

ECONOMIC CONSIDERATIONS OF STARTING AN ORNAMENTAL ENTERPRISE

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Abstract. The financial feasibility of ornamental production was evaluated using a discounted cash-flow investment analysis procedure. Components of the analysis included the purchase of land, land improvements, capital purchases, ornamental production and marketing programs, financing, tax benefits, and appreciation of land. These factors were used to estimate the internal rate of return from ornamental production. The opportunity to utilize tax benefits and experience some level of real estate appreciation during the production period significantly contributed to making the ornamental investment profitable.

Ornamental production is an important segment of the Florida agricultural economy. Florida ornamental growers produced greater than \$362 million of ornamental products on slightly more than 15,000 acres during 1982. The farm value of ornamentals accounted for approximately 10% of Florida's agricultural income (5).

Deciding whether or not to invest in an ornamental production program is not a simple decision. Ornamental production involves some risk and a long-term commitment in land and capital investments. Planning a successful ornamental production program requires an individual to effectively combine the resources of land, labor, capital, and management.

This paper develops a format to evaluate the economic feasibility of producing ornamentals. The example analysis is specific to Florida conditions, but the format is structured so that ornamental production for other situations and locations can be evaluated.

Materials and Methods

An internal rate of return procedure was used to estimate the financial feasibility of an ornamental investment. Table 1 describes the inputs for the various capital expenditures, revenue and production cost estimates, yield, financing, and other related parameters associated with producing ornamentals. These estimates were projected over a 7-year planning horizon and used to develop after-tax profit and after-tax cash flow returns.

The after-tax profit and after-tax cash flow returns were used to calculate the internal rate of return on the ornamental project. The internal rate of return provides both investors and agricultural producers with a financial

measurement to determine if the investment is feasible based on individual profit objectives (1).

Capital requirements. The capital requirements for establishing an ornamental production program include expenditures for land, soil and water conservation practices, development, irrigation system, machinery and equipment, and structures. These capital expenditures are described in Table 2.

The total capital cost of establishing an ornamental operation in this analysis sums to \$203,850 for a 5-acre site

Table 1. Enterprise data requirements to evaluate a floricultural investment.

Land	
Year operation to begin	1985
Total price of land	\$30,000
Number of acres purchased	5
Number of productive acres	1
Total land clearing costs	\$1,000
Soil and water conservation	
Plow and root removal costs	\$300
Ditches and canals costs	\$300
Land leveling costs	\$300
Development	
Pipe and culvert costs	\$300
Installation costs	\$150
Irrigation	
Well (4-inch) costs	\$6,000
Pump costs	\$5,000
Pipe and materials costs	\$1,000
Capillary mat costs	\$5,000
Machinery and equipment	
Pickup	\$7,000
Tractor	\$7,000
Hydraulic sprayer	\$2,000
Trailer	\$2,500
Structures	
Greenhouse (1 acre)	\$132,000
Headhouse (1000 ft ²)	\$4,000
Financing information	
Interest rate	
Long term capital	12.5%
Operating capital	14.0%
Time use of funds	
Long term capital	10 years
Operating capital	6 months
Percentage of capital investment financed	50%
Income tax rate	25%
Annual percentage increase of operating costs	3%
Annual percentage increase of revenues	2%
Annual percentage real estate appreciation	4%
Production information	
Grower	\$20,000
Foreman	\$10,000

Plant	Pots	Market value/pot	Growing costs/pot
Poinsettias	16,727	\$3.25	\$1.95
Potted mums	14,050	2.50	1.10
Bedding plants	31,614	1.10	0.85
Caladiums	14,050	2.50	1.10
Hanging baskets	23,232	3.00	2.00

Table 2. Floricultural capital budget.

	Cost per productive acre	Total cost
Land	\$30,000	\$30,000
Land clearing	1,000	1,000
Soil & water conservation	900	900
Development	450	450
Irrigation	17,000	17,000
Machinery & equipment	18,500	18,500
Structures	136,000	136,000
Total capital costs	203,850	203,850

with a 1-acre greenhouse structure. Additional greenhouse structures on this site would increase the total capital cost, but capital cost per productive acre would decrease.

Production and marketing. Developing and regularly analyzing a production and marketing strategy for an ornamental operation is essential to maintain a profitable enterprise. The production and marketing objective selected in this paper was aimed at supplying ornamental plants for targeted holidays with slack periods used to produce commonly purchased plants.

The strategy for this analysis of an ornamental greenhouse operation included producing a crop of poinsettias for the Christmas holidays (1-15 Dec.), 4-inch potted bedding plants for mid-late February, 6-inch pot chrysanthemums for Easter, 6-inch pot caladiums for Mother's Day, and hanging baskets with annuals for summer sales.

The poinsettia crop would be started in late August and would occupy the entire greenhouse (16,727 pots on 15-inch centers). The 4-inch bedding plants would be started 1 Jan. and spaced on 10-inch centers involving 5/6 of the greenhouse (31,614 pots). Six-inch pot mums would be started pot-to-pot in the remaining 1/6 of the growing area (14,050 pots) to be moved to final spacing mid-late February as the bedding plants are sold. At the final spacing of the pot mums, 1/6 of the area would be available to start caladiums during the last week of February (14,050 pots) to be spaced on 15-inch centers after the Easter pot mums are sold. Ten-inch hanging baskets would be started in mid-May (11,616 baskets on benches with 18-inch spacing) to be sold by 10 July, and an additional group of hanging baskets (11,616 baskets) would be started that would mature by mid-late August.

The type of plants produced, quantity, market value, and growing costs are described in Table 1 (3, 4). Other production and marketing strategies may be evaluated simply by adjusting the product mix. In this analysis, growing costs and market value were indexed to increase annually at 3% and 2%, respectively.

Tax benefits. Recent changes in the tax treatment of investment property have had a favorable impact on agricultural developments (6). Presently, agricultural investors are allowed to expense or depreciate most capital investments against taxable income in a shorter time period, as well as receive investment tax credit on several of the capital outlays (6).

Currently, investment tax credit may be applied to the development costs of the ornamental production site, irrigation costs, machinery and equipment, and structures. Investment tax credit equal to 10 percent of the capital investments may be taken. The annual investment tax credit deduction, however, is limited to an individual's income

Table 3. Investment tax credit and depreciation schedules for floricultural capital assets.

	Year				
	1	2	3	4	5
Investment tax credit					
Development	\$ 450				
Irrigation	17,000				
Machinery & equipment	18,500				
Structures	136,000				
Total applicable	171,950				
Investment tax credit ²	17,195				
Depreciation					
Land clearing	1,000				
Soil & water conservation	900				
Development	68	99	95	95	95
Irrigation	2,550	3,740	3,570	3,570	3,570
Machinery & equipment	2,775	4,070	3,885	3,885	3,885
Structures	20,400	29,920	28,560	28,560	28,560
Total depreciation	27,693	37,829	36,110	36,110	36,110

²If the total investment tax credit may not be utilized in the year realized, it may be carried back 3 years or forward 15 years.

tax liability (as adjusted on line 20 of Form 3468), or to \$25,000 plus 85% of the tax that is more than \$25,000, whichever is less. Any unused investment tax credit deduction may be carried back to previous returns or carried forward to future tax returns. Tax advisors should be consulted to ensure the latest tax laws are implemented correctly and proper methods are used when multiple investors are involved.

Land clearing, soil and water conservation, development, irrigation system, structures, machinery and equipment capital expenses, and interest may be expensed against taxable income, as shown in Table 3. An income tax rate of 25% was assumed in this analysis. The treatment of the tax benefits is as follows:

(1) Land Clearing—The total deduction in any tax year cannot exceed \$5,000 or 25% of taxable income from farming, whichever is less, and the balance must be capitalized.

(2) Soil and Water Conservation—The total deduction during any tax year of expenditures of a capital nature for soil and water conservation is limited to 25% of gross income from farming during the year. These expenses were allocated during the first year in this analysis.

(3) Development—These capital costs are eligible for the 10% investment tax credit and depreciation. The following 5-year Accelerated Cost Recovery System (ACRS) was used: 15, 22, 21, 21, and 21% for 1st, 2nd, 3rd, 4th, and 5th year, respectively.

(4) Irrigation System—It is eligible for investment tax credit and depreciation (5-year ACRS) beginning the year of installation.

(5) Machinery and Equipment—They are eligible for investment tax credit and depreciation (5-year ACRS).

(6) Interest—Both operating and long-term capital interests are allowed to reduce taxable income.

Financing. The land purchase and capital expenditures incurred for establishing the ornamental operation (land clearing, soil and water conservation, development,

Table 4. Floricultural loan amortization schedule.

	Year						
	1	2	3	4	5	6	7
Capital outlay	\$101,925						
Annual payment	18,410	18,410	18,410	18,410	18,410	18,410	18,410
Annual interest	12,741	12,032	11,235	10,338	9,329	8,194	6,917
Annual principal	5,669	6,378	7,175	8,072	9,081	10,216	11,493
Remaining loan balance	96,256	89,878	82,703	74,631	65,550	55,333	43,840

Table 5. Projected floricultural capital budget, operating budget, tax benefits, and after-tax cash flow.

Item	Year						
	1	2	3	4	5	6	7
Capital							
Land	\$ 30,000						
Land clearing	1,000						
Soil & water conservation	900						
Development	450						
Irrigation	17,000						
Machinery & equipment	18,500						
Structures	136,000						
Net capital	203,850						
Operating budget							
Revenue	199,084	203,066	207,127	211,270	215,495	219,805	224,201
Growing costs	116,864	119,201	121,585	124,017	126,497	129,027	131,607
Labor costs	30,000	30,600	31,212	31,836	32,473	33,122	33,785
Interest, short-term	10,280	10,486	10,696	10,910	11,128	11,350	11,577
Interest, long-term	12,741	12,032	11,235	10,338	9,329	8,194	6,917
Net profit	29,200	30,747	32,400	34,169	36,069	38,112	40,315
After-tax profit	21,900	23,060	24,300	25,627	27,051	28,584	30,236
Tax benefits							
Depreciation	27,693	37,829	36,110	36,110	36,110	0	0
Tax benefit (dep.)	6,923	9,457	9,027	9,027	9,027	0	0
Investment tax credit	17,195	0	0	0	0	0	0
Tax benefit	24,118	9,457	9,027	9,027	9,027	0	0
Cash Flow							
After-tax profit	21,900	23,060	24,300	25,627	27,051	28,584	30,236
Tax benefit	24,118	9,457	9,027	9,027	9,027	0	0
Principal payment	5,669	6,378	7,175	8,072	9,081	10,216	11,493
After-tax cash flow	40,349	26,140	26,152	26,582	26,998	18,368	18,743

machinery and equipment, irrigation system, and structures) were financed assuming 50% of the capital investment would be available from lenders as shown in Table 4. The capital investment was financed at 12.5% per annum for a term of 10 years. The remaining 50% (\$101,925) of the capital investment was considered the initial investment (down payment) of the agricultural investor.

This financing arrangement represents only 1 alternative of many. There are several potential sources for financing as well as numerous financing arrangements, such as length and terms of the loan. Investors should evaluate additional financing alternatives to determine which arrangement is most beneficial.

Projected proforma budget. The projected proforma budget organizes the information and data presented for the ornamental production project into 1 table that allows the investor to easily review the investment project and evaluate how certain factors affect the after-tax profit and after-tax cash flow. This statement summarizes the timing and allocation of capital expenditures, revenues, costs, income taxes, interest, tax benefits, and after-tax cash flow, as presented in Table 5.

The results of Table 5, after-tax profit and after-tax cash flow, were used to determine the internal rate of return of this investment project. The after-tax profit less principal payment is the result of reducing revenues by the operating expenses, income tax liability at 25%, and the annual principal payment. The after-tax cash flow represents the sum of after-tax profit, tax benefits (at 25%), and investment tax credit less the principal payment.

Internal Rate of Return. Internal rate of return is one of the most widely used measures of return on investment projects. The internal rate of return is a form of discounted cash flow analysis where cash flows are discounted at the interest rate at which they exactly equal the present value of the initial investment (2). The cash flows in the internal rate of return method include the initial investment, periodic cash flows from the investment during the 7-year planning period, and the market value of the investment at the end of the investment period.

The internal rate of return analysis in this ornamental evaluation used 50% of the capital investment as the initial investment (\$101,925), after-tax profit less principal payment and after-tax cash flow data from Table 5, and the market value of the ornamental production site at the end

Table 6. Internal rate of return for a floricultural operation.

Period	After-tax profit less principal payment	After-tax cash flow
Initial investment	-\$101,925	-\$101,925
1	16,230	40,349
2	16,682	26,140
3	17,125	26,152
4	17,555	26,582
5	17,970	26,998
6	18,368	18,368
7	13,433	13,433
Internal rate of return (%)	3.69	19.40

of the planning horizon (7-years). The market value at the end of the seventh year was estimated to total \$39,478 (4% annual real estate appreciation). After-tax, the value amounts to \$35,530, less the remaining loan balance of \$43,840 (includes all capital improvements). Obviously, since the value of the ornamental site after taxes on the capital gains is less than the remaining loan balance, some of the after-tax profit will be needed to pay off the remaining loan balance. Should the planning period be longer or the capital investments be smaller, then less after-tax profit would be needed to repay the remaining loan balance.

The distinguishing factor between the internal rates of return for the after-tax profit less principal payment and after-tax cash flow is the tax benefits. The tax benefits were included in the after-tax cash flow internal rate of return estimate. The evaluation assumes the individual can use these benefits in the proposed ornamental investment project or from outside income. The after-tax profit less principal payment was used to provide the investor with an internal rate of return estimate for the investment, ignoring tax benefits. In other words, this estimate is the internal rate of return on the investment in the event that the tax benefits could not be utilized.

Results and Discussion

The decision to implement an ornamental production program should be based on whether the investment meets the investor's profit objectives. The evaluation of the ornamental project presented in this analysis uses the internal rate of return as a financial measurement that allows individuals to determine whether an investment meets the de-

sired level of return and to compare this investment with other investment opportunities, as shown in Table 6.

For instance, the internal rates of return generated in the example in this paper were 3.69% and 19.40% for after-tax profit less principal payment and after-tax cash flow, respectively. These internal rates of return may be used to compare with annual percentage rate (APR) earned on certificates of deposits (savings certificates) and other investment alternatives provided they account for tax considerations and length of time. Given the example situation and assuming the investor could use the tax benefits, he would choose an investment that would meet or exceed the after-tax cash flow internal rate of return of 19.40% on the ornamental project. If the investor could not use the tax benefits, then this individual would choose an investment that would meet or exceed the after-tax profit less principal payment of 3.69% on the ornamental project. In this situation, the comparison of the after-tax profit less principal payment internal rate of return of 3.69% with a certificate of deposit that could earn an after-tax profit internal rate of return of greater than 3.69% (>4.92% APR at 25% tax rate) would result in the ornamental investment project being rejected.

Interested growers and investors using an ornamental investment analysis procedure before committing capital will likely be more aware of how certain production factors affect profitability and make more informed decisions. The time spent in prior planning and investment analyses costs much less than discovering a certain project will not work after capital is committed.

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ELECTRONIC SPREADSHEET FOR WOODY ORNAMENTAL NURSERY BUDGETING

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Abstract. A flexible budget procedure was developed using an electronic spreadsheet template to allow nursery managers to

calculate per unit costs of production. The method permits the user to compensate for losses and idle nursery space as well as variable lengths of time in production. The budget provides management data for decision-making such as which nursery species or container size to produce and guidelines for cost-based pricing. An example, using 1984 Nursery Business Analysis data, was developed.

Essential formulae for the spreadsheets are presented using VisiCalc, which is "upwardly transportable" or adapted for other types of spreadsheets.

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