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Calculating Pansy Production Costs

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Profitable production of pansies is dependent upon the knowledge and control of production costs. Growers who understand production costs will be better prepared to make decisions on the optimal number of plants to produce and to help establish prices. The costs presented here should be useful to current growers who wish to compare their own production expenses and for potential growers in determining whether to begin growing fall pansies. The data was collected from a North Carolina firm that specializes in producing high quality pansy plants for the landscape and retail garden center market. Costs are calculated for the 2003 growing year and compare the production of deep 1801 and deep 606 cell pack flats.

Costs: Variable versus Fixed. Costs can be categorized as either variable or fixed. Variable Costs, also called direct costs, are costs that are incurred directly when growing a plant. Variable costs items include the pots, plants, root substrate, chemicals, and hourly labor used to grow the crop. These items' costs are easily allocated to a specific crop because the materials used to produce the crop and production practices followed are known. The variable costs for an 1801 flat were $2.04 (Table 1) and $3.22 for a 606 flat (Table 2).

The primary reason for the $1.18 higher costs with the 606 flat was because twice as many plugs were used. The cost of the pansy plugs were the single highest variable costs item, representing 45% of the variable costs of the 1801 flat and 57% of a 606 flat. The flat, insert, label, and substrate are the next highest expense at $0.83 or 41% of the variable costs for an 1801 and $0.97 or 30% for a 606 flat. Transplant labor was more expensive with ▶

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the 606 flat because fewer flats can be planted per hour with the extra time needed to plant the 36 plugs. Similar to what was found in earlier costs studies with garden mums and ornamental cabbage, chemicals used on pansies are only a small percentage of the production costs and were less than 2.5 cents per flat.

Fixed Costs, also called overhead or indirect costs, are incurred whether or not a crop is produced. It includes items like management salaries, depreciation, insurance, interest, repairs, marketing, and taxes. Fixed costs are the general operation expenses of the greenhouse facility. These costs are usually the hardest to determine and to equitably allocate to each crop grown. In general, for greenhouse operations, fixed costs are allocated to a crop on a cost-per-square-foot-per-week basis.

Because pansies fill in a production niche during the fall, fixed costs for this firm were allocated based on a percentage of the growing year. Greenhouse production occurs 10 out of 12 months. Pansy production occurs over a 4 month time span. Therefore 40% of the annual fixed costs were allocated to the pansies and other fall crops such as poinsettias and garden mums. (The remaining 60% of fixed costs were allocated to the spring crops.) The fixed costs were further divided between 1801 flats and 606 flats based on the percentage of growing area they required. Overall, 16% of the annual fixed costs were allocated to the 1801s and 12% to the 606s. Fixed costs for an 1801 flat totaled $4.51 per flat (Table 1) and $4.94 for a 606 flat (Table 2).

The depreciation expense was fairly high for this firm because of their method of allocating fixed costs, their investment in capital equipment, and their use of an accelerated depreciation schedule. Firms utilizing new machinery and equipment will also have a high depreciation expense, while firms that rely upon used equipment will have a lower depreciation expenses.

As stated earlier, fixed costs can be allocated to a crop in a variety of ways. Because this firm allocated these expenses as a percentage of the production time, this means that pansies are carrying a greater percentage (28%) of the fixed costs than would be allocated if costs were based on square-foot-weeks. Crops such as poinsettias which have a longer production time and require more fuel to heat the greenhouse should be allocated a larger amount of the overhead expenses. In essence these fixed costs are being under-allocated to the poinsettia crop. Is this an appropriate approach? It all gets back to philosophy of the firm. They have excellent growers who they keep on staff year round and they want to protect the profit generated from the spring crops. Growing pansies fills a niche to keep the growers employed, provides cash flow, and contributes revenue to cover fixed expenses. So with that philosophy, using the percentage of production time approach to allocated fixed costs to the pansy crop is appropriate. Other firms may decide to allocate costs based on the inputs required or allocate a higher percentage of the fixed costs to the spring bedding plant crop. Those firms may find their fixed expenses to be as much as 50% lower than reported for this greenhouse.

Shrink. Even under the best production practices, a certain percentage of the crop will not be marketable due to poor growth, insects, disease, or damage. The input costs used in the production of these non-marketable plants have to be accounted for in some way by the operation. This is accounted for by adjusting the production cost by a shrink factor. In this case, a 10.7% shrink was calculated for the 1801 flats and 8.3% for the 606 flats. Losses added $0.78 to the cost of an 1801 flat and $0.73 to a 606 flat. Shrink is an expense that must be managed. As profit margins continue their downward trend in the greenhouse industry, the shrink percentage will have a huge impact on the total profitability of the firm and will require a greater focus by greenhouse operators in the future.

Total production costs per 1801 flat including the shrink was $7.34 (Table 1). It costs $8.89 to grow a 606 flat (Table 2).

Profitability. By adding the total variable costs and total fixed costs together, this provides the total costs of producing fall pansies. The profitability of the crop is directly related to the price received. The profitability per 1801 flat was $2.41 (a 33% profit margin). The 606 flats were grown at a loss of $1.17 per flat. Why the difference in profitability between an 1801 and 606? The primary reason for the profitability difference is the sales price: 1801s were sold for $9.75 per flat and 606s sold for $7.72 per flat. A contributing factor was also the higher plug costs for the 606 flats.

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Table 1. Pansy production costs for a 1801 cell pack.

Number of Flats:	33,500				
Variable (Direct) Costs					
Item	**Amount**	**Type**	**Cost Each**	**Total Cost**	**Cost per Flat**
Plugs	603,000	384 cell plugs	$0.0505	$30,451.50	$0.909
Plastic Flat	33,500	Deep web flats	$0.2109	$7,065.15	$0.211
Plastic 1801 insert	33,500	Deep 1801 inserts	$0.1947	$6,522.45	$0.195
Label	33,500	One label per flat	$0.0101	$338.35	$0.010
Substrate	102.8	Bulk bags (66 cubic feet)	$135.98	$13,978.74	$0.417
Fertilizer	28	Fertilizer bags (25# of 15-3-20 Pansy Blend)	$15.95	$446.60	$0.013
Insect Control					
Caterpillars	6.75	Ounces of Conserve (spinosad), 6 fl oz/100 gal. [1 spray application for each flat]	$2.66	$17.96	$0.0005
Caterpillars	17.9	Ounces of Dipel 3.2 ES (*Bacillus thuringiensis*), 16 fl oz/100 gal. [1 spray application for each flat]	$0.44	$7.88	$0.0002
Aphids	2.3	Ounces of Endeavor (pymetrozine), 4 fl oz/100 gal. [only applied once to 50% of the total flats]	$8.25	$18.98	$0.0006
Disease Control					
Cercospora leafspot	2.24	Junction (copper hydroxide + mancozeb), 2 lbs/100 gal.	$10.58	$23.70	$0.0007
Botrytis	0.11	Pounds of Decree 50 WDG (fenhexamide), 1 lb/100 gal. [only applied once to 10% of the total flats]	$92.25	$10.15	$0.0003
Plant Growth Regulators	2.81	Quarts of Piccolo (paclobutrzol), 10 ppm [applied once to each flat]	$102.00	$286.62	$0.009
Labor for Transplanting					
Transplanting	700	Hours of time	$7.50	$5,250.00	$0.157
Flat Filling	108	Hours of time	$7.50	$810.00	$0.024
Subtotal Variable Costs (Direct Items and Labor)				**$65,228.07**	**$1.947**
Interest on Variable Expenses	(Total Variable Expenses x 5% interest * 0.10 years)			$3,261.40	$0.097
	Total Variable Expenses	$65,228.07			
	Interest (%)	0.5			
	Time (years)	0.1			
TOTAL VARIABLE COSTS				**$68,489.47**	**$2.044**
Fixed (Indirect) Costs					
Item	**Type**			**Total Cost**	**Cost per Flat**
Depreciation	Total depreciation for the operation. Includes all structures, trucks and equipment.			$25,650.00	$0.766
Overhead Operating Costs	Total fixed operating costs for the operation. Includes all taxes, utilities, fuel, office costs, mortgage, insurance, and delivery costs.,			$33,710.00	$1.006
Total Operation Labor	Includes grower, marketing and management labor.			$91,740.00	$2.739
TOTAL FIXED COSTS				**$151,100.00**	**$4.510**
TOTAL PRODUCTION COSTS				**$219,589.47**	**$6.555**
Shrink (Number Sold)	29,923	Loss Percentage [(Number Grown-Number Sold)/Number Grown]	10.7%	---	$0.784
TOTAL PRODUCTION COSTS (with shrink)				---	**$7.34**
REVENUE (Sales)	[Flat price calculated based on: (Sales / Number Flats Sold)]			**$291,754.00**	**$9.75**
NET PROFIT	[Flat profit calculated based on: (Net Profit / Number Flats Sold)]			**$72,164.53**	**$2.41**

Losses are not a good thing and should be avoided. This grower would need to evaluate options to try to make 606 flats more profitable. One option is to stop growing them, but 606s are required for the retail trade and by not growing them would negatively affect sales of other fall crops. A second option would be to increase production of 606s to spread out more of the fixed costs. Of course there would have to be a market for the extra 606s and establishing one would take time. Otherwise the extra flats could turn into losses and increase the shrink percentage. Option three would be to try to increase the sales price, but the price competition in the area may limit that approach. The fourth option would be to try to decrease the ▶

Table 2. Pansy production costs for a deep 606 cell pack.

Number of Flats:	20,750				
Variable (Direct) Costs					
Item	**Amount**	**Type**	**Cost Each**	**Total Cost**	**Cost per Flat**
Plugs	747,000	384 cell plugs	$0.0505	$37,723.50	$1.818
Plastic Flat	20,750	Deep web flats	$0.2109	$4,376.18	$0.211
Plastic 606 insert	20,750	Deep 606 inserts	$0.1806	$3,747.45	$0.181
Label	124,500	One label per 6 pack	$0.0101	$1,257.45	$0.061
Substrate		Bulk bags (66 cubic feet)	$135.98	$10,701.63	$0.516
Fertilizer	16	Fertilizer bags (25# of 15-3-20 Pansy Blend)	$15.95	$255.20	$0.012
Insect Control					
Caterpillars	4.2	Ounces of Conserve (spinosad), 6 fl oz/100 gal. [1 spray application for each flat]	$2.66	$11.17	$0.0005
Caterpillars	11.2	Ounces of Dipel 3.2 ES (*Bacillus thuringiensis*), 16 fl oz/100 gal. [1 spray application for each flat]	$0.44	$4.93	$0.0002
Aphids	1.35	Ounces of Endeavor (pymetrozine), 4 fl oz/100 gal. [only applied once to 50% of the total flats]	$8.25	$11.14	$0.0005
Disease Control					
Cercospora leafspot	1.45	Junction (copper hydroxide + mancozeb), 2 lbs/100 gal.	$10.58	$15.34	$0.0007
Plant Growth Regulators	0.87	Quarts of Piccolo (paclobutrzol), 10 ppm [applied once to each flat]	$102.00	$88.74	$0.004
Labor for Transplanting					
Transplanting	652	Hours of time	$7.50	$4,890.00	$0.236
Flat Filling	63.8	Hours of time	$7.50	$478.50	$0.023
Subtotal Variable Costs (Direct Items and Labor)				**$63,561.22**	**$3.063**
Interest on Variable Expenses	(Total Variable Expenses x 5% interest * 0.10 years)			$3,178.06	$0.153
	Total Variable Expenses	$63,561.22			
	Interest (%)	0.5			
	Time (years)	0.1			
TOTAL VARIABLE COSTS				**$66,739.28**	**$3.216**
Fixed (Indirect) Costs					
Item	**Type**			**Total Cost**	**Cost per Flat**
Depreciation	Total depreciation for the operation. Includes all structures, trucks and equipment.			$14,250.00	$0.687
Overhead Operating Costs	Total fixed operating costs for the operation. Includes all taxes, utilities, fuel, office costs, mortgage, insurance, and delivery costs.,			$20,150.00	$0.971
Total Operation Labor	Includes grower, marketing and management labor.			$68,031.50	$3.279
TOTAL FIXED COSTS				**$102,431.50**	**$4.936**
TOTAL PRODUCTION COSTS				**$169,170.78**	**$8.153**
Shrink (Number Sold)	19,036	Loss Percentage [(Number Grown-Number Sold)/Number Grown]	8.3%	---	$0.734
TOTAL PRODUCTION COSTS (with shrink)				**---**	**$8.89**
REVENUE (Sales)	[Flat price calculated based on: (Sales / Number Flats Sold)]			**$147,000.00**	**$7.72**
NET PROFIT	[Flat profit calculated based on: (Net Profit / Number Flats Sold)]			**$(22,170.78)**	**$(1.17)**

shrink percentage, but factors such as weather and market conditions limit the ability of a grower to manage it. A fifth option is to increase the production of 1801s if the market can absorb them to offset the losses of the 606s. A sixth option is to calculate production costs for the entire firm and evaluate the distribution of fixed costs. Maybe a greater amount of the fixed costs should be shifted from pansies to the spring crop?

The overall question to ask: was it profitable for the operation to grow pansies? Reflecting back to the overall philosophy of the operation the answer is yes. The total profit of $72,164.53 from the 1801s was

greater than the loss of $22,170.78 with the 606s. The total profit with pansies was $49,993.75. The firm achieved their goal of covering fixed costs, preserving the profit from the spring season, and adding almost $50,000.00 to the bottom line.

This illustrates the importance of knowing each crops' profitability and its contribution to the firm's overhead expenses. Ideally a firm should calculate the production costs for all crops grown, evaluate the allocation of fixed costs, and determine profitability of each crop. Some crops may not be profitable, but if they contribute to covering the fixed costs or fill a void in the production mix to encourage buyers to purchase from you, then one may be required to grow them. The only way to properly evaluate an operation's profitability is to invest the time and energy into the calculations.

Using the methods outlined above will enable pansy growers to compare the profitability of their pansy crop. Of course costs will vary among greenhouses according to their amount of capitalization in equipment and structures and their ability to purchase inputs at lower costs. Therefore, each operation will need to calculate their specific production costs in order to determine their own profitability.

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