Travel and entertainment	\$ 345	\$ 345
Office expense	\$ 314	\$ 314
Professional fees	\$ 550	\$ 550
Truck expense and equipment rental	\$ 7,150	\$ 7,150
Land rental	\$ 2,000	\$ 2,000
Contributions	\$ 18	\$ 18
Bad debts	\$ 925	\$ 925
Miscellaneous	\$ 550	\$ 550
Greenhouse area (ft ²)	20,000	20,000
Greenhouse space used for production (%) (e.g., enter 75% as 75, 125% as 125)	75	75
Weeks in operation (52 if a full year)	29	14

Table 3. An example of input section 2, which includes information on specific crops, from the Greenhouse Cost Accounting program.

Input section (2)						
Crop						
	Petunia flats	Marigold flats	Geranium flats	Geraniums (4-inch pots)	Poinsettias (6-inch pots)	Total
Labor	\$3,385.00	\$2,031.00	\$3,385.00	\$1,240.00	\$2,070.00	\$12,111.00
Seeds or plants	\$1,320.00	\$ 792.00	\$7,920.00	\$ 660.00	\$8,400.00	\$19,092.00
Containers	\$2,900.00	\$1,740.00	\$2,900.00	\$ 600.00	\$1,350.00	\$ 9,490.00
Growing medium	\$2,750.00	\$1,650.00	\$2,750.00	\$ 500.00	\$1,500.00	\$ 9,150.00
Fertilizer and chemicals	\$ 155.00	\$ 90.00	\$ 235.00	\$ 200.00	\$ 450.00	\$ 1,130.00
Tags	\$ 823.50	\$ 494.10	\$ 823.50	\$1,647.00	\$ 0.00	\$ 3,788.10
Other direct costs	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Number of units started	5,000	3,000	5,000	10,000	15,000	38,000
Square feet per unit	1.64	1.64	1.64	0.11	1.00	---
Weeks to grow	8	6	13	6	15	---
Percent sold	0.98	0.98	0.98	0.95	0.95	---
Sales price	\$ 6.50	\$ 6.50	\$ 10.00	\$ 1.20	\$ 5.00	---

Table 4. An example from the Greenhouse Cost Accounting program of output information per units and per crop with no poinsettias.

	Crops					Total
	Petunia Flats	Marigold flats	Geranium flats	Geraniums (4-inch pots)	Poinsettias (6-inch pots)	
Cost per unit						
Total direct costs	\$ 2.27	\$ 2.27	\$ 3.60	\$ 0.48	\$ 0.00	---
Overhead costs	\$ 7.29	\$ 5.47	\$ 11.84	\$ 0.37	\$ 0.00	---
Loss of unsold plants	\$ 0.19	\$ 0.16	\$ 0.32	\$ 0.04	\$ 0.00	---
Total costs	\$ 9.55	\$ 7.73	\$ 15.45	\$ 0.85	\$ 0.00	---
Sales price	\$ 6.50	\$ 6.50	\$ 10.00	\$ 1.20	\$ 5.00	---
Profit (loss)	\$ (3.25)	\$ (1.39)	\$ (5.76)	\$ 0.30	\$ 0.00	---
Costs per crop						
Direct costs	\$11,335.50	\$ 6,793.50	\$18,015.00	\$ 4,847.00	\$ 0.00	\$ 40,990
Square foot	8,200	4,920	8,200	1,100	0	22,420
Square ft-wk	65,600	29,520	106,600	6,600	0	208,320
Overhead per sq. ft-wk	\$ 0.56	\$ 0.56	\$ 0.56	\$ 0.56	\$ 0.00	\$ 0.56
Sales	\$31,850.00	\$19,110.00	\$49,000.00	\$11,400.00	\$ 0.00	\$111,360
Totals costs	\$47,772.64	\$23,194.61	\$77,226.61	\$ 8,513.13	\$ 0.00	\$156,707
Profit (loss) per crop	\$(15,922.64)	\$(4,084.61)	\$(28,226.61)	\$ 2,886.87	\$ 0.00	\$(45,347)
Profit (loss) per unit	\$ (3.25)	\$ (1.39)	\$ (5.76)	\$ 0.30	\$ 0.00	---
Profit (loss) per sq. ft-wk	\$ (0.24)	\$ (0.14)	\$ (0.26)	\$ 0.44	\$ 0.00	---

You can use the program to analyze various strategies to improve the overall profitability of your business. You can enter either hypothetical crops into the program or hypothetical changes in the current production system and then compare the results to your current system.

To order a copy of the Greenhouse Cost Accounting Software, please send a check for \$50 to:

Dr. Robin Brumfield
Rutgers, The State University of New Jersey
55 Dudley Road
New Brunswick, NJ 08901-8520

Please be sure to include your name, address, phone number, and e-mail address.

Acknowledgements:

Thanks to the producers who were willing to share data and to the USDA Risk Management Agency who provided funding for this research.