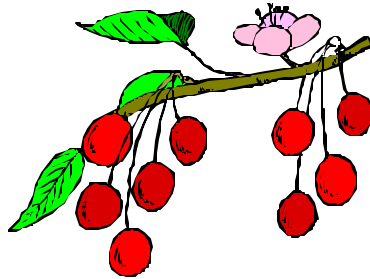

Cranberry Grower's Planning Handbook



Charting a Business Course Under Adversity

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Massachusetts cranberry growers are currently grappling with depressed prices brought on by a national surplus. Virtually all growers are operating at a loss, although there is a wide range among growers in terms of how large the loss is. Future prospects for cranberry farming are, to the say the least, quite uncertain.

The purpose of this report is to assist growers in analyzing their own situation and ultimately developing their own plan for the future. Each grower must ultimately chart his/her own course through this very uncertain future.

Key Points

- ◆ Forget about trying to predict the future price of cranberries. No one can tell you when and how much prices will improve. Look at your relative efficiency in relationship to the rest of the industry. There is going to be attrition among growers. Evaluate your situation under a variety of price scenarios and consider your chances for success based on your own cost structure.
- ◆ Decide if you are in for the long haul or ready to exit from growing cranberries. This is more an attitudinal or emotional exercise than a financial decision. Do you plan to stick it out regardless of the future price? Answering this fundamental question will help you through the rest of the decision process.
- ◆ Yield per acre is the key driver of profitability. Industry information indicates that yields affect profit much more than per acre costs. While some variation in yield relates to production management practices, varietal selection is the major factor. This means that **replanting to new higher-yielding varieties must be considered as a method of improving your competitive position.**
- ◆ Cranberry farm size is the second most important factor. If you are a full-time grower dependent on your operation for your family living, you must evaluate your size with an eye to the future. Under most circumstances, a minimum of 60 acres will be needed to support a family unit.
- ◆ Size alone will not guarantee financial success. If you can't produce cranberries consistently at the industry average (\$22-25) per barrel cost or less, getting bigger probably will not help. Keep in mind that other Massachusetts growers are not the only competition. The market has become global and other areas are growing cranberries with similar per acre input costs and higher yields.
- ◆ Cost of Production, Capital Investment, Debt Load and Structure, Risk Tolerance and Quality of Life are all critical to your decision process.
- ◆ Have a clear understanding that your industry is going to evolve and restructure. The number of growers will be reduced significantly as consolidation occurs in the industry. Surviving operations will tend to become larger and some marginal acreage will be abandoned. Supply and demand does eventually work! Cranberry acreage has increased by 25% since 1994 and national production is up even more. Prices will not recover until production decreases and/or consumption increases. Neither of these will happen overnight. There will be

casualties along the way. It is better to control your destiny by identifying your strengths and weaknesses, making a plan and then taking action.

- ◆ Massachusetts' cranberry yields have been consistently below the U.S. average since 1993. Prior to 1993, they were frequently above the national average. Wisconsin's higher yielding and new acreage places Massachusetts at a serious competitive disadvantage. Cost per barrel must be brought down to stay in the game.
- ◆ Evaluate individual expense items based on their impact on yield and quality. Look at the expenses where there is the greatest variation among growers. These are the areas where tighter control can reduce costs without reducing yields and revenues. First areas to consider are labor, gas, fuel and oil, supplies and miscellaneous expenses. These 5 items represent over 50% of the typical growers' expenses.
- ◆ The time has arrived to think "out of the box". Growers must find low-cost, practical ways to improve production and renovate. This may mean putting time-honored production practices behind and focusing on Profit Maximizing Strategies in place of Best Management Practices. All aspects of the business, from traditional renovation and sanding practices to thresholds for IPM decisions, must be reevaluated with current conditions in mind.
- ◆ Growers will have to more actively participate in rebuilding cranberry markets through their industry groups and processors/handlers/cooperatives. Devote personal time and resources to improving marketing and product development.
Investigate ideas that have worked for other industries such as check-off promotions (Got Milk? Pork – the other white meat, etc.) Increasing sales is the most appealing answer to the current oversupply. Low prices put a lot of pressure on individual growers to increase production in order to cover cash flow. Greater involvement in marketing may become a requirement for success. Sending out truckloads and waiting for the check makes growers "price-takers".

How to Use this Report

You have just read the **Key Points** summary. It puts all of the issues on the line that you as a farm businessperson face. The remainder of this report is intended to give you more detail as to how these conclusions were reached and to provide tools for analysis of your own farming operation.

This report initially looks into the factors of what it will take to be successful in the cranberry business. It concludes with a financial model and analysis of the economics of renovating bogs.

Dynamics of Cranberry Industry Readjustment

As a cranberry grower, your planning for the future depends on what happens to your industry—"the million dollar question" as they say on TV. You are painfully aware now that the North American cranberry industry is currently wrestling with a major imbalance between cranberry production and cranberry product sales:

- ◆ Recent crops have exceeded annual sales by about 38 percent.

- ◆ Inventories have mushroomed to the point that the old-crop carryovers into the 2000-2001 marketing year are estimated to be equivalent to an entire year's crop.

The result is depressed grower prices and substantial industry effort to turn the situation around, including a market order set-aside to reduce 2000 crop marketings of processing fruit.

Prior experience in both the cranberry and other farm industries tells us that an industry adjustment will take place over the next several years. Production (supply) and sales (demand) will come back together and eventually grower prices will improve from their current levels. What nobody can really say about this industry adjustment process is how long it will take and where grower prices will eventually settle.

Here are the dynamics of North American cranberry industry readjustment:

- ◆ Depressed grower prices are forcing growers to cut costs and increase efficiency in order to survive. It is clear that the prevailing cost of production per barrel will be substantially lower several years from now compared to the industry peak in the late 1990s. In addition to enabling certain growers to survive at lower prices, this will make the industry more efficient and competitive overall.
- ◆ Some bog acreage that is incapable of producing at competitive yield levels will go out of production. This will help bring down cranberry production to a more profitable level for the industry.
- ◆ Some growers who are unable or unwilling to bring cost of production down to competitive levels will be forced to exit the cranberry business. If other growers pick up their acreage, this may not do much to rebalance the industry. To the extent that their acreage goes out of production, this too will help reduce production.
- ◆ To the extent that lower raw material costs are passed on to consumers, cheaper cranberries may help cranberry marketers increase sales of cranberry products. While clearly beneficial to sales, this benefit is limited by two factors. First, the cost of the cranberries in most processed products is a relatively small proportion of the actual price paid by the consumer. For example, a 64-oz. bottle of cranberry drink (17% juice) contains only 11.1 ounces of cranberries with a value to the grower of 10¢ when the price is \$14.40 per barrel. This same bottle of cranberry drink will retail for \$2.49 – 3.29. Thus large decreases in the grower price translate into small decreases at the consumer level. Second, consumer purchases of cranberry products may have a lot of price inelasticity. This means that even at lower prices, consumption may not increase very much, particularly if the juice content of the drink products remains unchanged.
- ◆ Ultimately the key to increased cranberry sales probably lies in new products and new markets, just as has been true in the post-1959 era. Ample cranberry supplies and low prices could be major advantages in the development of new products. The timing and extent of success is difficult to foresee.

The combination of all of the above will determine the turn-around. By making the right business decisions for themselves, the actions of individual growers will contribute to this eventual turnaround.

What Are the Dynamics of Cranberry Producer Success?

The existing data from the *1999 Massachusetts Cranberry Cost of Production Summary* published jointly by First Pioneer Farm Credit, ACA and the Cape Cod Cranberry Growers Association, makes several dynamics apparent. This information is provided by 10 percent of the state's producers with 40 percent of the state's cranberry acreage and 47 percent of the crop. Their yields run about 17 percent higher than the state average. This is a good representative sample of Massachusetts cranberry acreage. Since large growers account for a substantial portion of the acreage, the average yields and costs tend to reflect their cost structure. Overall, we can conclude that the *Cost of Production Summary* group is at least as profitable as the average grower in the state, if not probably above average.

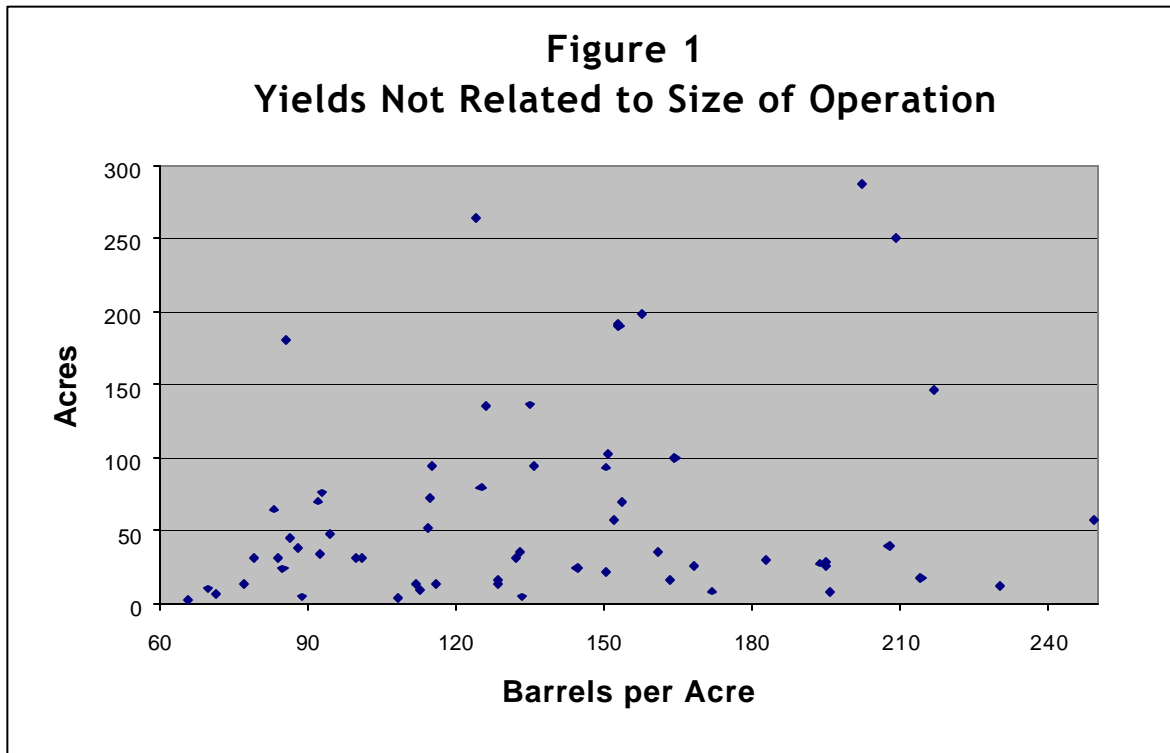
First the larger, lowest-cost per barrel producers do not have lower per acre costs. Low yielding operations suffer from both high costs per acre and low average production. Increasing yields lowers the cost per barrel significantly. The data indicates that there is a fairly strong competitive advantage to the larger operations that can spread their fixed costs over more production. Moderately productive operations are able to maintain financial security without being at the highest levels of production as a result of their typically larger scale of operation.

Production Per Acre is Key to Low Cost Per Barrel

In looking at rankings on production yields per acre, we find that the most productive growers have the least expensive production costs per acre and are somewhat larger in size. This chart seems to indicate a relationship between productivity and overall management intensity. The payoff comes in an average cost per barrel that should allow profitability in all but the very worst of years.

Productivity	Producing Acres	Operating Costs/Acre	Average Production/Acre	Number of Operations	Cost per Barrel
Less Than 100 Barrels/Acre	37.8 acres	\$5,143	87	19	\$61.58
100 – 160 Barrels/Acre	76.1 acres	\$4,601	137	27	\$33.58
Greater Than 160 Barrels/Acre	82.7 acres	\$4,336	194	18	\$22.82

Figure 1 demonstrates that production per acre is not related to size of operation. Yields are distributed widely across all sizes of operation.



Variety is Key to Higher Production per Acre

Clearly, the varietal composition of the bogs is correlated to productivity. The percentage of Howes and Others holds almost constant for all farms (44.5% - 45.2%) in the sample group. As Stevens are substituted for Early Blacks, production increases rapidly. Massachusetts bogs have an average of 11.7 percent Stevens statewide.

<u>Productivity</u>	<u>Early Black</u>	<u>Howes</u>	<u>Other</u>	<u>Stevens</u>
Less Than 100 Barrels/Acre	51.6%	40.6%	4.4%	3.4%
100 – 160 Barrels/Acre	43.8%	40.2%	5.0%	11.0%
Greater Than 160 Barrels/Acre	34.3%	37.3%	7.2%	21.2%

There are many other variables involved in growing a crop and the data submitted on varietal selection is incomplete. The production response may be influenced by other factors as well. There are additional considerations that must be made for color premiums and suitability for the fresh market.

Nationally, Stevens account for 47.9 percent of all cranberry acreage. The percentage is higher in Wisconsin, Oregon and Canada. The Table below is a summary from a University of Wisconsin study by Teryl Roper on 1998 cranberry acreage. This information would seem to indicate that the marketplace is moving away from Early Blacks and Howes.

<u>Region</u>	<u>Early Black</u>	<u>Howes</u>	<u>Other</u>	<u>Stevens</u>
Massachusetts	42.7%	36.5%	9.1%	11.7%
Wisconsin	0.0%	0.6%	48.1%	51.3%
Oregon	0.0%	0.05%	25.3%	74.6%
Canadian	0.4%	0.6%	35.2%	63.8%
Other areas	39.4%	4.9%	29.3%	26.4%
TOTAL	12.8%	8.0%	31.3%	47.9%

Small Operations Have Higher Cost Structures

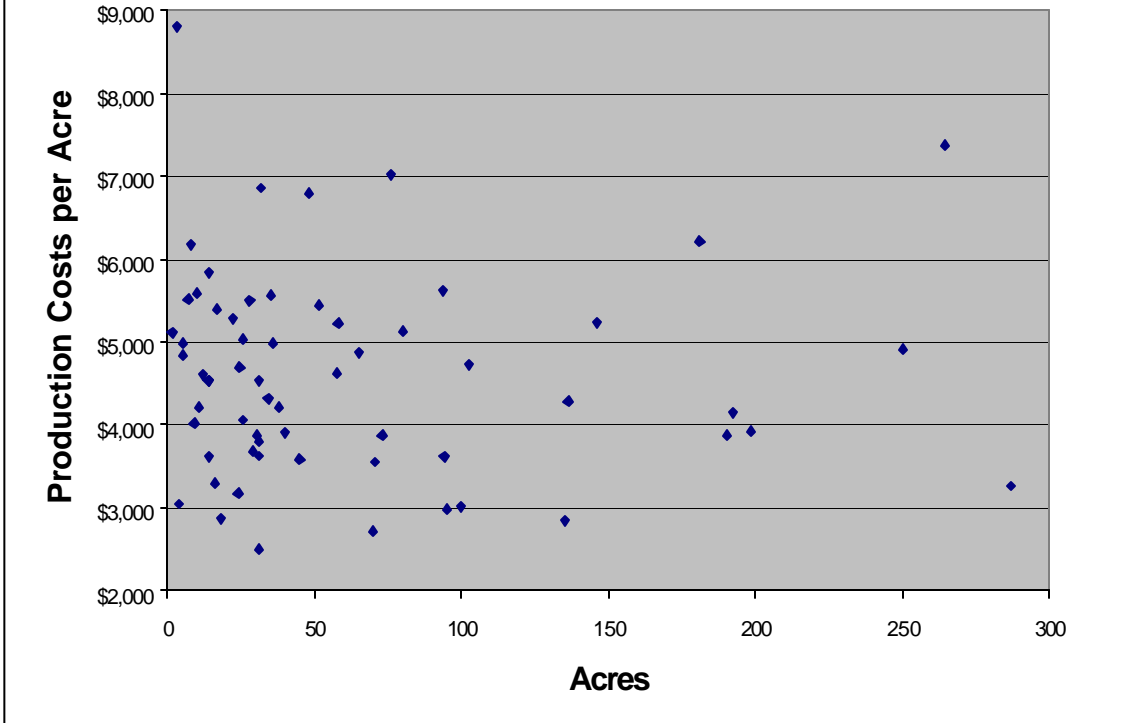
Smaller operations had significantly higher costs per acre and per barrel than other size groups. Average production per acre also increased incrementally with size. Small operations under 10 acres are clearly at a competitive disadvantage due to costs of overhead being spread across a small amount of production. Medium (10 - 40 acres) and large size operations (over 40 acres) are not significantly different in their costs per acre. The lower average cost per barrel on the large operations can be attributed largely to the higher yields.

<u>Size Category</u>	<u>Average Cost Per Acre</u>	<u>Average Cost Per Barrel</u>	<u>Average Production/Acre</u>	<u>Number Of Operations</u>
<10 Acres (5.5 acre average)	\$5515	\$53.15	119.3	10
10 - 40 Acres (25.1 acre average)	\$4406	\$32.17	138.3	27
>40 Acres (130.7 acre average)	\$4439	\$29.79	151.3	27

Operating Costs per Acre Are Not Tied to Yield or Size

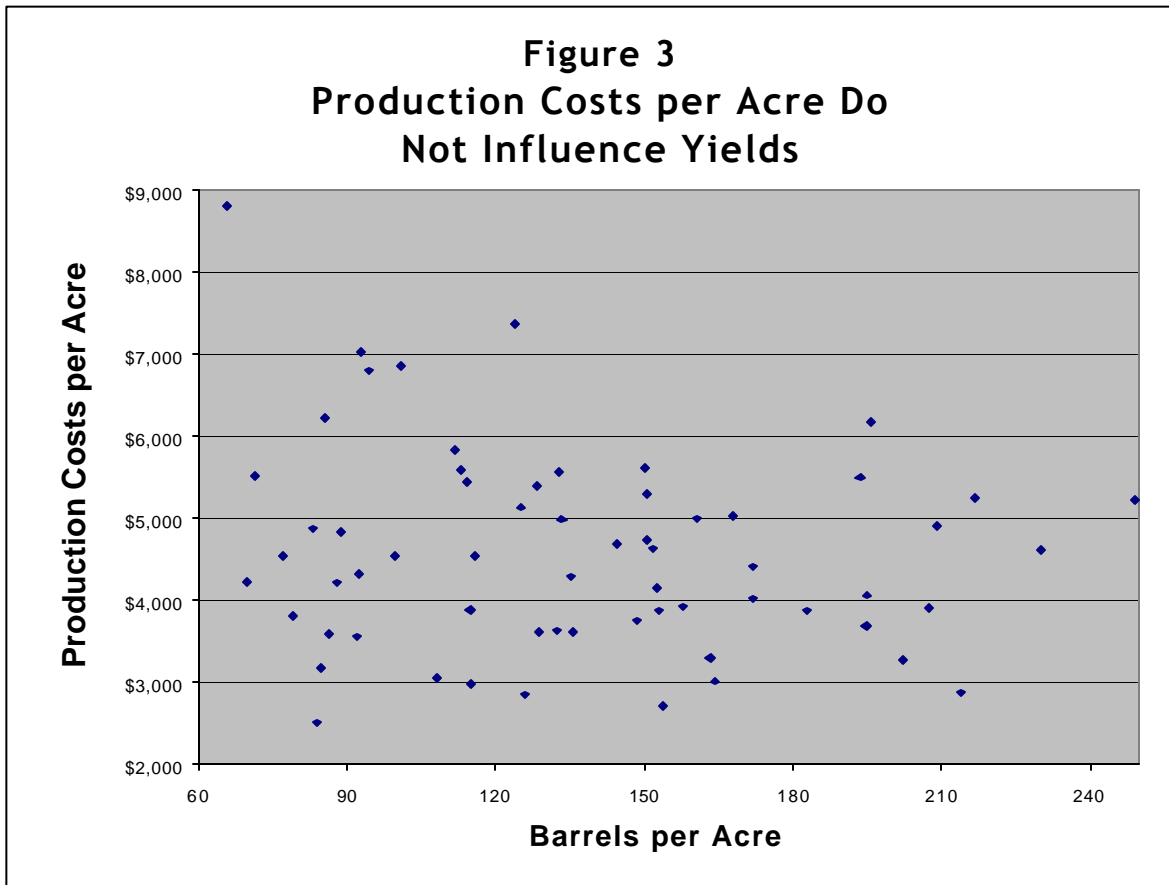
Sorted by operating costs per acre, the importance of scale of operation is reduced. It is significant that when sorted by operating costs, small operations do not stand out as clearly as high cost producers. Figure 2 shows the distribution of farm size by costs per acre.

Figure 2
Production Costs per Acre Not Related to Size of Operation



Keep in mind that size of operation can have a direct relationship to labor costs. It is important to avoid the trap of feeling as though every employee must be treated as full-time and/or entitled to benefits. An operation that can function with 1½ employees cannot afford to keep two full-time employees on the payroll.

Also note that the production per acre does not vary significantly when looking at production cost levels. This trend is displayed in Figure 3.



Average cost per acre is strongly related to management style. Expenditures are not directly related to size or productivity levels. High cost producers will benefit greatly by incorporating cost controls in their business. Some of the variation may also be explained by factors that were not measured. These might include age of bog, grade of bog, distance of bog from the main operation, water availability and other physical factors.

<u>Per Acre Cost</u>	<u>Average Cost Per Acre</u>	<u>Producing Acres</u>	<u>Average Production/Acre</u>	<u>Number Of Operations</u>
High	\$6,140	54.7	136.1	22
Medium	\$4,509	71.6	157.8	20
Low	\$3,424	73.9	150.2	22

Cost Per Barrel Is Key

A key indicator of which growers will survive the current downturn will be how their cost of production per barrel relates to their peer growers. Your peer growers are now a global group, not just other

Massachusetts growers. Those who can produce cranberries at well under the prevailing industry average will be well positioned for the long term. Their critical challenge will be financial ability to withstand the current downturn.

Those with above average costs per barrel face a far more daunting challenge. Their losses during the current downturn will erode financial resources far more quickly. When cranberry prices do begin to recover, it will take even more time (if ever) to return high cost producers to a profitable position. To survive, this group is challenged to quickly bring costs down while bringing yields up, as well as having the financial ability to withstand the downturn. For certain growers, this may just be beyond the realm of possibility. For them, an early and planned exit from growing cranberries may be the most appropriate business decision.

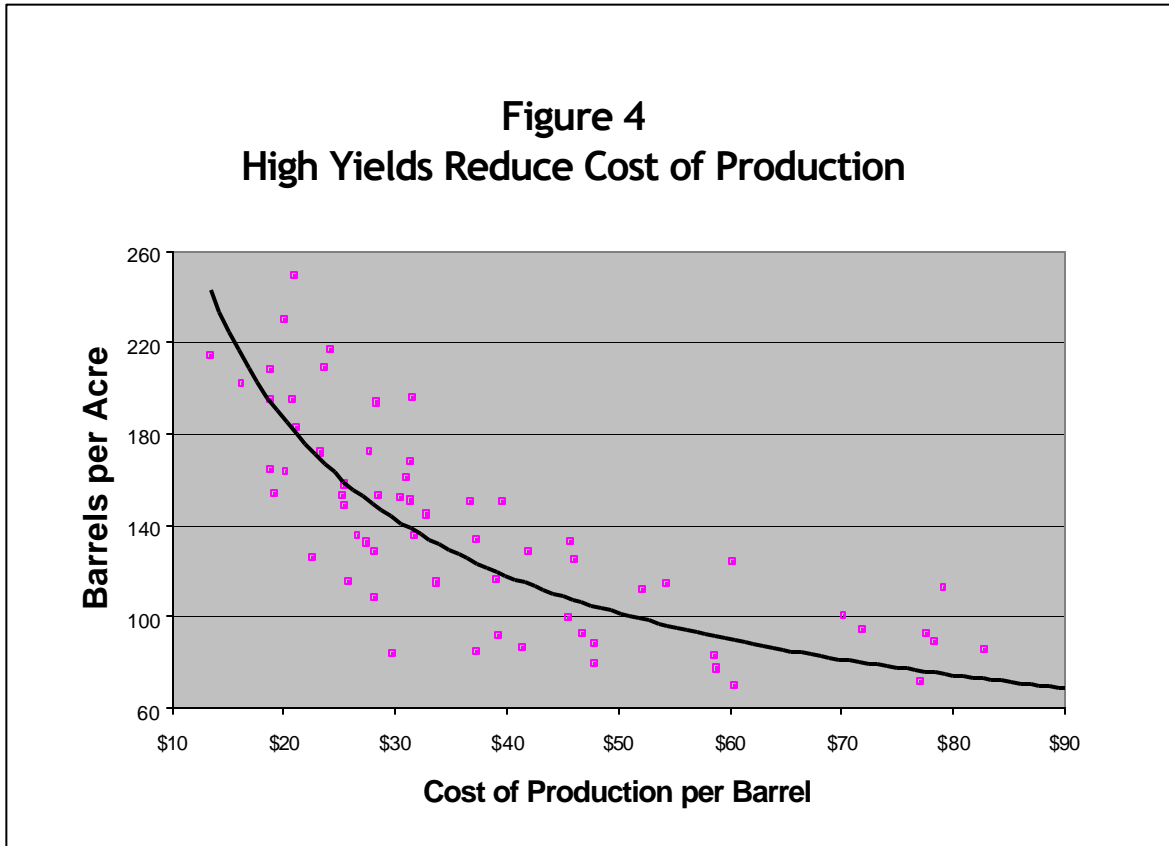
Highly efficient operations that produce at low per barrel costs clearly demonstrate the dual importance of both scale of operation and high crop yield. These efficient growers produced an average of 172.7 barrels/acre at an average cost per barrel of \$23.52. This level makes them highly competitive and assures them of being industry survivors if they choose to be. This represents a per acre expenditure of \$3,933, not the lowest level (as seen in the table above), but the relatively low cost coupled with high productivity is a winning combination.

<u>Per Barrel Cost</u>	<u>Average Cost Per Barrel</u>	<u>Size of Operation</u>	<u>Average Production</u>	<u>Number Of Operations</u>
< \$30	\$23.52	95.1 acres	172.7	26
\$30 - \$50	\$36.89	45.6 acres	126.6	22
> \$50	\$67.56	49.1 acres	101.9	16

The operations that achieved highest production levels (averaging 194 barrels/acre) produced at a lower average cost per barrel (\$22.35), at a slightly smaller scale of operation (82.7 acres), but did not reduce per acre costs as significantly (\$4,336). Figure 4 shows the relationship between yield and cost of production.

While it may seem confusing that different combinations of variables produce similar efficiencies, it is vitally important to understand that this is what makes production agriculture so interesting. There is no single right way to be successful and no exact formula for "the best way". A combination of managing costs, high production and adequate size of operation can work for all producers. Your challenge is to find what works for you.

Figure 4
High Yields Reduce Cost of Production



Additional statistical information is reported in Appendix 1 at the end of this paper.

Labor Efficiency

Labor efficiency is generally measured in two ways, financially and physically. Financially, labor as a percentage of total expense, dollars of labor per barrel or dollars per acre are all methods of evaluating labor efficiency. Physically, acres per worker or barrels per worker are useful measures. The data was not detailed in providing hours worked for employees, but reasonable estimates were made based on gross wages paid and benefits.

Wages for workers averaged \$18 - \$19 per hour. Note that these wages include management, non-management and seasonal labor. For businesses operated as corporations, the officer's salaries are also included. Benefits costs averaged 10 percent of cash wages for these businesses.

More importantly, the total cost of labor (wage and benefits) ranged from 26-56 percent of total operating expense with an average of 39 percent. A good goal for family operated businesses is to keep total labor expense below 35 percent of total expenditures or under \$1,500 per acre of producing bog.

Acres operated per worker (full-time equivalents) ranged from 15-52. The average was 28 acres per full-time worker. Future goals should be set at 30 or more acres per worker.

Characteristics of the Successful Grower of the Future

The successful grower of the future is going to fit one of these basic models:

1. Part-time small operations - These growers will look at their bogs as supplemental income, an investment vehicle and/or a recreational activity. The bog will be expected to support operating costs, have little or no debt. It will not be expected to be a significant source of income.
2. Mid-size operations- Probably 20 to 60 acres with the owner/operator providing the majority of labor and management. These operations will by necessity be low-cost, efficient producers. They will also be either low-debt or have a low-to-modest requirement for family living expenses.
3. Large operations - These will fit the more traditional model of full-time business with employees and larger debt commitments. Spreading overhead costs over larger acreage will make it work.
4. Investor operations - May be any size category, most likely operated by a custom service provider for absentee owner. Owner will manage with a current rate of return or long term appreciation rate of return as a goal.

Goals for Successful Commercial Operations (Survivors)

- ✓ Production greater than 15,000 barrels. In a commodity market, it will require greater volume to cover overhead and remain viable.
- ✓ Cash operating costs less than \$24 per barrel. High cost producers will exit the industry.
- ✓ Size greater than 60 acres. Average size will continue to increase as industry consolidates. Some bogs will be abandoned due to significant inefficiencies. Some growers will get bigger in order to remain viable.
- ✓ Labor costs below \$1,500 per acre.
- ✓ More than 30 acres producing bog per full time worker equivalent.
- ✓ Do what it takes to be a long-term survivor. This may include reducing costs, increasing yields, focusing on high-yielding acreage, selling or abandoning low-yielding acreage, selling off non-productive assets and/or subsidizing the cranberry enterprise with non-farm earnings.
- ✓ Bog renovation (to be discussed in next section) will have a role for some growers and some bog units.
- ✓ Use all existing resources and tools available to determine the most appropriate course of action. Do it now before further financial erosion takes place due to indecision.
- ✓ Total debt commitment (principal and interest) less than 10% of gross income.

The Challenges and Benefits of Cranberry Bog Renovation

What are the business dynamics of bog renovation? With limited experience in Massachusetts and all the difficulties of obtaining hard numbers, a financial modeling approach supported by extensive grower and industry experts was undertaken.

The obvious goal of bog renovation is to increase yields in order to lower long-term production costs and thereby become more competitive. To do the analysis, certain assumptions had to be made in the model. These are described below. The model was developed so that certain variables can be changed to calculate potential outcomes for individual producers. In order to compare results here, only a few variables were modified in the renovation analysis.

Yield

Production levels were evaluated using a 150-barrel per acre yield. It was assumed that renovations would be made at 10 percent per year for 10 years. The renovated acreage would be out of production for two years; then begin to yield 50 barrels per acre two years after the completion of the renovation; 200 barrels per acre three years after the renovation and 300 barrels per acre (full production) four years following renovation and continually thereafter.

Income and Expenses

Price started with receipts of \$30/barrel for processing fruit and increase at the same inflationary rate as operating expenses. This rate is 2 ½ percent per year.

Expenses were set at \$4,344 per acre. Operating costs were based on the *1999 Cranberry Cost of Production* study published by CCCGA and First Pioneer. This figure is believed to be a reasonable estimate of costs that would be necessary for reasonable production practices that would be *sustainable over the long term*. Previous years' costs included inefficiencies and demonstrated that costs will often increase to match income. All growers should focus on knowing their actual costs per acre.

In years of severe crisis, it is possible that the average cost could be pushed lower. This would probably not be sustainable over extended periods of time. If significant income increases are experienced as in the early- and mid-90s, operating costs would likely increase as new technologies and deferred expenditures were put into place. While this is a nice feature for an industry with strong earnings, it is not the level of expenditure that would be considered absolutely necessary.

The specifics of how operating costs are categorized are not significant to growers as a group. **The important issue is total cash expense per acre.** The model is designed to allow individual growers to put in their own financial estimates and come up with an adjusted figure that fits their operation.

For purposes of the study, reasonable averages are used throughout. Some of these figures become important to individual growers as they examine their own efficiency and cost structures.

Renovation

Costs of renovation are held constant throughout the 10-year renovation process at \$17,000/acre. This is broken down as \$12,000 per acre for excavation and site preparation work, \$2,500 per acre for irrigation renovation, \$1,800 per acre for vine purchases and \$700 per acre for labor. Individual operations report

widely varying costs of renovation depending on system used. The range of costs incurred were (reported during interviews conducted in July 2000) \$2,000 - \$30,000 per acre.

Debt Load

This study used \$3,570 per acre based on 9¼ percent interest with a 15-year term to generate principal and interest payments of \$450 per year/per acre. No additional interest expense was input for the costs of renovation. If in the more likely circumstance that it was financed with debt, the cash expenses would be higher and require a longer time period to attain payback on the investment.

This number would have to be customized to individual circumstances when growers look at their own situation.

Capital Expenditures

In the model, equipment and miscellaneous capital expenditures were included at \$11,000 per year for the entire operation. This figure represents the out of pocket cash costs for replacement of capital assets above and beyond that which is covered by the debt payments. This would include purchases of new machinery, major repairs or overhauls and other expenses that are typically depreciated.

It was assumed that no new real estate would be purchased in this model and that the operation would remain stable sized throughout the term of the study. This allows comparisons across different scenarios without the added complication of changing farm size.

Family Living and Non-Farm Expenditures

These are the necessary costs of living for the business operator that must come out of farm cash flow. A modest figure of \$36,000 per year for family living withdrawals, \$3,000 for income and self-employment taxes and \$3,000 per year for other costs such as medical insurance. This figure was also inflated at 2½ percent per year in the model. An acceptable level must be individually determined by families, as they analyze their unique financial situations.

Results of Renovation Model

Given these assumptions for price, costs, inflation and renovation expense, it would take 17 years to recover the cash costs of improving bogs so that they are capable of consistently yielding 300 barrel per acre. A publication from the Nova Scotia Department of Agriculture and Marketing entitled "Cranberry Planning Considerations" (updated 5-20-97) states that cost recovery for a new bog requires 9-10 years if the site is already owned outright and no family living expenses are required. The publication goes on to say that 15 to 18 years is a more practical expectation.

Maximum accumulated negative cash flows would be reached in Year 11, requiring additional funds totaling \$26,340 per acre to be infused before a turn around would be seen. Eleven years of negative cash flow is more risk than many farmers or their lenders might be willing to endure. However, the alternative of operating at the status quo with 150-barrel yields is also financially unacceptable. Growers should also give consideration to the useful economic life of a bog in the future.

Circumstances that differ from this average scenario would change the dynamics of the decision to fully renovate. These differences might include lower than average production costs, ample cash reserves, other external motivators or a very stubborn personality.

A series of scenarios with varying price expectations, 3 levels of cost per acre and 3 levels of renovation cost per acre were run. Selected results are summarized in the following table.

Price per Barrel	Renovation Costs per Acre	Production Costs per Acre	Years to Positive Cash Flow	Years to Payback Investment (break-even)	Maximum Cash Outlay (shortfall) per Acre
\$20	\$10,000	\$3,000	12	19	\$21,344
\$20	\$10,000	\$5,000	15	>30	\$48,683
\$30	\$10,000	\$3,000	8	12	\$ 6,434
\$30	\$17,000	\$4,000	12	16	\$22,046
\$30	\$24,000	\$5,000	12	20	\$41,528
\$40	\$10,000	\$3,000	6	6	\$ 0
\$40	\$17,000	\$4,000	8	12	\$ 8,430
\$40	\$24,000	\$5,000	11	15	\$23,317

Break-even Analysis

Using the assumptions stated in the model, tables were generated to calculate break-even points for producers. Table 1 allows a grower to find the required price for a given size and yield of an operation. The formula assumes an "average" cost structure of \$4,344 per acre and overhead of \$108,000 per year for personal expenses, capital replacement and debt repayment.

TABLE 1**Price Required to Break-even at Given Yields and Acreages**

Assumes overhead of \$108,000 for personal expenses, capital replacement and debt repayment with an "average" cost structure of \$4,344 per acre.

Yield bbl/acre	Acreage										
	<u>10</u>	<u>30</u>	<u>50</u>	<u>70</u>	<u>90</u>	<u>110</u>	<u>130</u>	<u>150</u>	<u>170</u>	<u>190</u>	<u>210</u>
100	\$ 151.44	\$ 79.44	\$ 65.04	\$ 58.87	\$ 55.44	\$ 53.26	\$ 51.75	\$ 50.64	\$ 49.79	\$ 49.12	\$ 48.58
110	\$ 137.67	\$ 72.22	\$ 59.13	\$ 53.52	\$ 50.40	\$ 48.42	\$ 47.04	\$ 46.04	\$ 45.27	\$ 44.66	\$ 44.17
120	\$ 126.20	\$ 66.20	\$ 54.20	\$ 49.06	\$ 46.20	\$ 44.38	\$ 43.12	\$ 42.20	\$ 41.49	\$ 40.94	\$ 40.49
130	\$ 116.49	\$ 61.11	\$ 50.03	\$ 45.28	\$ 42.65	\$ 40.97	\$ 39.81	\$ 38.95	\$ 38.30	\$ 37.79	\$ 37.37
140	\$ 108.17	\$ 56.74	\$ 46.46	\$ 42.05	\$ 39.60	\$ 38.04	\$ 36.96	\$ 36.17	\$ 35.57	\$ 35.09	\$ 34.70
150	\$ 100.96	\$ 52.96	\$ 43.36	\$ 39.25	\$ 36.96	\$ 35.51	\$ 34.50	\$ 33.76	\$ 33.20	\$ 32.75	\$ 32.39
160	\$ 94.65	\$ 49.65	\$ 40.65	\$ 36.79	\$ 34.65	\$ 33.29	\$ 32.34	\$ 31.65	\$ 31.12	\$ 30.70	\$ 30.36
170	\$ 89.08	\$ 46.73	\$ 38.26	\$ 34.63	\$ 32.61	\$ 31.33	\$ 30.44	\$ 29.79	\$ 29.29	\$ 28.90	\$ 28.58
180	\$ 84.13	\$ 44.13	\$ 36.13	\$ 32.70	\$ 30.80	\$ 29.59	\$ 28.75	\$ 28.13	\$ 27.66	\$ 27.29	\$ 26.99
190	\$ 79.71	\$ 41.81	\$ 34.23	\$ 30.98	\$ 29.18	\$ 28.03	\$ 27.24	\$ 26.65	\$ 26.21	\$ 25.85	\$ 25.57
200	\$ 75.72	\$ 39.72	\$ 32.52	\$ 29.43	\$ 27.72	\$ 26.63	\$ 25.87	\$ 25.32	\$ 24.90	\$ 24.56	\$ 24.29
210	\$ 72.11	\$ 37.83	\$ 30.97	\$ 28.03	\$ 26.40	\$ 25.36	\$ 24.64	\$ 24.11	\$ 23.71	\$ 23.39	\$ 23.13
220	\$ 68.84	\$ 36.11	\$ 29.56	\$ 26.76	\$ 25.20	\$ 24.21	\$ 23.52	\$ 23.02	\$ 22.63	\$ 22.33	\$ 22.08
230	\$ 65.84	\$ 34.54	\$ 28.28	\$ 25.60	\$ 24.10	\$ 23.16	\$ 22.50	\$ 22.02	\$ 21.65	\$ 21.36	\$ 21.12
240	\$ 63.10	\$ 33.10	\$ 27.10	\$ 24.53	\$ 23.10	\$ 22.19	\$ 21.56	\$ 21.10	\$ 20.75	\$ 20.47	\$ 20.24
250	\$ 60.58	\$ 31.78	\$ 26.02	\$ 23.55	\$ 22.18	\$ 21.30	\$ 20.70	\$ 20.26	\$ 19.92	\$ 19.65	\$ 19.43
260	\$ 58.25	\$ 30.55	\$ 25.02	\$ 22.64	\$ 21.32	\$ 20.48	\$ 19.90	\$ 19.48	\$ 19.15	\$ 18.89	\$ 18.69
270	\$ 56.09	\$ 29.42	\$ 24.09	\$ 21.80	\$ 20.53	\$ 19.73	\$ 19.17	\$ 18.76	\$ 18.44	\$ 18.19	\$ 17.99
280	\$ 54.09	\$ 28.37	\$ 23.23	\$ 21.02	\$ 19.80	\$ 19.02	\$ 18.48	\$ 18.09	\$ 17.78	\$ 17.54	\$ 17.35
290	\$ 52.22	\$ 27.39	\$ 22.43	\$ 20.30	\$ 19.12	\$ 18.36	\$ 17.84	\$ 17.46	\$ 17.17	\$ 16.94	\$ 16.75
300	\$ 50.48	\$ 26.48	\$ 21.68	\$ 19.62	\$ 18.48	\$ 17.75	\$ 17.25	\$ 16.88	\$ 16.60	\$ 16.37	\$ 16.19

Table 2 shows a minimum, or break-even acreage required with a known price and yield. This is a useful tool for growers who want to measure the impact of changing the size of their operation to gain economies of scale.

TABLE 2

Acreage Required to Break-even at Given Yields and Prices

Assumes overhead of \$108,000 for personal expenses, capital replacement and debt repayment with an "average" cost structure of \$4,344 per acre.

Yield bbl/acre	Price per Barrel								
	<u>18</u>	<u>22</u>	<u>26</u>	<u>30</u>	<u>34</u>	<u>38</u>	<u>42</u>	<u>46</u>	<u>50</u>
100	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	421.9	164.6
110	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	391.3	150.8	93.4
120	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	500.0	155.2	91.8	65.2
130	NOT VALID	NOT VALID	NOT VALID	NOT VALID	1421.1	181.2	96.8	66.0	50.1
140	NOT VALID	NOT VALID	NOT VALID	NOT VALID	259.6	110.7	70.3	51.5	40.7
150	NOT VALID	NOT VALID	NOT VALID	692.3	142.9	79.6	55.2	42.3	34.2
160	NOT VALID	NOT VALID	NOT VALID	236.8	98.5	62.2	45.5	35.8	29.5
170	NOT VALID	NOT VALID	1421.1	142.9	75.2	51.0	38.6	31.1	26.0
180	NOT VALID	NOT VALID	321.4	102.3	60.8	43.3	33.6	27.4	23.2
190	NOT VALID	NOT VALID	181.2	79.6	51.0	37.6	29.7	24.6	20.9
200	NOT VALID	1928.6	126.2	65.2	44.0	33.2	26.6	22.2	19.1
210	NOT VALID	391.3	96.8	55.2	38.6	29.7	24.1	20.3	17.5
220	NOT VALID	217.7	78.5	47.9	34.4	26.9	22.1	18.7	16.2
230	NOT VALID	150.8	66.0	42.3	31.1	24.6	20.3	17.3	15.1
240	NOT VALID	115.4	57.0	37.8	28.3	22.6	18.8	16.1	14.1
250	692.3	93.4	50.1	34.2	26.0	20.9	17.5	15.1	13.2
260	321.4	78.5	44.7	31.3	24.0	19.5	16.4	14.2	12.5
270	209.3	67.7	40.4	28.8	22.3	18.3	15.4	13.4	11.8
280	155.2	59.5	36.8	26.6	20.9	17.2	14.6	12.7	11.2
290	123.3	53.0	33.8	24.8	19.6	16.2	13.8	12.0	10.6
300	102.3	47.9	31.3	23.2	18.4	15.3	13.1	11.4	10.1

Table 3 is the same tool as Table 2 with the costs per acre reduced to a "better-than-average" \$3,500 and the overhead for personal expenses, capital replacement and debt repayment lowered to \$80,000 per year. Comparing Tables 2 and 3 allows growers to assess the impacts of changing cost structures.

TABLE 3

Acresage Required to Break-even at Given Yields and Prices

Assumes overhead of \$80,000 for personal expenses, capital replacement and debt repayment and "better than average" cost structure of \$3,500 per acre.

Yield bbl/acre	Price per Barrel								
	<u>18</u>	<u>22</u>	<u>26</u>	<u>30</u>	<u>34</u>	<u>38</u>	<u>42</u>	<u>46</u>	<u>50</u>
100	NOT VALID	NOT VALID	NOT VALID	NOT VALID	NOT VALID	266.7	114.3	72.7	53.3
110	NOT VALID	NOT VALID	NOT VALID	NOT VALID	333.3	117.6	71.4	51.3	40.0
120	NOT VALID	NOT VALID	NOT VALID	800.0	137.9	75.5	51.9	39.6	32.0
130	NOT VALID	NOT VALID	NOT VALID	200.0	87.0	55.6	40.8	32.3	26.7
140	NOT VALID	NOT VALID	571.4	114.3	63.5	44.0	33.6	27.2	22.9
150	NOT VALID	NOT VALID	200.0	80.0	50.0	36.4	28.6	23.5	20.0
160	NOT VALID	4000.0	121.2	61.5	41.2	31.0	24.8	20.7	17.8
170	NOT VALID	333.3	87.0	50.0	35.1	27.0	22.0	18.5	16.0
180	NOT VALID	173.9	67.8	42.1	30.5	24.0	19.7	16.7	14.5
190	NOT VALID	117.6	55.6	36.4	27.0	21.5	17.9	15.3	13.3
200	800.0	88.9	47.1	32.0	24.2	19.5	16.3	14.0	12.3
210	285.7	71.4	40.8	28.6	22.0	17.9	15.0	13.0	11.4
220	173.9	59.7	36.0	25.8	20.1	16.5	13.9	12.1	10.7
230	125.0	51.3	32.3	23.5	18.5	15.3	13.0	11.3	10.0
240	97.6	44.9	29.2	21.6	17.2	14.2	12.2	10.6	9.4
250	80.0	40.0	26.7	20.0	16.0	13.3	11.4	10.0	8.9
260	67.8	36.0	24.5	18.6	15.0	12.5	10.8	9.5	8.4
270	58.8	32.8	22.7	17.4	14.1	11.8	10.2	9.0	8.0
280	51.9	30.1	21.2	16.3	13.3	11.2	9.7	8.5	7.6
290	46.5	27.8	19.8	15.4	12.6	10.6	9.2	8.1	7.3
300	42.1	25.8	18.6	14.5	11.9	10.1	8.8	7.8	7.0

Conclusions Regarding Renovation

- ◆ It is critical to keep renovation costs as low as possible. Investments may be kept low by reduced site preparation, utilizing cuttings from your own vines and providing on-site labor.
- ◆ Renovations may only be done on a percentage of owned acreage, with priority given to lower producing and higher cost bogs. This will affect the final analysis. The need for farm specific decision-making is critical to the process.
- ◆ Operating costs per acre are just as critical to reducing the amount of time required to payback initial investment as they are to overall profitability.
- ◆ Your expectations of long-term cranberry prices are critical to this analysis.
- ◆ Assumptions regarding yields as renovations come in to production and yields at maturity are critical to the decision process. Renovated bogs with varieties that have the potential for high yields still require top management to attain the desired results.
- ◆ Overhead requirements (debt commitment, family living expenses and capital purchases needed) have a significant impact on the ability of a bog renovation to provide the desired financial results.

Questions to Ask Yourself as a Business Person

- ◆ How large is your operation? Do you plan to increase acreage? Purchase or rent additional bogs?
- ◆ How strong are you financially? Current debt load, debt structure, repayment ability and capital reserves all affect your ability to withstand adversity. Any debt load is difficult to service under current market conditions. A rule of thumb for many agricultural businesses is to keep debt commitments (Principal and Interest) below 15% of Total Receipts.
- ◆ What is the availability and reliability of labor (both full-time and seasonal)? Cost? Need for benefits?
- ◆ Are you comfortable managing labor? This is a critical issue to business growth.
- ◆ What is your risk tolerance? Can you sleep at night now? Will you still feel comfortable if you have to take on debt or deplete your reserves (savings, retirement funds, etc.) to expand, renovate or ride out the tough times?
- ◆ What is your attitude about the long-term future of your industry? Can you remain motivated and upbeat?
- ◆ Do you have an interest and/or ability in the marketing side of the business?
- ◆ Can you maintain your family's living needs? Quality of life? Could your standard of living be lowered?

- ◆ Do you have a specific threshold/goal for Return on Investment? What is the likelihood of it being met?
- ◆ Do you have or are you willing to consider off-farm income to provide for family living needs?
- ◆ Do you have/are you willing to use non-farm resources such as timber, sand, gravel or house lots.
- ◆ What is your planning horizon? Financial modeling indicates that total renovation will generally take a minimum of 15 years before financial benefits are realized. A number of variables affect the exact payback period.
- ◆ Do you have an exit plan? This is important whether your exit is near-term or far in the future.

Appendix 1

Statistical Information

The mean cost of production per acre in the 1999 data was \$4,344. The median was \$4,534. Standard deviations indicate that 68 percent of the sample group fell between \$2,829 per acre and \$5,855 per acre.

The total range (excluding one outlier) in cost of production was \$2,500 per acre to \$8,810 per acre. Average production for this group was 145.2 barrels per acre with an average cost of production per barrel of \$29.90.

There is a high correlation (.69) between dollars per acre and dollars per barrel. This tells us that high cost producers are not getting significantly higher yields. In other words, increasing inputs does not cause increases in productivity. Without higher yields to dilute costs and cause dollars per barrel to decrease, there is no financial return for added operating costs per acre.

This is reinforced by a strong negative correlation (-.47) between dollars per barrel and barrels per acre. This tells us that increasing input costs per acre do not translate into efficient production. A scatter-graph of the relationship of yield to input costs (Figure 3) shows that production costs per acre decrease somewhat as the number of barrels per acre increases. However, the R^2 for this is very low.

The mean cost of production per barrel in the 1999 data was \$29.90. The total range (excluding 3 outliers) was \$13.40 per barrel to \$82.86 per barrel. The median was \$31.68. Standard deviations indicate that 68 percent of the sample group fell between \$13.58 per barrel and \$49.78 per barrel.