

**Financial Planning Information
for Establishing a
VINIFERA Wine Grape Planting
*Okanagan Region***
Revised November 2000



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INTRODUCTION

Financial Planning Information for Establishing a VINIFERA Wine Grape Planting *Okanagan Region*

This financial planning information is not a cost of production study. It is to be used as a planning tool in assessing the financial requirements for vineyard establishment and production. Any use of this information is entirely the responsibility of the reader.

The income and expense projections in this document provide a general indication of the financial requirements associated with the establishment and production of Vinifera wine grapes. This information is based on a **10 acre vineyard model** developed using a consensus approach with growers operating various sized vineyards. As well, a summary of the estimated labour hours, and machinery investment and usage is provided. The last section includes a discussion on risk along with a sensitivity analysis that looks at the impact on potential returns from changes in three key variables: grape prices, yields and canopy management labour hours.

Financial information for this enterprise is summarized on a **contribution margin basis**. Contribution margin is defined as: the surplus or (deficit) calculated by subtracting direct expenses specific to the vineyard enterprise from direct income specific to the same vineyard enterprise. This margin provides an indication of the potential contribution of the enterprise to the overall profitability of the farm business and provides a basis for comparison to alternative farm enterprises. **The contribution margin must provide funds for overhead, interest, and other fixed costs as well as for living expenses, loan principal repayment, investment and management. These indirect expense items and other uses of cash are not included in this analysis as they are specific to each situation and must be established for individual circumstances and expectations.**

It is recommended that individual investors develop a complete farm business plan to reflect their own situation and evaluation of a vineyard's future potential, financial feasibility and associated risks.

The authors wish to express their appreciation to the grape growers and industry representatives who assisted in the development of the original and updated information on which these projections are based.

I. Considerations and Assumptions

A. General Considerations - 10 Acre Vinifera Grape Establishment

PRIOR TO PLANTING

It is assumed that a new vineyard is being planted. Land acquisition and any land clearing, road building, water source development, securing of power and telephone utilities, construction of deer fences or bird netting structures and any other improvements, are not included in this enterprise analysis.

All figures are in year 2000 dollars. The labour, equipment and machinery used are solely for this vineyard operation. For the purposes of this study the economic life of the Vinifera vineyard is 15 years (5 years of establishment and 10 years of production) to account for variety obsolescence. However, the variety's market life could be shorter, depending on global wine demand and supply.

Income tax considerations associated with vineyard ownership are not taken into account.

FARM SIZE

The average vineyard size in British Columbia is approximately 15 acres. This figure is slightly skewed to account for many small vineyards and a few very large ones.

The site for the vineyard in this model was carefully chosen. The goals and objectives of the operator are integrated into the vineyard's overall business plan that also takes into account the needs of wineries and consumers.

The farm size for this vineyard is 12 acres. The establishment and production expenses for this

vineyard enterprise are based on planting 10 of these acres to high quality vinifera grapes. Headlands, side clearances and any other non-productive land are not used to calculate the per acre values.

TRELLIS SYSTEM AND VINE SPACING

The type of trellis and vine spacing used are decided before the vineyard is planted.

Most vineyards in British Columbia are trained to a single vertical upright canopy system. A few are trained to divided canopy systems involving two vertical canopies from one vine.

The site selected for this vineyard has low to moderately fertile soil. Good management in the control of irrigation water and fertilizer plus the use of a cover crop will provide adequate vigor but will avoid high to excess vigor in this vineyard. Installation of a divided canopy trellis to utilize high vigor to obtain extra production is not justified here.

This vineyard is trained to the standard single curtain vertical trellis system. Rows are 302.5 feet long and are spaced 8 feet apart creating 18 rows per acre. Pressure treated wooden posts are used with ground anchors at the end posts. Vines are spaced at 4.0 feet in the row. This spacing of rows and vines requires 1,361 vines per acre. Vines grafted to C-3309 rootstock are used in this vineyard. Costs for grafted vines may vary depending on the availability of specific variety clones or rootstocks. Grafted vines were chosen because of nematode resistance, growth control and grape phylloxera concerns. Planting of self-rooted vines, costing less than grafted vines, is still an option.

An estimated 3% of the vines are replanted in the second year to replace dead and damaged vines.

High tensile galvanized steel wire is used as

both crop load and foliage catch wires. One 11 gauge wire is considered to be the crop load wire. There are 3 sets of non-movable catch wires to contain the canopy as it grows upright. Kiwi locks are used to secure the wires to the end posts and staples secure the wires to the post.

The vineyard is cane pruned, requiring tying.

PRODUCTION LEVELS AND PRACTICES

Local experience, research and expected long term demand by the wine industry was used to select the vinifera grape variety for this vineyard. Other vineyard operations may have more than one variety. It would be necessary to consider different production levels if there was more than one variety. In this vineyard a production level of 4.3 short tons (2,000 pounds per ton) was estimated as the long term average level of production for the mature vineyard. The 4.3 tons per acre average allows for crop reductions due to winter freezes and other climate related risk factors.

At 1,361 vines per acre, only 6.32 pounds of fruit are required per vine to produce 4.3 tons per acre at maturity. Larger yields per vine would be required to maintain 4.3 tons per acre at lower densities with smaller per vine yields required if planting density was increased.

Crop production practices and any adjustments made in the vineyard to prevent over cropping or other management factors are described in the *Management Guide for Grapes for Commercial Growers* available from the BC Wine Institute or BCMAFF.

HARVEST AND MARKETING

Production in this vineyard begins when vines are in their second leaf. At this time they have completed one full growing season in the

vineyard and produced 1 ton per acre. The second crop is produced the following year when vines are in their third leaf. At this time the vines are capable of a crop of 2.5 tons per acre. Careful management in training/sucker removal/shoot thinning maintains the crop. Yields of 3.7 and 4.3 tons per acre are projected in the fourth and fifth years respectively.

Direct income and expenses associated with year 5 are considered typical of a mature vineyard. The price for Vinifera grapes in this vineyard is \$1,350 per ton, based on the 1999 crop's average returns for all varieties. Vineyards with a mix of varieties will need to consider a range of crop values in forecasting income.

Marketing of the crop from this vineyard is to Wineries on a long term basis using evergreen contracts with annual renewable clauses for flexibility in crop value, fruit composition and crop condition.

Items such as unloading bins, contract harvest and fees paid to industry organizations are considered as part of the harvest and marketing costs.

NUTRITION AND DISEASE CONTROL

Some fertilizer is used in this vineyard due to the relatively low to moderate fertility of the soil. A small quantity of nitrogen fertilizer only is applied as a ground application. There are no foliar applications of fertilizers in this vineyard.

Powdery mildew is controlled by 6 applications of Kumulus DF. There are no other diseases in this vineyard. Sprays for bunch rot are not needed in this vineyard due to the open canopy produced by shoot removal and the moderate vigor obtained through control of the water and fertilizer programs. Some other vineyards may require control sprays for bunch rot or insect

pests.

WILDLIFE CONTROL

Bird control is provided by various bird scaring devices. Netting of the vineyard will be considered in the future if birds become a serious problem. This logic also applies to other potential wildlife problems such as deer and rabbit damage. Control recommendations for such pest problems are found in the BCMAFF *Grape Management Guide*.

CROP INSURANCE

All businesses have various degrees of risk. Grape production risks are associated with low temperatures that freeze buds or permanent structures of the vine. Climatic events such as hail or rain at bloom can also affect fruit set. Excessive heat during portions of the year may affect cluster size. Disasters affecting production can occur at any time. Crop insurance and vine loss insurance are methods available to producers to transfer some of this risk to a third party. This vineyard operator has decided not to carry the risk of vine or crop loss alone, but rather to split that risk by buying vine and crop loss insurance. Premiums reflect averages for full Plus insurance (Basic @ \$175 plus buy up to 80%).

COVER CROP

Permanent cover crops in vineyards are known to compete for water and nutrients. Under poor management, permanent cover crops compete with grapevines resulting in stunted vines with insufficient growth to produce 4.3 tons per acre and not enough renewal wood for future target crops. However, if properly managed, permanent cover crops can also have beneficial effects in the vineyard. For example: controlling soil compaction, enabling the use of equipment during wet periods of the year;

building organic matter, stabilizing soil on hillsides, helping to reduce erosion and the leaching of nutrients into ground water, and protecting grape roots from cold winters.

Mixtures of permanent cover crops are superior to single grasses to satisfy the need for rapid grass establishment. This vineyard required a cover crop to assist in soil management and to provide a base for machinery during wet weather. A permanent cover crop suitable for low moisture conditions is desirable even though overhead sprinklers will be installed. Crested wheatgrass and sheep fescue are good options. They take longer to establish on soils with low to moderate fertility than some other cover crops, but will provide a lower level of cover crop maintenance once established. Perennial ryegrass was added to this grass mixture to act as a nurse crop, to provide soil management and facilitate equipment operations during the time that other grasses are germinating and becoming established. The other grasses will eventually replace the perennial ryegrass.

Black plastic mulch in the row during the establishment years was not used in this vineyard due to topography. However, black plastic mulch in the row during the establishment years has been proven to decrease the number of years required to reach full production. Black plastic mulch is an effective tool for weed control, moisture conservation and it warms the soil early in the year encouraging early root growth.

A rotovator and weed sprayer are used to provide weed control in this vineyard.

B. Detailed Assumptions

General Items

Total Farm Acreage	12	Yield - Year 1 (tons/acre)	0.0
Vinifera Grape Acreage	10	Yield - Year 2 (tons/acre)	1.0
Plant Spacing (ft)	4.0	Yield - Year 3 (tons/acre)	2.5
Row Spacing (ft)	8.0	Yield - Year 4 (tons/acre)	3.7
Planting Density (Vines/acre)	1,361	Yield - Year 5 (tons/acre)	4.3
Percent of Vines Replanted - (Yr. 2)	3.0%	Bin Weight in Pounds	400
Row Length (ft)	302.5	Price (\$/ton)	1,350
Number of Rows/acre	18	Grape Association (annual)	200
<i>Vertical Upright Canopy System</i>		Wine Institute \$/ton	32.50
# 8 ft Row Posts/acre	174	Hauling \$/ton	20.00
# 8 ft End Posts/acre	36	Harvest \$/bin	18.00
# Anchors (metal Rod)/acre	36	Bin Yarding \$/bin	1.50
# Wires/row - 11 gal	1	Building R & M	3%
# Wires/row - 13.5	6	General Items (Misc. Exp.)	3%
11 gauge wire-feet/lb	28		
13.5 gauge wire-feet/lb	41		
Staples (#1-3/4"/post)	8		
# Staples / pound	65		
Other Hardware (\$/end post)	3.80		
Vine protection (Cartons) (\$ ea.)	0.11		

Vine Insurance *

Grower Premium \$/acre	Year 1	Year 2	Year 3
	66.51	66.51	66.51

Crop Insurance *

Insurance Base Yields:	lb./acre	Grower Premiums:	\$/acre
Year 2	0	Year 2	0
Year 3	2,000	Year 3	24.45
Year 4	5,000	Year 4	61.11
Year 5+	9,000	Year 5+	110.00

* These rates vary with each situation. A BCMAFF Crop Insurance Representative should be contacted to determine appropriate values for each situation. Premiums assume full Plus coverage.

Input Costs

			\$	unit	\$/acre
Plants	1,361	#	2.50	plant	3,403.13
Stakes	1,361	#	0.07	stake	89.13
Posts	210	#	3.15	post	661.50
Anchors	36	#	9.00	anchor	324.00
High Tensile Wire - 11 gauge	195	lb	0.78	lb	151.71
13.5 gauge	797	lb	0.83	lb	661.51
Staples	26	lb	0.92	lb	23.78
Other Hardware	210	#	3.80	post	798.00
Milk Cartons	1,361	#	0.11	ea.	149.74
Tape- Year 1	2,042	ft	0.0400	ft	81.68
Tape- Year 2	1,210	ft	0.0400	ft	48.40
Tape- Year 3	605	ft	0.0400	ft	24.20
Wire String -Years 4+	2.5 rolls	(400m)	16.00	roll	40.00
Fertilizer (per acre cost estimate)			60.00	acre	60.00
Fuel Costs	Diesel		0.60	litre	
	Gas		0.70	litre	
Irrigation Water Costs (Irrigation District)			100.00	acre	100.00
Hired Labor Rate:			10.00	hr	
Total:			12.10	hr	
Total Labor	100% Hired				

Fungicide Application

Material	Kumulus DF	Cost of Materials:	
Rate per Application	1.4 kg/acre	\$3.63/kg	
# Applications/year	6		
Total Material/year	8.4 kg/acre		Cost/acre: \$30.49

Cover Crop

		\$	Unit	\$/acre
Crested Wheat Grass	6.0 kg	3.26	kg	19.54
Sheep Fescue	3.2 kg	3.48	kg	11.12
Perennial Ryegrass	4.0 kg	4.20	kg	16.80
Total Cover Crop Costs				47.46

Herbicides

	Application Rate	\$	Unit	\$/acre
Gramoxone	2.2 litre/acre	20.80	litre	45.76
Glyphosate	3.0 litre/acre	10.08	litre	30.24
Years 1-3 (3 applications) / Years 4 – 5 (2 applications)				

II. Contribution Margin Summary and Planting Year Cash Outlay Estimates

The contribution margin estimates summary (Table 1) provides an overview of the direct income and direct expenses per acre from the planting year (1) through to the average full production year (5) for the vineyard model. It is important to note that **the contribution margin must provide funds for interest, overhead and other fixed costs as well as a return for living expenses, loan repayment and investment. These items are specific to each situation and should be calculated for individual circumstances and expectations and added to this basic enterprise information.** As mentioned previously, the contribution margin format is the easiest for comparing the financial contribution of various enterprises to the farm business. It provides the farm manager with a starting point from which to select an enterprise and to prepare a total farm income and expense projection, cashflow statement and business plan.

Table 2 provides a look at the planting year cash outlay estimates for direct expenses and the machinery compliment for a total 10 acre vineyard. This is based on the assumption that the land and water resources are already acquired and the owner is assessing the additional capital requirement to start a vineyard and purchase the machinery listed in this publication. Again, these values do not include indirect expenses or fixed costs (e.g. General overhead, interest charges, accounting, depreciation, etc.). These should be added for each specific situation, as individual circumstances and requirements will vary.

TABLE 1
CONTRIBUTION MARGIN ESTIMATES SUMMARY
(Vinifera Grape Establishment \$ per Acre)

	Year 1 <i>Planting</i>	Your Estimates	Year 2	Your Estimates	Year 3	Your Estimates	Year 4	Your Estimates	Year 5 <i>Full Prod'n</i>	Your Estimates	5 Year Totals
Direct Income											
Yield (tons)	0.0		1.0		2.5		3.7		4.3		11.50
Price (\$/ton)	1,350		1,350		1,350		1,350		1,350		1,350
Total Direct Income	0		1,350		3,375		4,995		5,805		15,525
Direct Expenses											
Vines *	3,403										3,403
Support System *	2,710										2,710
Irrigation System *	1,500										1,500
Replanting 3.0%			109								109
Plant Nutrients			60		60		60		60		240
Crop Protection	318		121		121		121		121		802
Machinery Fuel/Oil	354		133		147		134		152		920
R&M	274		172		252		264		269		1,231
Total Labour (100% hired)	3,056		1,517		2,039		2,124		2,170		10,905
Contract Harvesting			118		294		435		505		1,351
Marketing			53		101		140		160		454
Equipment Rentals	301		15		123		15		15		469
Other Supplies (Crop Ins.)	568		339		312		374		430		2,024
Total Direct Expenses	12,484		2,637		3,449		3,668		3,881		26,119
Contribution Margin	-12,484		-1,287		-74		1,327		1,924		-10,594
Indirect Expenses											
Interest											
Depreciation											
Other Indirect Expenses											
Net Farm Income											

TABLE 2
PLANTING YEAR CASH OUTLAY ESTIMATES
10 ACRE VINEYARD DEVELOPMENT*
 Vinifera Wine Grape Establishment and Production

Direct Expenses		
Vines		34,031
Support System		27,096
Nutrients/Pesticides/Herbicides		3,175
Machinery	Fuel/Oil	3,542
	R&M	2,742
Total Labour (100% Hired)		30,559
Equipment Rentals		3,011
Other Supplies (Crop Ins.)		5,681
Total Direct Expenses		109,837
Capital Items		
Irrigation System		15,000
Machinery & Buildings		77,480
Total Capital Items		92,480
ESTIMATED OUTLAY		202,317

* This information reflects the added capital to plant a 10 acre vineyard and purchase a complement of machinery. It is based on the assumption that land and related development resources have already been acquired.

III. Detailed Operations Tables

Tables 3-7 provide the detailed information for the establishment and full production years of a Vinifera Grape planting. The information is organized by specific operations and shows the machinery item use, labour hours and cost, and other related material costs. The first four tables summarize these detailed operations over the establishment period of the vineyard, and provide an estimate of the direct income and expenses and resulting contribution margins. Table 7 reflects an average full production year for the vineyard model used in this study.

These values should be used as a starting point from which to develop individual enterprise plans. As previously noted, the total of the margins from all vineyard acreage or all farm enterprises must provide the funds to cover indirect expenses, fixed costs, and other items such as debt servicing, income tax, living expenses and return on investment. To assist managers in preparing overall financial plans for the farm business, there are crop planning forms available from local BC Ministry of Agriculture, Food and Fisheries offices (or on BCMAFF Farm Business Management web site <http://www.agf.gov.bc.ca/busmgmt/>).

TABLE 3
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 1 (Planting)

Operation Description	Machinery Number *	Times Done	Machinery Items			Labour		Other	Total Direct	
			Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre	
Plow (rent \$30/day)	1	1	2.25	2.25	17.92	2.25	27.23	15.00	60.14	
Cultivating (rent \$20/day)	1	1	3.0	3.0	23.89	3.0	36.30	10.00	70.19	
Rock Picking	1	2	1	2.0	2.0	16.02	21.0	254.10	270.12	
Custom Work (Discing)								60.00	60.00	
Survey/Stake/Transit Rental		1				4.0	48.40	3.00	51.40	
Augering (Auger Rent&Bits)	1	1	12.0	12.0	95.55	12.0	145.20	123.07	363.82	
Anchors		1			0.00	8.0	96.80	324.00	420.80	
Vinifera Vines @ \$2.50/plant		1						3,403.13	3,403.13	
Planting & Staking	1	1	1.0	0.5	7.96	81.0	980.10	89.13	1,077.20	
Posts & Spreading	1	2	1	2.0	2.0	16.02	2.0	24.20	661.50	701.72
Post Pounding & Rental	1	1	20.0	20.0	159.26	20.0	242.00	80.00	481.26	
Wire Spreading/Staples/Application		1				30.0	363.00	1,635.00	1,998.00	
Irrigation (maintenance)	10	4	12	48	78.11	2.8	33.88	100.00	211.99	
Tying & Suckering		1				45.0	544.50	81.68	626.18	
Covering Grafts	1	1	2.0	2.0	15.93	2.0	24.20		40.13	
Weed Spraying	1	4	3	1.5	4.5	37.12	4.5	54.45	137.28	228.85
Kumulus DF 1.4 kg/ac	1	6	6	1.0	6.0	62.65	6.0	72.60	30.49	165.74
Vine Protection / cartons		1						149.74	149.74	
Irrig/Compressor Rental		1						10.00	10.00	
Vine Insurance								66.51	66.51	
Use of Pickup	9	1	9.0	9.0	98.02	9.0	108.90		206.92	
Miscellaneous Expenses								319.91	319.91	
TOTALS					628.43	252.6	3,055.86	7,299.43	10,983.72	
Expected Income- Vinifera Grapes:	0.0	Tons per acre at	\$1,350	per Ton				Total Direct Income	0.00	
								Total Direct Expenses	10,983.72	
								CONTRIBUTION MARGIN	-10,983.72	

* See Capital Investment Table for Description

TABLE 4
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 2

Operation Description	Machinery Number *	Times Done	Machinery Items			Labour		Other	Total Direct
			Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre
Pruning		1				12.0	145.20		145.20
Dormant Tying (plastic tape)		1				10.0	121.00	48.40	169.40
Replanting/Re-staking/Cartons	3.0%	1				4.0	48.40	109.26	157.66
Rotovate	1	7	2	1.0	2.0	16.71	2.0	24.20	40.91
Seed Cover Crop (Seed Drill Rental)	1		1	1.6	1.6	12.74	1.6	19.36	47.46
Mow Cover Crop	1	3	2	0.75	1.5	13.27	1.5	18.15	31.42
Fertilizer Application	1	5	1	0.5	0.5	4.35	0.5	6.05	60.00
Canopy Management			1				50.0	605.00	655.00
Irrigation (Maint./Water Taxes)	10		4	12			2.8	33.88	100.00
Kumulus DF	1.4 kg/ac	1	6	1.0	6.00	62.65	6.0	72.60	30.49
Rock Picking	1	2	1	1.00	1.00	8.01	2.0	24.20	32.21
Uncovering Grafts (hand hoe)			1				12.0	145.20	145.20
Weed Spraying	1	4	3	2.00	6.00	49.50	6.0	72.60	90.72
Irrig/Compressor Rental			1					10.00	10.00
Covering Grafts	1		1	2.0	2	15.93	2.0	24.20	45.13
Adjusting Wires			1				1.0	12.1	12.10
Contract Harvest	\$18.00 /bin	1	2	2.00	2.00	16.02	2.0	24.20	90.00
BinUnload/Yd/Hauling	\$1.50/bin 400# /bin	1	2	1.00	1.00	8.01	1.0	12.10	27.50
Grape Association	\$20.00 /acre (\$200 / 10 acres)							20.00	20.00
Wine Institute	\$32.50 /ton							32.50	32.50
Vine Insurance								66.51	66.51
Use of Pickup	9		1	9.0	9	98.02	9.0	108.90	206.92
Miscellaneous Expenses								76.81	76.81
TOTALS						305.19	125.4	1,517.34	809.65
Expected Income- Vinifera Grapes:		1.0	Tons per acre at	\$1,350	per Ton			Total Direct Income	1,350.00
								Total Direct Expenses	2,637.17
								CONTRIBUTION MARGIN	-1,287.17

* See Capital Investment Table for Description

TABLE 5
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 3

Operation Description	Machinery		Times Done	Machinery Items			Labour		Other Materials \$/Acre	Total Direct Expenses \$/Acre
	Number *			Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre		
Pruning (hand)			1				25.0	302.50		302.50
Mow Prunings	1	3	1	1.0	1.0	8.85	1.0	12.10		20.95
Dormant Tying			1				10.0	121.00	24.20	145.20
Mow Cover Crop	1	3	2	0.75	1.5	13.27	1.5	18.15		31.42
Uncover Grafts (hand hoe)			1				12.0	145.20		145.20
Fertilizer Application	1	5	1	0.5	0.5	4.35	0.5	6.05	60.00	70.40
Rotovating	1	7	2	1.0	2.0	16.71	2.00	24.20		40.91
Canopy Management			1				80.0	968.00		968.00
Irrigation(Maint./Water Taxes)	10		4	12.0	48.0	78.11	2.8	33.88	100.00	211.99
Kumulus DF 1.4 kg/ac	1	6	6	1.0	6.0	62.65	6.0	72.60	30.49	165.74
Vine/Crop Insurance			0						90.95	90.95
Weed Spraying	1	4	3	2.0	6.0	49.50	6.0	72.60	90.72	212.82
Bird Control	8		21	0.56	11.76	5.60	4.0	48.40		54.00
BinUnload/Yarding \$1.50/bin 400# /bin	1	2	1	1.5	1.5	12.01	1.5	18.15	18.75	48.91
Contract Harvest \$18.00 /bin	1	2	1	4.2	4.2	33.63	4.2	50.82	225.00	309.45
Custom Hauling \$20.00 /ton			1						50.00	50.00
Grape Association \$20.00 /acre (\$200 / 10 acres)									20.00	20.00
Wine Institute \$32.50 /ton									81.25	81.25
Adjusting Wires			1				1.0	12.10		12.10
Irrig/CompressorRental			1						10.00	10.00
Covering Grafts	1		1	2.0	2.0	15.93	2.0	24.20	5.00	45.13
Use of Pickup	9		1	9.0	9.0	98.02	9.0	108.90		206.92
Miscellaneous Expenses									97.31	97.31
TOTALS						398.61	168.5	2,038.85	903.68	3,341.14
Expected Income- Vinifera Grapes:		2.5	Tons per acre at	\$1,350	per Ton				Total Direct Income	3,375.00
									Total Direct Expenses	3,341.14
									CONTRIBUTION MARGIN	33.86

* See Capital Investment Table for Description

TABLE 6
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 4

Operation Description	Machinery		Machinery Items			Labour		Other	Total Direct
	Number	Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre
Pruning (hand)		1				35.0	423.50		423.50
Mow Prunings	1	3	1.0	1.0	8.85	1.0	12.10		20.95
Dormant Tying		1				10.0	121.00	40.00	161.00
Mow Cover Crop	1	3	0.75	1.5	13.27	1.5	18.15		31.42
Uncover Grafts (hand hoe)		1				10.0	121.00		121.00
Fertilizer Application	1	5	0.5	0.5	4.35	0.5	6.05	60.00	70.40
Vine/Crop Insurance								127.62	127.62
Canopy Management		1				80.0	968.00		968.00
Irrigation(Maint./Water Taxes)	10	4	12.0	48.0	78.11	2.8	33.88	100.00	211.99
Kumulus DF 1.4 kg/ac	1	6	1.0	6.0	62.65	6.0	72.60	30.49	165.74
Weed Spraying	1	4	2.0	6.0	49.50	6.0	72.60	90.72	212.82
Rotovating	1	7	1.0	2.0	16.71	2.0	24.20		40.91
Bird Control	8	21	0.56	11.76	5.60	4.0	48.40		54.00
BinUnload/Yarding \$1.50/bin 400# /bin	1	2	1.5	1.5	12.01	1.5	18.15	27.75	57.91
Contract Harvest \$18.00 /bin	1	1	4.2	4.2	33.44	4.2	50.82	333.00	417.26
Custom Hauling \$20.00 /ton		1						74.00	74.00
Grape Association \$20.00 /acre (\$200 / 10 acres)								20.00	20.00
Wine Institute \$32.50 /ton								120.25	120.25
Covering Grafts	1	1	2.0	2.0	15.93	2.0	24.20	5.00	45.13
Irrig/Compressor Rental		1						10.00	10.00
Use of Pickup	9	1	9.0	9.0	98.02	9.0	108.90		206.92
Miscellaneous Expenses								106.82	106.82
TOTALS					398.42	175.5	2,123.55	1,145.65	3,667.63
Expected Income- Vinifera Grapes:	3.7	Tons per acre at	\$1,350	per Ton				Total Direct Income	4,995.00
								Total Direct Expenses	3,667.63
								CONTRIBUTION MARGIN	1,327.37

* See Capital Investment Table for Description

TABLE 7
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 5 (Full Production)

Operation Description	Machinery Number *	Times Done	Machinery Items			Labour		Other Materials \$/Acre	Total Direct Expenses \$/Acre
			Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre		
Pruning (hand)		1				35.0	423.50		423.50
Mow Prunings	1	3	1	1.0	1.0	8.85	1.0	12.10	20.95
Dormant Tying		1				11.0	133.10	40.00	173.10
Mow Cover Crop	1	3	2	0.75	1.5	13.27	1.5	18.15	31.42
Uncover Grafts		1				10.0	121.00		121.00
Crop Insurance								176.51	176.51
Fertilizer Application	1	5	1	0.5	0.5	4.35	0.5	6.05	60.00
Rotovating	1	7	2	1.0	2.0	16.71	2.0	24.20	40.91
Canopy Management		1				80.0	968.00		968.00
Irrigation(Maint./Water Taxes)	10	4		12.0	48.0	78.11	2.8	33.88	100.00
Kumulus DF	1.4 kg/ac	1	6	1.0	6.0	62.65	6.0	72.60	30.49
Weed Spraying		1	4	2.0	6.0	49.50	6.0	72.60	90.72
Bird Control		8	21	0.6	11.76	5.60	4.0	48.40	54.00
BinUnload/Yarding	\$1.50/bin 400# /bin	1	2	3.5	3.5	28.03	3.5	42.35	32.25
Contract Harvest	\$18.00 /bin	1	1	5.0	5.0	39.81	5.0	60.50	387.00
Custom Hauling	\$20.00 /ton		1					86.00	86.00
Grape Association	\$20.00 /acre (\$200 / 10 acres)							20.00	20.00
Wine Institute	\$32.50 /ton							139.75	139.75
Covering Grafts (plow attachment)		1	1	2.0	2.0	15.93	2.0	24.20	5.00
Irrig/Comp-Rntl			1					10.00	10.00
Use of Pickup		9	1	9.0	9.0	98.02	9.0	108.90	206.92
Miscellaneous Expenses								113.04	113.04
TOTALS						420.81	179.3	2,169.53	1,290.76
Expected Income- Vinifera Grapes:		4.30	Tons per acre at	\$1,350	per Ton			Total Direct Income	5,805.00
								Total Direct Expenses	3,881.10
								CONTRIBUTION MARGIN	1,923.90

* See Capital Investment Table for Description

IV. Labour Time Estimates & Planning

In developing a financial plan for a grape planting it is important to consider the time demands for numerous operations during planting, establishment and full production years. The objective of this section is to provide a base of information to evaluate labour hour requirements. Tables 8 & 9 summarize labour time estimates developed with grape producers. They reflect “typical” operations in the vineyard. **It should be noted that, other than some labour for bin moving in the vineyard, harvesting and bin hauling are done on a contract basis and are not included in these hours. Costs for harvesting and hauling can be found in the detailed operations tables in Section III.**

For this financial planning model, all labour is hired at a cost of \$12.10/hour (inclusive). Operations must be performed on time for good horticultural management. Stages of vine growth for canopy management and other labour intensive tasks have a narrow window of time when they are required. Canopy management includes a range of techniques which affect fruit quality. It is expected that operations are done in a timely and efficient manner.

Care should be taken when planning labour requirements and costs for individual situations. There is a significant range of hours required for canopy management within the industry. Labour hours will be impacted by vineyard site, production system and grape variety. Canopy management operations include: tying and suckering in year one; tying, suckering and bunch thinning in year two; and shoot thinning, suckering, leaf removal, bunch thinning, tucking and hedging in years three to five. Time estimates for canopy management range from 30 to 55 hours in year one, 40 to 60 hours in year two and 60 to 120 or more hours in years three to five. With moderate vigor in this vineyard, the estimated hours per acre for canopy management are 45 hours in year one, 50 hours in year two and 80 hours in years three to five.

Table 9 summarizes the total labour hours for a 10 acre vineyard for the 5 year planning period. Estimated annual hours are: 2,526 in the planting year, 1,169 in year two, 1,685 in year three and 1,755 in year four. For the average full production year labour hours total 1,793. This equates to about 1 full time hired person for a year. However, the most important management decision regarding the use of labour is timing and, for many operations in the vineyard, the annual hours listed are required over a few short weeks placing considerable demand on labour needs. It is important to review these labour estimates in order to identify if sufficient resources are available to satisfy operational requirements and to make adjustments for individual circumstances.

TABLE 8
LABOUR TIME ESTIMATES SUMMARY
Annual Hours/Acre- Various Operations (Years 1 - 5)

Labour Operation	Year 1		Labour Operation	Year 2		Year 3		Year 4		Year 5	
	Annual Labour	Your Est.		Annual Labour	Your Est.	Annual Labour	Your Est.	Annual Labour	Your Est.	Annual Labour	Your Est.
	<i>hr/Ac</i>	<i>hr/Ac</i>		<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>	<i>hr/Ac</i>
Plowing	2.25	_____	Pruning	12	_____	25	_____	35	_____	35	_____
Cultivation	3	_____	Mow Prunings	-	_____	1	_____	1	_____	1	_____
Survey/Stake	4	_____	Replanting	4	_____	-	_____	-	_____	-	_____
Augering	12	_____	Rotovate	2	_____	2	_____	2	_____	2	_____
Planting/Stake	81	_____	Seed Cover Crop	1.6	_____	-	_____	-	_____	-	_____
Spreading Posts	2	_____	Dormant Tying	10	_____	10	_____	10	_____	11	_____
Anchor Install	8	_____	Mow Cover Crop	1.5	_____	1.5	_____	1.5	_____	1.5	_____
Pounding Posts	20	_____	Fertilizer Application	0.5	_____	0.5	_____	0.5	_____	0.5	_____
Wire Spreading/Install	30	_____	Bird Control	-	_____	4	_____	4	_____	4	_____
Rock Picking	21	_____	Wire Adjusting	1	_____	1	_____	-	_____	-	_____
Weed Sprayer	4.5	_____	Rock Picking	2	_____	-	_____	-	_____	-	_____
Fungicide Application	6	_____	Weed Spraying	6	_____	6	_____	6	_____	6	_____
Canopy Management *	45	_____	Fungicide Application	0.50	_____	6	_____	6	_____	6	_____
Hand Hoe	0	_____	Canopy Management *	50	_____	80	_____	80	_____	80	_____
Irrigation Work	2.8	_____	Uncover Grafts (Hand Hoe)	12	_____	12	_____	10	_____	10	_____
Pickup Operation	9	_____	Irrigation Work	2.8	_____	2.8	_____	2.8	_____	2.8	_____
Covering Grafts	2	_____	Pickup Operation	9	_____	9	_____	9	_____	9	_____
		_____	Covering Grafts	2	_____	2	_____	2	_____	2	_____
		_____	Bin Handling- Harvest	-	_____	4.2	_____	4.2	_____	5	_____
		_____	Bin Handling- Yarding	-	_____	2	_____	1.5	_____	3.5	_____
Total Hours/Acre	253		Total Hours/Acre	117		169		176		179	

* There is a significant range of labour hours for Canopy Management operations (see page 16)

TABLE 9
LABOUR TIME ESTIMATES SUMMARY
Annual Hours & Weeks for 10 Acre Vineyard- Various Operations (Years 1 - 5)

Labour Operation	Year 1		Year 2		Year 3		Year 4		Year 5		
	Annual Labour		Annual Labour		Annual Labour		Annual Labour		Annual Labour		
	hours	weeks*	hours	weeks*	hours	weeks*	hours	weeks*	hours	weeks*	
Plowing	22.5	0.6	Pruning	120	3.0	250	6.3	350	8.8	350	8.8
Cultivation	30	0.8	Mow Prunings	-	-	10	0.3	10	0.3	10	0.3
Survey/Stake	40	1.0	Replanting	40	1.0	-	-	-	-	-	-
Augering	120	3.0	Rotovate	20	0.5	20	0.5	20	0.5	20	0.5
Planting/Stake	810	20.3	Seed Cover Crop	16	0.4	-	-	-	-	-	-
Spreading Posts	20	0.5	Dormant Tying	100	2.5	100	2.5	100	2.5	110	2.8
Anchor Install	80	2.0	Mow Cover Crop	15	0.4	15	0.4	15	0.4	15	0.4
Pounding Posts	200	5.0	Fertilizer Application	5	0.1	5	0.1	5	0.1	5	0.1
Wire Spreading/Install	300	7.5	Bird Control	-	-	40	1.0	40	1.0	40	1.0
Rock Picking	210	5.3	Wire Adjusting	10	0.3	10	0.3	-	-	-	-
Weeding/Grape Hoe	45	1.1	Rock Picking	20	0.5	-	-	-	-	-	-
Fungicide Application	60	1.5	Weed Sprayer	60	1.5	60	1.5	60	1.5	60	1.5
Canopy Management *	450	11.3	Fungicide Application	5	0.1	60	1.5	60	1.5	60	1.5
Hand Hoe	0	0.0	Canopy Management *	500	12.5	800	20.0	800	20.0	800	20.0
Irrigation Work	28	0.7	Uncover Grafts (Hand Hoe)	120	3.0	120	3.0	100	2.5	100	2.5
Pickup Operation	90	2.3	Irrigation Work	28	0.7	28	0.7	28	0.7	28	0.7
Covering Grafts	20	0.5	Pickup Operation	90	2.3	90	2.3	90	2.3	90	2.3
			Covering Grafts	20	0.5	20	0.5	20	0.5	20	0.5
			Bin Handling- Harvest			42	1.1	42	1.1	50	1.3
			Bin Handling- Yarding			15	0.4	15	0.4	35	0.9
<i>* 40 hours</i>											
Total for 10 Acres	2,526	63.1	Total for 10 Acres	1,169	29.2	1,685	42.1	1,755	43.9	1,793	44.8

* There is a significant range of labour hours for Canopy Management operations (see page 16)

Vinifera Grape Establishment

V. Machinery & Buildings: Investment, Operating Costs and Usage Summary

This section summarizes the estimated capital investment in machinery, equipment and buildings (Table 10) and provides some background to the hours of use, repair and maintenance, and operating costs (Table 11) associated with estimating the direct expenses for the establishment and production years of a 10 acre Vinifera Grape planting.

The machinery investment and use will change with the size of the vineyard and should be evaluated for each situation. Costs are based on quotes received from machinery dealers when these items are purchased new as a package. Machinery and equipment operational costs are based on agriculture engineering estimates. Years of useful life, salvage values and hours of use per year for equipment and machinery are based on information provided by grape producers.

It is important to note that *the level of investment in depreciable assets on a per acre basis has a significant impact on profitability*. The \$92,480 investment in machinery, equipment and buildings for this vineyard could be utilized for vineyards from 5 to 25 acres in size. The resulting investment levels per acre would range from \$18,496 to \$3,699 respectively. The vineyard model here is based on a 10 acre planting with the depreciable asset investment at an estimated \$9,248 per acre. This level of investment must be supported by the margins generated from the production of grapes. With a higher level of investment in depreciable assets, particularly if financed through loans, a smaller vineyard will have a higher cost structure to support resulting in greater financial risk. The level of investment in depreciable assets in terms of operation requirements and the farm's ability to withstand various sources of risk should be evaluated for specific situations.

Adjustments to the machinery list may be possible where certain equipment is only used on occasion. In this case, managers might consider rental or custom hire as a means to reduce investment costs and improve profit potential. The smaller the projected margins the greater the need for managing the capital investment in machinery and equipment as well as other fixed and indirect expenses. The sensitivity analysis section illustrates the impact of price, yield and labour hour variations on projected contribution margins.

TABLE 10
CAPITAL INVESTMENT AND OPERATING COST SUMMARY
Machinery, Equipment & Buildings
10 Acre Vineyard Operation

Machine List	New Value	Years Life	Salvage Value	Hours Use/Yr	Repair \$/hr	Operating \$/hr
#						
1 Tractor 50 HP	32,000	15	3,200	311	1.49	7.96
2 Rear & Front Forks	6,000	15	400	25	0.04	0.04
3 Mower - Flail Chopper	4,800	15	250	18	0.88	0.88
4 Weed Sprayer - 110 gal	1,480	10	0	65	0.29	0.29
5 Fertilizer Spreader	1,800	15	200	4	0.74	0.74
6 Sprayer - 100 Gal	6,240	15	800	60	2.48	2.48
7 Rotovator	3,000	15	100	16	0.39	0.39
8 Bird Alarms/Control Mach	1,500	6	100	71	0.48	0.48
9 Pick-Up 1/2 Ton (used)	10,000	5	2,000	90	1.35	10.89
10 Irrigation System (Solid Set)	15,000	15	0	480	1.63	1.63
Subtotal (Hourly Equipment)	81,820					
					Repair \$/Yr	
Small Tools	2,500	10		25		
Storage shed	8,160	30		163		
TOTAL	92,480					

Fuel Consumption Factors

Mach. #	H.P.	Consumption		Cents /Litre
		litre/hp	litres/hr	
1 Tractor	50	0.2157		0.60
10 1/2 Pickup			13.63	0.70

VI. Sensitivity Analysis: Key Success Factors and Risk Assessment

This section addresses the sensitivity of the financial projections to changes in price, yield levels and labour hours for canopy management in years 3 to 15. Price, yield and labour costs are key success factors in terms of financial feasibility and potential returns for this enterprise. To evaluate the impact of these risks on potential profitability, an economic analysis was done using the Internal Rate of Return method.

Contribution Margins

Table 12 shows the projected accumulated balance for the 15 year contribution margins and is intended to provide an indication of the cash flows specific to this enterprise. In actual terms, years in which there is a negative margin would have to be supported from other parts of the farm or from owner's or external sources. The accumulated margin (balance) line on Table 12 is based on the enterprise funding itself from grape income and doesn't show a positive balance until year 11. The ending balance at the end of 15 years is \$8,645 for the acre indicating that, based on the assumptions used, the planting has paid back the initial establishment costs and has made a positive contribution to the cashflow of the vineyard.

If outside capital is used to cover the negative margins in the first 3 years, then the enterprise begins contributing positively to farm cashflow in the fourth year starting with \$1,327 per acre and peaking at \$1,924 per acre for the average full production years.

With the exception of an irrigation system, the purchase of machinery and buildings is **not** included in this cashflow analysis. In many cases existing vineyards already own equipment and only look at the added direct costs associated with the planting of a new or replacement acre of grapes; including the upgrading of old irrigation systems.

The fixed overhead and indirect costs along with debt servicing requirements, capital purchases, personal withdrawals and interest, as well as other inflows for individual situations must be added to these projections to prepare a cashflow budget to assess the feasibility of this enterprise for the farm unit as a whole.

Table 13 summarizes the impact of price and yield changes on the accumulated margin balance at the end of 15 years, with labour hours for canopy management in years 3 to 15 fixed at 80 hours. The value in bold denotes the ending balance for the base yield and price assumptions used in the vineyard model. As would be expected, this ending balance declines significantly with reduced prices and yields for grapes. For example, if average annual yield drops from the projected 4.3 tons/acre to 4.0 tons, the ending balance declines to \$4,700 at the same price. If the projected price also declines to \$1,000/ton over the planning period, then the ending balance for the margins drops to negative \$13,220 for the 1 acre planting.

Table 14 shows the impact on the 15 year accumulated margins as a result of changes to yield and the major labour component, canopy management hours for years 3 to 15, with price fixed at the \$1,350 per ton level. The impact of labour hours on these projections is a significant factor in assessing the financial requirements of the grape planting. For example, if canopy management hours increase from 80 to 100 the ending balance decreases from \$8,645 to \$5,405.

These tables can be used to provide a quick determination of how the 15 year balance changes with the stated ranges of prices, yields and canopy management labour hours; a best case/worse case analysis.

Income Potential

Price is a key variable in this analysis. Changes in the estimated price for grapes have a significant impact on profitability of the vineyard. A reduction or increase in overall price received by the producer changes the potential return and the resulting contribution margins. It is important to assess the market or price risk associated with this crop. A broad range of price possibilities means a higher degree of risk.

The income projections contained in this publication are based on a projected price of \$1,350/ton, calculated from overall 1999 industry prices for Vinifera grape varieties purchased by British Columbia wineries. This reflects a higher than average quality and demand for the variety in our vineyard. Caution should be exercised in applying this information to specific farm situations. To assist in this, there are tables in the Appendices summarizing the winery purchase and value estimates for wine grapes.

Given that wineries do not have to buy a vineyard's grapes, producers should have a commitment from a winery **before** planting to purchase the grapes for a long enough period of time to recover the vineyard investment. Grape producers are responsible for the negotiations that establish the value and payment schedule, the production of grapes to standards required by the buyer and marketing of the crop. Grapes produced by a winery for its own use should be purchased from the

vineyard enterprise at fair market value. Depending on specific plans or objectives, other marketing options to consider may be the home wine or the juice, jam and jelly markets. Again, a market should be developed before planting.

It is important for each investor looking at planting grapes to consider the target market as well as the variety and quality of grapes required to service that market over time. There is considerable market risk associated with the establishment and production of a vineyard, and it is best to obtain information from a variety of sources to help develop a marketing plan.

Yield Levels

Profitability of the vineyard is significantly impacted by changes in the level of grape production, and may be further impacted by the variation in grape quality.

Crop losses due to weather and/or pests do occur and the projections in this guide try to reflect these occurrences through the average annual yield of 4.3 tons per acre. Yields and quality vary from farm to farm and between varieties, and they will need to form part of an individual risk assessment in terms of yield expectations. This vineyard uses crop insurance as one vehicle to manage yield risks. The information in the Appendices summarizing crop insurance information on vine productivity may help in assessing yield potential for specific situations. For more information contact a crop insurance representative from the local BCMAFF office.

Producers may also want to consider the impact of yield levels in terms of meeting the requirements for contracts and the relationship to quality and prices. Corresponding price and yield changes will need to be assessed in terms of the impact on vineyard profitability and cash flow.

Labour Hours

Profitability of the vineyard is also impacted by the total labour hours required for canopy management resulting from differences in production system, soils, vineyard location and management. The impact may also be affected from labour availability and skill.

There are significant variations in labour hours employed for different vineyards. Tables 14 and 16 illustrate the impact of changes to the main labour component (canopy management hours from year 3 - 15) and grape yields on accumulated margins and the internal rate of return. Care must be used in assessing this component for specific vineyards when developing a whole farm plan.

TABLE 12
CUMULATIVE CONTRIBUTION MARGIN SUMMARY (Cashflow Projection)

\$ per Acre

Vinifera Wine Grape Establishment and Production

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Planting					Average Full Production										
Direct Income															
Yield (tons)	0	1.0	2.5	3.7	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Price (\$/ton)	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350
Total Direct Income	0	1,350	3,375	4,995	5,805	5,805	5,805	5,805	5,805	5,805	5,805	5,805	5,805	5,805	5,805
Direct Expenses															
Vines *	3,403	109													
Support System *	2,710														
Plant Nutrients		60	60	60	60	60	60	60	60	60	60	60	60	60	60
Pesticides/Herbicides	318	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Machinery Fuel/Oil	354	133	147	134	152	152	152	152	152	152	152	152	152	152	152
R&M	274	172	252	264	269	269	269	269	269	269	269	269	269	269	269
Total Labour (100% hired)	3,056	1,517	2,039	2,124	2,170	2,170	2,170	2,170	2,170	2,170	2,170	2,170	2,170	2,170	2,170
Contract Harvesting		118	294	435	505	505	505	505	505	505	505	505	505	505	505
Marketing		53	101	140	160	160	160	160	160	160	160	160	160	160	160
Equipment Rentals	301	15	123	15	15	15	15	15	15	15	15	15	15	15	15
Other Supplies (Crop Ins.)	568	339	312	374	430	430	430	430	430	430	430	430	430	430	430
Total Direct Expenses	10,984	2,637	3,449	3,668	3,881	3,881	3,881	3,881	3,881	3,881	3,881	3,881	3,881	3,881	3,881
Contribution Margin	-10,984	-1,287	-74	1,327	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924	1,924
Irrigation System *	1,500														
Beginning Balance	0	-12,484	-13,771	-13,845	-12,518	-10,594	-8,670	-6,746	-4,822	-2,898	-974	950	2,874	4,797	6,721
Interest 0.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Margin (balance)	-12,484	-13,771	-13,845	-12,518	-10,594	-8,670	-6,746	-4,822	-2,898	-974	950	2,874	4,797	6,721	8,645

* May be considered Capital Items.

Note: Fixed costs are not included in this summary. A complete financial/business plan should be done for individual situations.

TABLE 13
IMPACT OF PRICE AND YIELD CHANGES ON
15 YEAR ACCUMULATED CONTRIBUTION MARGIN

With Canopy Management at 80 Hours/Acre
 Vinifera Wine Grape Establishment and Production
 \$/Acre

Average Annual Yield at Full Production (tons/acre)

		3.0	3.5	4.0	4.3	5.0	5.5	6.0	6.5	7.0
Average Price \$/ton	1,000	-22,520	-17,870	-13,220	-10,430	-3,919	731	5,381	10,031	14,682
	1,100	-18,500	-13,300	-8,100	-4,980	2,301	7,501	12,701	17,901	23,102
	1,200	-14,480	-8,730	-2,980	470	8,521	14,271	20,021	25,771	31,522
	1,300	-10,460	-4,160	2,140	5,920	14,741	21,041	27,341	33,641	39,942
	1,350	-8,450	-1,875	4,700	8,645	17,851	24,426	31,001	37,576	44,152
	1,400	-6,440	410	7,260	11,370	20,961	27,811	34,661	41,511	48,362
	1,500	-2,420	4,980	12,380	16,820	27,181	34,581	41,981	49,381	56,782
	1,600	1,600	9,550	17,500	22,270	33,401	41,351	49,301	57,251	65,202
	1,700	5,620	14,120	22,620	27,720	39,621	48,121	56,621	65,121	73,622
	1,800	9,640	18,690	27,740	33,170	45,841	54,891	63,941	72,991	82,042
	1,900	13,660	23,260	32,860	38,620	52,061	61,661	71,261	80,861	90,462
	2,000	17,680	27,830	37,980	44,070	58,281	68,431	78,581	88,731	98,882
	2,100	21,700	32,400	43,100	49,520	64,501	75,201	85,901	96,601	107,302
	2,200	25,720	36,970	48,220	54,970	70,721	81,971	93,221	104,471	115,722

This table shows the change in the 15 year accumulated Contribution Margins (Table 12), and illustrates the impact of the projected values for grape prices and yields with **hours for canopy management** (years 3 - 5) **fixed at 80 hours/acre**. The 15 year ending balance of \$8,645 for the base assumptions indicates that the planting has paid back the initial establishment costs and has made a positive contribution to the cashflow of the vineyard. This value changes with price and yield. An individual financing plan, including indirect expenses (eg. interest, depreciation, etc.), fixed costs and capital purchases should be developed for specific situations.

TABLE 14

**IMPACT OF CHANGES IN YIELD AND CANOPY MANAGEMENT LABOUR HOURS ON
15 YEAR ACCUMULATED CONTRIBUTION MARGIN**

With Price constant at \$1,350/Ton

Vinifera Wine Grape Establishment and Production

\$/Acre

Average Annual Yield at Full Production (tons/acre)

		3.0	3.5	4.0	4.3	5.0	5.5	6.0	6.5	7.0
Canopy Mgt. (yr. 3 +) hrs./ac.	40	-1,970	4,606	11,181	15,126	24,331	30,907	37,482	44,057	50,632
	50	-3,590	2,985	9,561	13,506	22,711	29,286	35,862	42,437	49,012
	60	-5,210	1,365	7,940	11,886	21,091	27,666	34,241	40,817	47,392
	70	-6,830	-255	6,320	10,265	19,471	26,046	32,621	39,197	45,772
	75	-7,640	-1,065	5,510	9,455	18,661	25,236	31,811	38,386	44,962
	80	-8,450	-1,875	4,700	8,645	17,851	24,426	31,001	37,576	44,152
	85	-9,260	-2,685	3,890	7,835	17,041	23,616	30,191	36,766	43,342
	90	-10,071	-3,495	3,080	7,025	16,230	22,806	29,381	35,956	42,531
	95	-10,881	-4,305	2,270	6,215	15,420	21,996	28,571	35,146	41,721
	100	-11,691	-5,116	1,460	5,405	14,610	21,185	27,761	34,336	40,911
	110	-13,311	-6,736	-160	3,785	12,990	19,565	26,141	32,716	39,291
	120	-14,931	-8,356	-1,781	2,164	11,370	17,945	24,520	31,096	37,671
	130	-16,551	-9,976	-3,401	544	9,750	16,325	22,900	29,475	36,051

This table shows the change in the 15 year accumulated Contribution Margins (Table 12), and illustrates the impact of the projected values for grape yields and labour hours for canopy management (years 3 - 5) **with price constant at \$1,350/ton**. The 15 year ending balance of \$8,645 for the base assumptions indicates that the planting has paid back the initial establishment costs and has made a positive contribution to the cashflow of the vineyard. This value changes with yield and labour hours. An individual financing plan, including indirect expenses (eg. interest, depreciation, etc.), fixed costs and capital purchases should be developed for specific situations.

Internal Rate of Return

The internal rate of return (IRR) is one estimate of potential profitability that is used to evaluate or compare various investments that have a longer time frame in terms of income generating capacity, and is essentially the rate of capital growth within the project. In this analysis IRR is calculated using only the projected contribution margins for the vineyard planting over 15 years. IRR relates the concepts of discounting and the present value of future dollars, and is an estimate of profit for this vineyard. In this case, IRR is the discount rate that results in the benefits of the project (gross income) being equal to the relevant costs (direct expenses) associated with the project. It can be compared to the market or external rate of return, such as accounts in financial institutions, T-bills or other investments. From a strictly economic perspective, the investment would be made when the projected return for the vineyard is greater than the rate for alternative investments. However for individual situations, consideration of fixed and indirect expenses in addition to business goals, risks and other factors will need to be considered in making a final investment decision on whether to plant vinifera wine grapes.

Table 15 illustrates the impact of yield and price changes on IRR with other costs constant. The overall return is significantly impacted by a change in one or both of these factors. As a result, individual assessment of prices and yields are important in looking at potential profit levels. For example, the projected IRR for an average yield of 4.3 tons per acre and price of \$1,350 is 6.1%. Depending on each situation, the estimate of potential profitability changes from a very positive value in the best case scenarios to a negative value in the worst case scenarios. (n/a indicates the value was too small to be calculated).

Table 16 provides an indication of the impact of changes to yields and the major labour component, canopy management hours, on the IRR for the enterprise. As labour hours increase, the corresponding IRR decreases. For example if canopy management time increases from 80 to 120 hours per acre for years 3 to 15, IRR declines from 6.1% to 1.7% at the 4.3 ton yield level.

It is important to use caution when interpreting these numbers, because of the marginal analysis approach used. These projections provide only a relative indication of potential profitability, and must be evaluated within the context of the entire farm business. One possible interpretation may be to consider using a “threshold level” of return (i.e. that rate above which the vineyard investment is made). The “threshold level” would reflect the level of risk (price, yield and labour) and the overhead cost structure of the farm (indirect expenses, debt servicing, depreciable asset levels, and personal withdrawals). To illustrate this point, an example can be used from the base assumption on the sensitivity table where an IRR of 6.1% is shown. Although this might be viewed favorably compared to current deposit rates, it may be below an individual farmer’s “threshold level” for their farm. It may be that this farm requires a minimum of 16% before the

investment would be made. The appropriate threshold will vary for each farm and individual predictions of price, yield, labour and other outcomes.

The information in this section is intended to illustrate how projections vary with changes in the critical success factors of prices, yields and labour hours. The overall outcome of potential profitability and cashflow needs should be assessed for each individual situation in terms of marketing, variety, site, costs and management. Such analysis is important in determining the viability and associated risks for any vineyard investment. Developing a whole farm business plan is a critical next step in pulling all relevant factors together to make a complete assessment.

TABLE 15
IMPACT OF PRICE AND YIELD CHANGES ON
15 YEAR INTERNAL RATE OF RETURN (%) *
With Canopy Management Labour at 80 Hours/Acre
 Vinifera Wine Grape Establishment and Production

Average Annual Yield at Full Production (tons/acre)

		3.0	3.5	4.0	4.3	5.0	5.5	6.0	6.5	7.0
Average Price \$/ton	1,000	n/a	n/a	n/a	-11.9%	-3.3%	0.5%	3.6%	6.2%	8.5%
	1,100	n/a	n/a	-8.6%	-4.6%	1.7%	5.0%	7.7%	10.1%	12.3%
	1,200	n/a	-10.2%	-2.7%	0.4%	5.7%	8.7%	11.3%	13.6%	15.6%
	1,300	n/a	-4.1%	1.7%	4.3%	9.2%	12.0%	14.5%	16.7%	18.6%
	1,350	-10.8%	-1.7%	3.6%	6.1%	10.8%	13.5%	15.9%	18.1%	20.1%
	1,400	-7.5%	0.4%	5.3%	7.7%	12.3%	15.0%	17.4%	19.5%	21.5%
	1,500	-2.4%	4.0%	8.5%	10.7%	15.1%	17.7%	20.0%	22.1%	24.1%
	1,600	1.5%	7.2%	11.4%	13.5%	17.7%	20.3%	22.6%	24.6%	26.6%
	1,700	4.8%	10.0%	14.0%	16.0%	20.1%	22.7%	24.9%	27.0%	28.9%
	1,800	7.7%	12.6%	16.4%	18.4%	22.5%	25.0%	27.2%	29.3%	31.2%
	1,900	10.4%	15.0%	18.8%	20.7%	24.7%	27.2%	29.4%	31.5%	33.4%
	2,000	12.9%	17.3%	21.0%	22.9%	26.8%	29.3%	31.5%	33.6%	35.5%
	2,100	15.2%	19.5%	23.1%	25.0%	28.9%	31.3%	33.5%	35.6%	37.5%
	2,200	17.4%	21.6%	25.1%	27.0%	30.8%	33.3%	35.5%	37.6%	39.5%

* IRR is only based on the Contribution Margins. Indirect expenses (eg. Interest, depreciation, etc.), fixed costs, and machinery and land investment are not included. Values in bold denote base assumptions.

n/a- Indicates that the values are too small to calculate.

The target Internal Rate of Return for Contribution Margins should be in the lower right quadrants of the above table. Refer to the discussion on “threshold level”.

The above tables are set at portrait and 95% of size

TABLE 16
IMPACT OF CHANGES IN YIELD AND CANOPY MANAGEMENT LABOUR HOURS ON
15 YEAR INTERNAL RATE OF RETURN (%) *

With Price fixed at \$1,350/Ton
 Vinifera Wine Grape Establishment and Production

Average Annual Yield at Full Production (tons/acre)

		3.0	3.5	4.0	4.3	5.0	5.5	6.0	6.5	7.0
Canopy Mgt. (yr. 3 +) hrs./ac.	40	-1.9%	3.7%	7.8%	9.9%	13.9%	16.4%	18.6%	20.6%	22.4%
	50	-3.7%	2.5%	6.8%	9.0%	13.2%	15.7%	17.9%	20.0%	21.8%
	60	-5.7%	1.2%	5.8%	8.0%	12.4%	15.0%	17.3%	19.4%	21.3%
	70	-8.0%	-0.2%	4.7%	7.1%	11.6%	14.3%	16.6%	18.7%	20.7%
	75	-9.3%	-1.0%	4.2%	6.6%	11.2%	13.9%	16.3%	18.4%	20.4%
	80	-10.8%	-1.7%	3.6%	6.1%	10.8%	13.5%	15.9%	18.1%	20.1%
	85	-12.5%	-2.5%	3.0%	5.6%	10.4%	13.2%	15.6%	17.8%	19.8%
	90	-14.4%	-3.4%	2.4%	5.1%	9.9%	12.8%	15.3%	17.5%	19.5%
	95	n/a	-4.3%	1.8%	4.5%	9.5%	12.4%	14.9%	17.1%	19.2%
	100	n/a	-5.2%	1.2%	4.0%	9.1%	12.0%	14.6%	16.8%	18.9%
	110	n/a	-7.2%	-0.1%	2.9%	8.2%	11.2%	13.9%	16.2%	18.3%
	120	n/a	-9.6%	-1.5%	1.7%	7.3%	10.5%	13.1%	15.5%	17.6%
	130	n/a	-12.5%	-3.1%	0.4%	6.4%	9.6%	12.4%	14.8%	17.0%

* IRR is only based on the Contribution Margins. Indirect expenses (eg. Interest, depreciation, etc.), fixed costs, and machinery and land investment are not included. Values in bold denote base assumptions.

n/a- Indicates that the values are too small to calculate.

The target Internal Rate of Return for Contribution Margins should be in the lower right quadrants of the above table. Refer to the discussion on “threshold level”.

Assessing Risk

There are critical success factors needed to make any investment profitable. There are a number of elements or factors involved in assessing the risks for a vinifera wine grape planting. The following list of factors is intended as a guideline to ask questions for specific vineyards, and is not exhaustive.

Soil	Variety Selection	Financial
Climate	Quality	Business
Land Suitability	Disease	Marketing
Water	Production	Political
Crop Protection	Contract Requirements	Government Policy
Pest Control	Environment	Taxation

These variables will impact the overall financial projections for the establishment and production of vinifera wine grapes in the Southern Interior of British Columbia. As each location and situation vary, it is a necessary condition that individual risk assessments be conducted. This will determine the key risk factors, the degree of risk and the associated financial and economic impacts. The results will assist in making a better informed decision on the investment in a vinifera grape planting.

APPENDICES

Appendix 1

1999 Crush Tonnage and Average Prices Paid for Grapes (July 6, 2000)

Major White Grape Varieties	Tons Crushed 1999	Average Price \$/ton	Low Price \$/ton	High Price \$/ton
Chardonnay	1,597	1,442	1,000	1,705
Gewurztraminer	614	1,341	700	1,600
Pinot Gris	574	1,253	1,000	1,500
Pinot Blanc	1,133	1,158	800	1,686
Riesling	564	1,147	805	2,000
Ehrenfelser	349	1,327	1,000	1,600
Auxerrois	310	1,230	960	1,350
Bacchus	251	1,171	700	1,600
Vidal Blanc	216	623	623	623
Sauvignon Blanc	214	1,390	648	1,700
Kerner	93	1,333	1,040	1,450
Muller Thurgau	92	1,162	1,150	1,225
Semillon	77	1,500	1,500	1,500
Chenin Blanc	73	979	600	1,050
Optima	63	1,034	665	1,200
Verdelet	48	500	500	500
Major Red Grape Varieties				
Merlot	1,482	1,561	800	2,000
Pinot Noir	1,049	1,424	700	2,000
Cabernet Franc	639	1,390	600	2,000
Cabernet Sauvignon	566	1,522	800	2,400
Gamay	236	1,473	1,151	1,800
Baco Noir	226	933	765	1,600
Chancellor	114	820	744	900
Marechal Foch	113	1,130	660	1,506
Pinot Meunier	70	1,274	1,350	1,596
Misc. Other	521	na	na	na
Total All Grapes	11,284	1,319		

Appendix 2

B.C. WINE GRAPES ACREAGE SURVEY*

November 1, 1999

White Varieties:			
Variety	Acreage	Percent of Whites	Percent of Total
Chardonnay	602.57	26.82%	14.40%
Gewurztraminer	274.79	12.23%	6.57%
Pinot Gris	269.93	12.02%	6.45%
Pinot Blanc	248.42	11.06%	5.94%
Riesling	200.11	8.91%	4.78%
Sauvignon Blanc	99.03	4.41%	2.37%
Ehrenfelser	89.64	3.99%	2.14%
Auxerrois	67.10	2.99%	1.60%
Bacchus	43.12	1.92%	1.03%
Ortega	33.09	1.47%	0.79%
Vidal *	29.15	1.30%	0.70%
Semillon	23.90	1.06%	0.57%
Kerner	23.21	1.03%	0.55%
Madeleine Angevine	22.12	0.99%	0.53%
Muller Thurgau	19.63	0.87%	0.47%
Optima	19.43	0.86%	0.46%
Schonburger	15.89	0.71%	0.38%
Chenin Blanc	15.59	0.69%	0.37%
Seyval Blanc *	13.94	0.62%	0.33%
Scheurebe	13.60	0.61%	0.33%
Viognier	13.30	0.59%	0.32%
Silvaner	12.05	0.54%	0.29%
Chasselas	11.36	0.51%	0.27%
Siegerrebe	11.17	0.50%	0.27%
Muscat	10.41	0.46%	0.25%
Verdelet *	10.40	0.46%	0.25%
Pearl of C'saba	8.09	0.36%	0.19%
Trebbiano	6.50	0.29%	0.16%
Reichensteiner	5.75	0.26%	0.14%
Muscat Ottonel	5.25	0.23%	0.13%
Pear of Zala	4.30	0.19%	0.10%
Tocai	3.00	0.13%	0.07%
Okanagan Riesling *	2.35	0.11%	0.06%
Oraniensteiner	2.20	0.10%	0.05%
Morio Muscat	1.35	0.06%	0.03%
Misc.Mixed Whites(hyb.*/vin.)	14.62	0.65%	0.35%
* Total White Hybrids :	63.15	2.81%	1.51%
Total White Vinifera:	2183.21	97.19%	52.18%
Total BC Whites:	2246.36	100.00%	53.69%

Appendix 3

**B.C. WINERY PURCHASE ESTIMATES
VINIFERA WINE GRAPES (Tons)
1995 - 1999**

Year	Processed Tonnage	Non-Vinifera Tonnage	Total Tons Vinifera
1995	8,018	1,560	6,458
1996	6,180	1,202	4,978
1997	6,614	1,286	5,328
1998	10,188	1,981	8,207
1999	10,631	2,067	8,564

**ESTIMATED GRAPE VALUES
B.C. WINERIES (\$ per Ton)
1995 - 1999**

Year	Processed Crop	Non-Vinifera Crop	Vinifera Crop
1995	1,058	750	1,133
1996	1,066	755	1,141
1997	1,118	792	1,197
1998	1,334	945	1,428
1999	1,301	922	1,393

**ESTIMATED GRAPE VALUES (Overall)
B.C. WINERIES (\$)
1995 - 1999**

Year	Processed Crop	Non-Vinifera Crop	Vinifera Crop
1995	8,486,791	1,170,225	7,316,566
1996	6,587,880	908,090	5,679,942
1997	7,394,452	1,018,943	6,375,846
1998	13,590,792	1,872,870	11,718,501
1999	13,836,176	1,906,557	11,930,274

Appendix 4

VINE SPACING AND PLANT DENSITIES PER ACRE VINIFERA GRAPES

Number of Feet between Rows

	3	4	5	6	7	8	9	10	11
3.0	4,840	3,630	2,904	2,420	2,074	1,815	1,613	1,452	1,320
3.5	4,149	3,111	2,489	2,074	1,778	1,556	1,383	1,245	1,131
4.0	3,630	2,723	2,178	1,815	1,556	1,361	1,210	1,089	990
4.5	3,227	2,420	1,936	1,613	1,383	1,210	1,076	968	880
5.0	2,904	2,178	1,742	1,452	1,245	1,089	968	871	792
5.5	2,640	1,980	1,584	1,320	1,131	990	880	792	720
6.0	2,420	1,815	1,452	1,210	1,037	908	807	726	660
6.5	2,234	1,675	1,340	1,117	957	838	745	670	609
7.0	2,074	1,556	1,245	1,037	889	778	691	622	566
7.5	1,936	1,452	1,162	968	830	726	645	581	528
8.0	1,815	1,361	1,089	908	778	681	605	545	495

Red Varieties:			
Variety	Acreage	Percent of Reds	Percent of Total
Merlot	651.47	33.62%	15.57%
Pinot Noir	462.10	23.85%	11.04%
Cabernet Sauvignon	297.28	15.34%	7.11%
Cabernet Franc	176.48	9.11%	4.22%
Gamay	131.35	6.78%	3.14%
Foch *	57.05	2.94%	1.36%
Syrah	51.25	2.64%	1.22%
Pinot Meunier	24.44	1.26%	0.58%
Baco Noir *	18.10	0.93%	0.43%
Chancellor *	14.74	0.76%	0.35%
Lemberger	8.37	0.43%	0.20%
Rotberger	6.88	0.36%	0.16%
Rougeon *	4.50	0.23%	0.11%
Sangiovese	4.40	0.23%	0.11%
DeChaunac *	4.00	0.21%	0.10%
Agria	3.30	0.17%	0.08%
Barbera	3.00	0.15%	0.07%
Chambourcin *	1.50	0.08%	0.04%
Petit Verdot	1.40	0.07%	0.03%
Castel	1.30	0.07%	0.03%
Misc.Mixed Reds (hyb.*/vin.)	15.00	0.77%	0.36%
* Total Red Hybrids:	107.39	5.54%	2.57%
Total Red Vinifera:	1830.52	94.46%	43.74%
Total BC Reds:	1937.91	100.00%	46.31%

TOTAL BC WINE GRAPES:	4184.27 acres	Survey Response
Additional Plantings	615.73	
Total Estimated Plantings	4800 acres	

* Note: The number of acres may be underestimated due to missing growers that were not known for the survey. Informed estimates have been included for those wineries/growers choosing to keep their variety and acreage information private.

Source: BC Wine Institute Survey – November 1999