

From the Business Conception to the Bank: Application of Interactive model in Estimating the Financial Feasibility of Wet land Taro

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Abstract. The main objective is to provide investors and other existing farms with an accurate method for estimating the financial feasibility for agribusiness in Hawaii, customized to their farm operation and financial analysis to help banker access its profitability. This project provides an easy way to estimate the economic feasibility of starting agribusinesses or other enterprises. An innovative interactive model has been developed to estimate the financial feasibility of starting agribusiness projects. Data on the cost of establishing a business is entered into the webpage, then the model estimates the Pro forma Income Statement, Pro forma Balance Sheet, Cash Flow Statement, and conducts some financial analyses that are needed to approve a loan. This model can be used to conduct feasibility analyses and look at the profitability of the business by changing some or all of the assumptions in estimating the profitability simultaneously.

The model is published in our website, HawaiianAgriculturalProducts.com, allowing agribusiness owners to access to the model as well recognize the other benefits of using the website in marketing and obtaining other information. The model and the website could be duplicated by other universities as a model to serve their community.

Keywords, interactive, economic, feasibility, taro, hawaiianagriculturalproducts.com

1. Introduction

The purpose of this project is to develop interactive financial feasibility of taro cut flower farms in Hawaii. The main objective is to provide investors and other existing farms with an accurate method for estimating the financial feasibility of producing wet land taro (*Colocasia esculenta*), customized to their farm operation and financial analysis to help banker access its profitability. The software is located at the website www.hawaiianagriculturalproducts.com, under the taro economic feasibility. This website provides convenient and fast methods in accessing the viability of growing wet land taro. It can be used for planning new Taro farms and expanding the existing operation. It can also be used for various managerial decisions, such as sensitivity analysis, annual evaluations and farm budgeting.

II. Methodology and Cost Assumptions

Production coefficients are estimated based on the information provided by the growers surveyed and validated with researchers at CTAHR and previous publications. These coefficients are kept constant in estimating the production function equation. The costs of these coefficients are variable, and vary with size, and inflation rate. The program allows individuals to enter their value in inputs sheet; and is written to enter these values in the production function and calculate their total cost. These variables such as labor cost per plant, fertilizer cost per plant, chemical cost per plant, plants per SF, packaging material cost per plant, pot cost per plant, and media cost per plant etc are given in Figure 1. Other fixed cost such as establishment cost, depreciation, administrative salaries is treated as fixed cost but vary with given size of operation.

Coffee
Fish
Fruit
Nursery
Flowers
Orchids
Anthuriums
Processors
Jelly and Jam
Woodwork
Variety
Economic Analysis
Orchids
Anthuriums
Beef
Taro
Iea
Hawaii Home Health Care Coop Demo
Publications
Interactive Cost of Production for Extension and Teaching
The Attitudes of Hawaii Consumers Toward Genetically Modified Fruit
Feasibility of e-Commerce Cooperative
Food and Agricultural Science and Education Exhibition/ Reception Exhibit Description

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The existing default data represents the average.

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Units

Currency Type 1.00 = US\$1

Farm Size in Production acres

Infrastructure (banks, waterways, etc.) acres

| Taro Type | Percent | Time from planting to harvest | Avg. length of harvest period | Avg. length of fallow and land preparation |
|------------|------------------------------------|---|---|--|
| Maui Lehua | <input type="text" value="100"/> % | <input type="text" value="9.0"/> months | <input type="text" value="1.0"/> months | <input type="text" value="2.0"/> months |
| Moi | <input type="text" value=""/> % | <input type="text" value=""/> months | <input type="text" value=""/> months | <input type="text" value=""/> months |
| | <input type="text" value=""/> % | <input type="text" value=""/> months | <input type="text" value=""/> months | <input type="text" value=""/> months |
| | <input type="text" value=""/> % | <input type="text" value=""/> months | <input type="text" value=""/> months | <input type="text" value=""/> months |

Plant population per acre

Average weight of product per plant per cycle pounds

Fuel cost per gallon

Poi factory price per pound

Percentage of product sold to poi factories %

Wholesale market price per pound

Percentage of product sold to wholesalers %

Farmers' market price per pound

Percentage of product sold at farmers' markets %

Annual Land Lease Cost per acre

Equity to Total Assets Ratio
Owner investment divided by total investment

Hourly Wages

Management Salaries

Fringe Benefits %

Workers' Comp %

Wage Raise Rate %

Inflation Rate %

Interest Rate %

Loan Length, Years

| | Quantity | Cost Per | Life Expectancy, years |
|--------------------------------------|--------------------------------|------------------------------------|---------------------------------|
| Packing Shed and Office, square feet | | <input type="text" value="125"/> | <input type="text" value="30"/> |
| Tractor | <input type="text" value="1"/> | <input type="text" value="30000"/> | <input type="text" value="20"/> |
| Bobcat | | <input type="text" value="10000"/> | <input type="text" value="20"/> |
| Truck/Van 1 | <input type="text" value="1"/> | <input type="text" value="15000"/> | <input type="text" value="10"/> |
| Truck/Van 2 | | <input type="text" value="15000"/> | <input type="text" value="10"/> |
| Truck/Van 3 | | <input type="text" value="15000"/> | <input type="text" value="10"/> |
| Truck/Van 4 | | <input type="text" value="15000"/> | <input type="text" value="10"/> |
| Other Trucks/Vans | | <input type="text" value="0"/> | <input type="text" value="10"/> |
| Front Loader | | <input type="text" value="15000"/> | <input type="text" value="10"/> |
| Golf Cart | | <input type="text" value="1000"/> | <input type="text" value="10"/> |
| Trailer | | <input type="text" value="1500"/> | <input type="text" value="10"/> |
| Regular Sprayer | | <input type="text" value="1200"/> | <input type="text" value="5"/> |
| Truck Sprayer | | <input type="text" value="10000"/> | <input type="text" value="10"/> |
| Trailer Sprayer | | <input type="text" value="1200"/> | <input type="text" value="10"/> |

Figure 1. : Physical Inputs Needed its Cost to Calculate the Financial Feasibility

III. Application of the Model

3.1 Capitalization Cost

The following assumptions were made:

- Price of inputs remained constant
- Amount used per acre is liner related to the size
- Simple interest rate is used by the end of the accounting period.
- Jump start of operation is one year to complete the development
- No payment is required in the fist year of operation
- 100% of the project is financed through financial institutions.

Table 1 shows the capitalization cost for 4 acres taro farm. Individual can calculated the capitacion cost for different size of operation. The total establishment cost for 4 acres taros amounted to about \$44,200, \$14,700 per acre and \$0.34 per square foot

Table 1. Capitalization cost for 3 acres taro farm.

| | <i>Per Square Foot</i> | <i>Per Acre</i> | <i>Farm Total</i> |
|----------------------|------------------------|-----------------|-------------------|
| Land Clearing | 0.11 | 5,000 | 15,000 |
| Initial Plants Cost | 0.22 | 9,700 | 29,200 |
| Capitalization Total | 0.34 | 14,700 | 44,200 |

3.2 Profitability Analysis in the Next Five Years of Operation

The following assumptions were made:

- Average farm size of 3 acres was used (Statistics of Hawaiian Agriculture 2003)
- 3% inflation rate annually.
- 3% wages and salaries increase annually.
- Interest rate is 10%, the same as the present interest in 2007for financing fixed assets.
- The average hourly wage paid is \$8.50 for unskilled workers
- The health insurance, sick leave, paid vacation and other fringe benefits are calculated at 30% for full time workers only. Part-time and non member will not received fringe benefits.
- Capital expenditure depreciates at 10 years period.
- Workers' Compensation at 3%.

Table 2 lists the annual costs and return associated with producing cut taro for 3 acres farm. The gross sales amounted to \$135,700 in the First Year of operation and will reach \$152,700 in the fifth year of operation. The total variable cost amounted to \$18,300 in the first year of operation and will reach \$106,700 in the fifth year. The earning before taxes from operation amounted to \$12,000 and will reach \$30,900 in the fifth year of operation. (for more detailed analysis visit our website hawaiianagriculturalproducts.com)

Table 2. Pro Forma Profit and loss in the First Five Years of operation

| | <i>Year 1</i> | <i>Year 2</i> | <i>Year 3</i> | <i>Year 4</i> | <i>Year 5</i> |
|-----------------------------------|---------------|---------------|---------------|---------------|---------------|
| Total Revenue | 154,000 | 158,600 | 163,300 | 168,200 | 173,300 |
| Total Variable Costs | 18,300 | 18,800 | 19,400 | 20,000 | 20,600 |
| Gross Margin | 135,700 | 139,800 | 144,000 | 148,300 | 152,700 |
| Total Fixed Costs | 96,500 | 99,000 | 101,500 | 104,000 | 106,700 |
| Earning Before Interest and Taxes | 39,100 | 40,800 | 42,500 | 44,200 | 46,000 |
| Interest Cost | 27,100 | 25,700 | 22,700 | 19,100 | 15,100 |
| Earning Before Taxes | 12,000 | 15,000 | 19,800 | 25,100 | 30,900 |

3.3. Pro-forma Balance Sheet

The following assumptions are used to come with balance sheet:

- The account receivable represents one month of the total annual revenue.
- Accrual methods is used to estimate of the profitably of the business, we applied all net income to the payment of the loan.
- Depreciation on capital expenses is 10 years.
- For simplicity, no interest is paid on saving accounts.
- One month collectable rate is used to estimate the account receivable.

Table 3. Pro-forma Balance Sheet for Three Acres Farms

| | <i>Year 0</i> | <i>Year 1</i> | <i>Year 2</i> | <i>Year 3</i> | <i>Year 4</i> | <i>Year 5</i> |
|---------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Cash | 0 | 1,000 | 600 | 200 | 1,000 | 600 |
| A/R | 0 | 12,800 | 13,200 | 13,600 | 14,000 | 14,400 |
| Total Current Assets | 0 | 13,800 | 13,800 | 13,800 | 15,000 | 15,000 |
| Net Fixed Assets | 339,200 | 323,400 | 307,700 | 291,900 | 276,200 | 260,400 |
| Total Assets | 339,200 | 337,200 | 321,500 | 305,700 | 291,200 | 275,400 |
| Loans | 271,300 | 257,400 | 226,600 | 191,000 | 151,300 | 104,700 |
| Equity Investment | 67,800 | 67,800 | 67,800 | 67,800 | 67,800 | 67,800 |
| Retained Earnings | | | 12,000 | 27,100 | 46,900 | 72,000 |
| Net Profit | | 12,000 | 15,000 | 19,800 | 25,100 | 30,900 |
| Total Equity | 67,800 | 79,800 | 94,900 | 114,700 | 139,800 | 170,700 |
| Liabilities and Net Worth | 339,200 | 337,200 | 321,500 | 305,700 | 291,200 | 275,400 |

To establish taro farm a loan of \$339,200 plus interest is needed, this include establishing cost and running the farm in initial year. There is no revenue is generated the zero year of operation.

3.4 Cash Flow Projection for the First Five years of Operation

The cash flow is calculated base in the following assumptions:

- Interest rate is 10%
- Equal principle

Table 4. Cash Flow Projection for the First Five years of Operation

| | <i>Year 1</i> | <i>Year 1</i> | <i>Year 2</i> | <i>Year 3</i> | <i>Year 4</i> | <i>Year 5</i> |
|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Cash from Services | 0 | 141,100 | 145,400 | 149,700 | 154,200 | 158,800 |
| From Account Receivable | | | 12,800 | 13,200 | 13,600 | 14,000 |
| From Loan | 271,300 | 0 | 0 | 0 | 0 | 0 |
| Total Cash | 271,300 | 141,100 | 158,200 | 162,900 | 167,800 | 172,900 |
| Operating Expenses | 4,700 | 99,100 | 102,000 | 105,100 | 108,300 | 111,500 |
| Loan Principle | | 33,900 | 33,900 | 33,900 | 33,900 | 33,900 |
| Interest | | 23,700 | 20,300 | 17,000 | 13,600 | 10,200 |
| Total Cash Disbursement | 4,700 | 156,700 | 156,300 | 156,000 | 155,700 | 155,600 |
| Cash Balance | 266,700 | -15,600 | 1,900 | 7,000 | 12,100 | 17,300 |

Positive Cash flow accrues in the 2nd year of operations and will continue years after.

3.5 Loan Analysis of Taro Farm Operations

In order to assess the financial feasibility from the lending institution and investors point view, the model also provides additional financial analysis. These are debts service, collateral, and cash coverage, outstanding loan and collateral coverage. Income before interest, taxes, depreciation was used. Debt service cost (interest charges) is calculated at given interest rate (10.00%), cash conversion ratio is calculated by dividing EBITDA by debt service. The collateral used her is the 90% account receivable of the pervious year earning. From the above the financial institution will requires investor to come with past of equity to finance such venture.

Table 5. Loan Analysis of Taro Farm Operations

| <i>Year</i> | <i>Year 1</i> | <i>Year 2</i> | <i>Year 3</i> | <i>Year 4</i> | <i>Year 5</i> |
|-----------------------|---------------|---------------|---------------|---------------|---------------|
| EBITDA | 54,900 | 56,500 | 58,200 | 60,000 | 61,800 |
| Debt Service | 49,400 | 49,400 | 49,400 | 49,400 | 49,400 |
| Cash Coverage | 1.11 | 1.14 | 1.18 | 1.21 | 1.25 |
| Collateral | 9,600 | 9,900 | 10,200 | 10,500 | 10,800 |
| Principal Outstanding | 257,400 | 226,600 | 191,000 | 151,300 | 104,700 |
| Collateral Coverage | 0.04 | 0.04 | 0.05 | 0.07 | 0.1 |

Table 6. Payoff period for Four Acres Taro Operation

| | <i>Year 1</i> | <i>Year 2</i> | <i>Year 3</i> | <i>Year 4</i> | <i>Year 5</i> |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Loan Due, Beginning | 271,300 | 257,400 | 226,600 | 191,000 | 151,300 |
| Interest | 27,100 | 25,700 | 22,700 | 19,100 | 15,100 |
| Total Revenue from the Operation | 154,000 | 158,600 | 163,300 | 168,200 | 173,300 |
| Expenses Excluding Depr. & Interest | 99,100 | 102,000 | 105,100 | 108,300 | 111,500 |
| Loan Due | 257,400 | 226,600 | 191,000 | 151,300 | 104,700 |

IV. Conclusion

The software for cost of production and financial feasibility for cut taros has been developed, and is located at the website, www.hawaiianagriculturalproducts.com, and can be modified to include other horticultural commodities. This will provide a convenient and fast method for estimating the cost of production. The growers need to be trained to use this site as part of a farm management training program that can be conducted statewide.

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References

1. HAWAII AGRICULTURAL STATISTICS SERVICE. (2003). *Statistics of Hawaii Agriculture 2003*. Hawaii Department of Agriculture, Honolulu, HI.