



Business Planning and Economics of Cranberry Bog Establishment and Cost of Production in Nova Scotia

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Introduction

Nova Scotia is recognized by Canada and the world as an area with ideal climatic conditions for growing cranberries. With this increase in awareness of Nova Scotia as a cranberry growing region, there is also increased interest in the production of cranberries. To be successful at growing cranberries in Nova Scotia it is imperative that sound business decisions are made from the initial planning through the harvest, marketing and sale of the fruit. There is a substantial capital investment required for the establishment of a commercial bog and it takes many years to recover the costs associated with this investment. It is essential for financial success that the bog be operated as a business enterprise, paying great attention to detail in both production and financial management.

The Nova Scotia Industry

Nova Scotia is well suited to the production of cranberries. Wild, “native” cranberries are widely distributed across the Province, indicative of the general suitability of climatic conditions for this crop. Cranberries have been grown commercially in Nova Scotia for more than 100 years. Today, our cranberry industry is comprised of approximately 17 growers with 200 acres in production, with 280 acres in total. Most cranberry production in Nova Scotia is currently grown for the fresh market with the remaining crop used for processing.

Objectives

The purpose of this report is to provide individuals interested in the production of cranberries a guide to the development of a plan and an understanding of the costs associated with the establishment and operation of a commercial cranberry bog. This report reflects the management practices of growers in Nova Scotia at the present time and the current economic conditions that can influence the establishment and operating costs. The costs in this document represent an average scenario and the expenses will vary depending on the grower and the site.

Methods and Procedures

The information presented in this report was gathered through economic reports from other cranberry growing regions in Canada, online and printed resources, and discussions with Nova Scotia growers, specialists and agribusinesses.

Overview of Bog Establishment

“In the cranberry growing business returns are a function of costs (capital and operating) and revenue, which is a function of yield, price and quality.”

The costs associated with establishing and operating a cranberry bog can vary from site to site and from operator to operator due to the significant cost of land preparation, labour, machinery and materials. During the initial years of bog establishment, the main costs at play are the capital costs such as the land preparation, machinery purchases/rentals, labour, vines and interest on debt. There is significant variation in the cost of land preparation depending on the need for land clearing and leveling. A new grower or someone considering entry into cranberry production must carefully consider the advantages and disadvantages of the site and variety selection because these decisions will have a significant impact on the profitability of the planting.

Just knowing the establishment and production costs is not enough to make an educated decision whether to undertake cranberry production as a business or not. The individual must give consideration to the potential for profitability which is directly related to yield and price. Yield is a function of site selection, sanding, and management, to name a few. The price you can achieve for your crop is determined by the current market and quality, therefore the price is a function of your ability to grow and market a quality product. Cranberry packers in Nova Scotia are interested in marketing a premium quality cranberry and are very interested in securing the highest quality cranberries.

Bog – Site Selection

The success of a cranberry bog is directly related to the management of the crop and the site itself. A site that has been poorly selected can result in limitations to the long term financial viability of the operation, regardless of how skilled the manager is.

Cranberry bogs can be constructed in two different settings: natural and man-made. A natural cranberry bog is constructed on peat bogs or organic soils, however peat bogs are considered wetlands and environmental approval is required before proceeding with development. This process can be very costly, thus influencing producers to develop bogs on mineral soils, called uplands. These bogs are designed to mimic a wetland environment, including the ability to hold a flood as required for harvest and/or winter protection.

Regardless of the type of setting used to construct the cranberry bog, each site should have the following characteristics:

1. An abundant supply of fresh water, used for irrigation, frost protection, wet harvesting and winter flooding.
2. Access to a reliable source of sand, used to ensure rapid water movement through the upper soil level and prevent water “ponding” on the bed surface.
3. The ability to hold flood water for wet harvesting of cranberries and winter protection of the vines.
4. The site topography should be as level as possible, with a slope no greater than two per cent.

Cranberry Varieties

Varieties suitable to the area and currently being grown in Nova Scotia include:

- Stevens (approximately 60% of all cranberry acreage)
- Ben Lear
- Bergman
- Early Black
- Pilgrim
- Howes
- Grygleski
- HyRed (the first acreage being planted in 2010)

Establishment and Cost of Production Assumptions

- Year 1 is the pre-planting year
- All loans are borrowed at a fixed rate of 5.5% for 25 years (based on current market conditions)
- Land preparation costs – a pasture state prior to planting
- The cost of land is excluded from the analysis
- The land is cleared and has a slope of 2% or less
- Accounting, legal, office, and general maintenance are not included
- Approximately 10” of sand is used; more if peat moss is not used
- Large farms use a wet harvest, small farms use a dry harvest method



Costs and Returns of Cranberry Production

Variable Costs

Variable costs are those costs that change directly with an increase or decrease in acreage. Vines, pond construction, pesticides, fertilizers, and labour are all examples of variable costs.

Fixed Costs

Fixed costs or overhead costs do not change as a result of an increase or decrease in acreage. Examples of fixed costs include machinery purchases and taxes.

Year 1: Pre-planting Costs

In the year prior to planting the vines, the selected location will require dykes, bed and pond construction, followed by water control structures (i.e. flumes), irrigation and pump house installation. (The overburden from bed leveling and the material from peripheral ditching are used in the dyke construction.) It is in this year that there is a requirement for a significant infusion of cash into the bog.

Table 1: Pre-Planting Year 1 Costs

	Large Farm Cost/Acre	Small Farm Cost/Acre
Establishment Costs		
Construction of Pond	\$5,160	\$5,160
Irrigation and Pump House	\$7,090	\$7,090
Heavy Equipment at \$115/hr	\$9,840	\$9,840
Sand - 1400 yards at \$4/yard	\$5,600	\$5,600
Peat Moss - 475 yards at \$12/yard	\$5,700	\$5,700
Other Miscellaneous	\$4,000	\$4,000
Total Establishment Costs	\$37,390	\$37,390
Fixed Costs		
Interest and Depreciation Tractor and Equipment	\$872	\$224
Taxes	\$28	\$28
Total Fixed Costs	\$900	\$252
Total Cost for Preplanting Year	\$38,290	\$37,642

Year 2: Planting Year Costs

The planting year also requires a considerable amount of cash into the bog. The cost of the vines is a significant portion of the cost in the planting year, making up over sixty per cent of the total costs.

The labour expense will vary depending on the amount of labour you need to hire, the availability of the labour, and the wage expected by the labour pool available to you at the time of the planting. If you are using your own labour and family labour, it is important to remember that even if you are not using cash to pay for it directly it still has a value and the value should be accounted for in all financial projections.

Table 2: Year 2 Planting Year Costs

	Large Farm Cost/Acre	Small Farm Cost/Acre
Establishment Costs		
Planting Costs	\$1,500	\$1,500
Vines - 2 tonnes at \$4000/tonne	\$8,000	\$8,000
Fertilizer	\$1,440	\$1,440
Pesticides	\$435	\$435
Labour	\$495	\$495
Total Establishment Costs	\$11,870	\$11,870
Fixed Costs		
Interest and Depreciation Tractor and Equipment	\$872	\$224
Taxes	\$28	\$28
Total Fixed Costs	\$900	\$252
Total Cost for Planting Year	\$12,770	\$12,122

Year 3: First Harvest Year

In the third year of establishment, the bog will begin to yield some return. In the first year of harvest, one should expect to receive only 10 to 20% of a full yield.

Table 3: First Harvest Year Costs

	Large Farm Cost/Acre	Small Farm Cost/Acre
Variable Costs		
Fertilizer	\$1,440	\$1,440
Pesticides	\$435	\$435
Bees @ \$125/Hive	\$250	\$250
Purchases	\$158	\$158
Labour	\$825	\$825
Maintenance & Repairs	\$105	\$105
Fuel/Oil/Electricity	\$570	\$570
Pruning	\$100	
Sanding	\$1,500	\$1,000
Tissue Sampling	\$22	\$22
Consulting Fees	\$45	\$150
Labour - Harvest	\$165	\$255
Total Variable Expenses	\$5,615	\$5,210
Fixed Costs		
Interest and Depreciation Tractor and Equipment	\$872	\$224
Taxes	\$28	\$28
Total Fixed Expenses	\$900	\$252
Total Costs	\$6,515	\$5,462

Year 4 and Beyond: Production Years

In year 4 and beyond, the total costs are the same as year 3 with the exception that under the variable costs, pruning is only done every other year for the large farm and sanding is done every three years for both the large and small farm. The bog should reach a full mature yield at approximately year 7.

Treatment of Establishment Costs

The establishment of a bog requires that a grower manage two successive years of establishment costs prior to any revenue being received. In order to evaluate the bog enterprise it is often necessary to accumulate the establishment costs until such time as a crop is harvested and revenue is received. In order to do this, the establishment costs in each of the two years along with their respective interest charges are accumulated to the third year using an interest rate of 5.5% compounded annually. The total compounded amount represents the cost of establishment per acre of bog that is to be repaid over a period of years of harvesting.

Table 4: Establishment Costs Per Acre

Yearly Costs	Cost/Acre
Pre-planting Costs - Year 1	\$37,390
Planting Costs - Year 2	\$11,870
Total Cost of Establishment	\$49,260
Compounded Interest	\$4,766
Compounded Amount	\$54,026
Interest Rate	5.50%
Term	25
Yearly Payment	\$4,028

To maintain a straightforward approach to production costs, it is necessary to assume constant costs and returns for each of the successive harvest years. It is for the same reason that the total compounded cost of establishment is amortized and the repayment of these costs is divided equally over the harvest years. By assuming that the establishment of the bog increases the asset value of the land, the grower is able to depreciate the costs annually over a defined number of years of actual harvesting.

Table 4 above shows the amortization of the total two year establishment cost over a 25 year period, at an interest rate of 5.5%.

Revenue

With the production of cranberries, the revenue or return on the investment does not begin until the third year, however, it is not until year 7 that a grower should expect the bog to be mature and to produce a full yield. On average, a grower practicing best management practices in Nova Scotia should expect a mature yield to be approximately 175 barrels per acre for wet harvesting and 150 barrels per acre for dry harvesting.

The price that a grower receives for the cranberries produced is a function of the current world prices (demand). The fluctuation in world prices causes a fluctuation in the prices the producer receives. It is important that the grower understand there is a correlation between demand and price.

Contribution Margin

The contribution margin is the difference between the revenue generated and the expenses used to generate the revenue. The contribution margin must provide funds to cover the other expenses, such as the overhead, loan payments, and capital expenses. The contribution margin of a mature bog is dependant on the price received for the cranberries, which is a function of the demand and quality of the berry.

The table below shows the average contribution margin per acre. The contribution margin was averaged because pruning and sanding are not done in the same years, therefore the variable costs and contribution margin are not the same every year.

Table 5: Price and Contribution Margin

	Large Farm	Small Farm
Price/Barrel	Average Contribution Margin Per Acre	Average Contribution Margin Per Acre
\$40/Barrel	\$2,335	\$1,457
\$50/Barrel	\$4,085	\$2,957
\$60/Barrel	\$5,835	\$4,457
\$70/Barrel	\$7,585	\$5,957
\$80/Barrel	\$9,335	\$7,457

Breakeven Analysis

From Table 6, it can be easily seen that the price received for the crop and the requirement for financing the establishment of the bog both have a significant impact on the number of years it takes to breakeven on the bog enterprise. If the farms receive no financing for the establishment costs and the price of cranberries is low (\$40/barrel), then the breakeven period will be greater than 25 years. If the price of cranberries is high (\$80/barrel), then the breakeven year will be 11 or 12 years.

If the farms do receive financing for the establishment costs and the price of cranberries is low, then the farms will never breakeven; they will only be accumulating debt. If the price of cranberries is high, then the breakeven year will be between 19 and 25 years, depending on the size of the farm. If the price remains somewhere between \$80 and \$60 a barrel, the breakeven period will be between 11 and 25 years, respectively.

In most cases, the farmer will not have the cash flow to cover the establishment costs. The less the farmer needs to borrow and the higher the price of the crop, the shorter the breakeven period. This means that the amount of financing required for the establishment of a bog is positively related to the length of the breakeven period, however the price received for the crop is inversely related to length of the breakeven period.

It should be noted that Table 6 represents estimates of breakeven years based on a stable price. The price of cranberries is very volatile and unlikely to remain the same over the life of the bog.

Table 6: Breakeven Analysis Per Acre

Financing	Farm Size	Price/Barrel \$40	Price/Barrel \$60	Price/Barrel \$80
No	Large Farm	> 25 years	16 years	11 years
	Small Farm	> 25 years	18 years	12 years
Yes	Large Farm	Never	> 25 years	19 years
	Small Farm	Never	> 25 years	25 years

Conclusion

From the information presented in this report, it has been shown that there is a significant investment of money required for the establishment of a cranberry bog in Nova Scotia. The growing of cranberries requires growers to pay close attention to both the production and financial details in order to ensure the crop has adequate yield and quality and to provide a return on the investment. If the establishment of the bog does not require external financing, there is considerably less pressure on the finances, and the breakeven on the investment will occur much sooner, as seen in Table 6.

Careful planning prior to establishment and close attention to detail during production are essential for the successful production of cranberries in Nova Scotia.

Business Planning Resources for Establishment of a Cranberry Bog

There are a number of useful resources available to individuals wishing to establish a cranberry bog in Nova Scotia, many of which are available by contacting one of the following:

Nova Scotia Department of Agriculture, Business Development and Economics
<http://www.gov.ns.ca/agri/bde/>

AgraPoint
<http://www.agrapoint.ca>

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