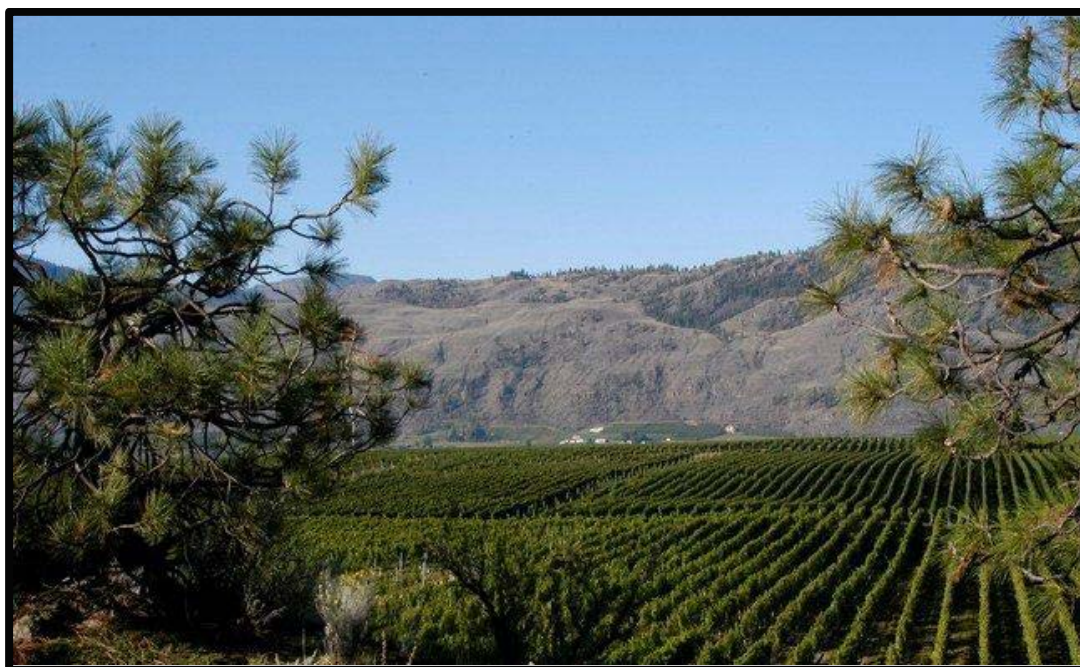




Financial Planning Information For Establishing a VINIFERA Wine Grape Planting *Okanagan Region*



Revised June 2014

Acknowledgements

This project is funded through *Growing Forward 2*, a federal-provincial-territorial initiative.

Financial Planning Information For Establishing a VINIFERA Wine Grape Planting, Okanagan Region *Revised June 2014* was prepared by: George Geldart, P.Ag. in consultation with a number of BC Grapegrowers' Association members.

First published by the B.C. Ministry of Agriculture, Fisheries and Food 1996.

Previously updated by the B.C. Ministry of Agriculture, Fisheries and Food 2000.

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Financial Planning Information for Establishing a VINIFERA Wine Grape Planting

Okanagan Region

INTRODUCTION

This financial planning information is not a cost of production study. The income and expense projections in this document provide a general indication of the financial requirements in establishing and producing Vinifera wine grapes and are to be used as a planning tool for those interested in developing a new wine grape planting. Any use of this information is entirely the responsibility of the reader.

This study 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**. It is defined as the surplus or (deficit) calculated by subtracting direct expenses from direct income for the vineyard. This margin provides an indication of the potential contribution of the enterprise to the overall profitability of the farm business and is used in comparing 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, and return to management and investment. 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 determined for individual circumstances and expectations.**

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

Fundamental questions to ask in this process include:

- Is there a market for my grapes?
- Is it technically feasible (e.g. site suitability, labor, resources, etc.)?
- Is it economically sound?
- Is it financially feasible?

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

I. Considerations and Assumptions

A. General Considerations - 10 Acre Vinifera Grape Establishment

PRIOR TO PLANTING

Establish a market for your grapes **before** investing in a new planting. Consult with wineries and other potential buyers and markets.

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 and any other improvements, are not included in this enterprise analysis.

All figures are in year 2014 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 or longer, depending on global wine demand and supply.

The *2010 Best Practices Guide for Grapes for British Columbia Growers* ("the guide") is referred to in parts of this document. It is available from the BC Wine Grape Council.

<http://www.bcwgc.org/best-practices-guide>

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

FARM SIZE

The average winery vineyard size in British Columbia is 28.97 acres, with 6.6 acres for independent grower vineyards. These averages reflect the fact that there are many small vineyards and a few very large ones.

The total farm acreage for this study 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.

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.

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 shoot positioning system (VSP). A few are trained to divided canopy systems involving two vertical canopies from one vine.

The site meets the soil condition referred in section 3.2 of the Best Practices Guide for Grapes. Sound management in the control of irrigation water and fertilizer plus cover crop is used to

ensure vine balance. During the first two years emphasis is placed on development of strong vines suited to the production of economical crops of high quality.

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. Steel posts are 20 feet apart in the row with ground anchors at the end posts. Vines are spaced at 4 feet in the row. This spacing of rows and vines results in 1,361 vines per acre. High-quality vines grafted on a suitable rootstock are . Costs for grafted vines may vary depending on the availability of specific variety clones or rootstocks are used. Grafted vines were chosen because this rootstock provides growth control and protection from some of the nematodes found in this area, as well as grape phylloxera concerns. Planting of self-rooted vines, costing less than grafted vines is an option.

An estimated 3% of the vines are replanted in the second year to replace dead and damaged vines. This percentage will vary, depending on the location, quality of plants purchased and weather and management practices.

High tensile galvanized steel wire is used as both crop load and foliage catch wires. One 12.5 gauge wire is used for the fruiting wire. There are six movable catch wires to contain the canopy as it grows upright plus one wire for the drip irrigation. Steel posts have integrated hooks to secure the wires to the post.

PRODUCTION LEVELS AND PRACTICES

Local experience, research and projected long term demand by the wine industry was used to select vinifera grape varieties for this vineyard. This model uses an equal mix of red and white grapes. Efficiencies may be gained from planting a mix of varieties in terms of harvest dates, access to labour, etc. The long term average target level of production at maturity in this vineyard for the varieties planted is 4.5 short tons (2,000 pounds per ton). This average reflects yield variations due to winter freezes and other climate related risk factors.

At 1,361 vines per acre, only 6.61 pounds of fruit per vine are required to produce 4.5 tons per acre at maturity. Larger yields per vine would be required to maintain 4.5 tons per acre at lower densities with smaller per vine yields required if planting density was increased.

The vineyard is cane pruned, requiring tying.

Crop growing practices and other management factors to support the sustainable production of high quality grapes are described in “the guide”.

Production in this vineyard begins when vines are in their third leaf with a yield of two tons per acre. This reflects the emphasis on root development versus pushing earlier production starting in the 2nd leaf. Consensus was that more consistent long term production and quality is achieved by targeting a 3rd leaf first yield. The second crop is produced the following year when vines are in their fourth leaf at a targeted yield of 3.5 tons. The vineyard reaches mature production in year five at a projected average of 4.5 tons per acre.

Direct income and expenses associated with year five are considered typical of a mature vineyard. The price for Vinifera grapes in this vineyard averaged \$2,100 per ton, based on the 2013 BC

Wine Grape Crop Report average 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. The sale of grapes on a price per ton basis includes performance standards. Other marketing options to consider may include export to wineries outside B.C., home wine market, etc.

Items such as 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 is applied as a ground application. There are foliar applications of Boron and Zinc.

Powdery mildew is controlled by applications of fungicides.

This study uses a mix of synthetic fungicides for bunch rot. However it is important to assess the control program based on the vineyard site and variety. These costs can be managed using a mix of materials.

There is one application of insecticide to control insects. Some vineyards may require control for other pests.

The use of all these products varies so it is recommended that you refer to “the guide” and the B.C. Ministry of Agriculture’s website (<http://www.al.gov.bc.ca/cropprot/grapeipm/>) for more specific information on your site.

WILDLIFE CONTROL

Bird control is managed through an annual bird monitoring service as well as with the use of bird netting. There are no projected costs to deal with other potential wildlife problems such as deer and rabbit damage. Recommendations for pest management can be found in “the guide”.

PRODUCTION 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. Production Insurance and vine loss insurance are methods available to producers to transfer some of this risk to a third party. As such, this study includes vine and crop loss insurance. Premiums reflect averages for a 30% deductible on probable yield at 100% insurable value and a 5% deductible on vine loss.

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 4.5 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.

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 a weed sprayer are used to provide weed control in this vineyard.

B. Detailed Assumptions

General Items			
Total Farm Acreage	12		
Vinifera Grape Acreage	10	Yield - Year 1 (tons/acre)	0.0
Plant Spacing (ft.)	4.0	Yield - Year 2 (tons/acre)	0.0
Row Spacing (ft.)	8.0	Yield - Year 3 (tons/acre)	2.0
Planting Density (Vines/acre)	1,361	Yield - Year 4 (tons/acre)	3.5
Percent of Vines Replanted - (Yr. 2)	3.0%	Yield - Year 5 (tons/acre)	4.5
Row Length (ft.)	302.5	Price (\$/ton)	2,100
Number of Rows/acre	18	Bin Weight in Pounds	900
<i>Vertical Shoot Positioning (VSP) System</i>		Contract Harvest \$/bin	55.00
# 8 ft. Row Posts/acre	270	Bin Handling/Yard hrs./ton	1
# 9 ft. End Posts/acre	36	General Items (Misc. Expenses)	3%
# Anchors (metal Rod)/acre	36	Wine Grape Council \$/ton	10.00
# Wires/row – 12.5 gauge	1	<u>Annual Costs:</u>	
# Wires/row - 14 gauge	7	Grapegrowers Association	150
12.5 gauge wire-feet/spool	3,750	Wine Institute	100
14.0 gauge wire-feet/spool	5,800	Starling Control Program-SCP	100
#Gripples/acre	144	<i>(Donation)</i>	

B. Detailed Assumptions continued

Input Costs			\$	unit	\$/acre	
Vines (high quality)	1,361	#	3.50	plant	4,764.38	
Steel Posts (row)	270	#	8.78	post	2,370.60	
Steel Posts (end)	36	#	21.80	post	784.80	
Anchors	36	#	8.75	anchor	315.00	
High Tensile Wire *	12.5 gauge	1.5	spools	106.20	spool	159.30
	14 gauge	6.6	spools	114.86	lb.	758.08
Gripples (18 small @ \$1.15/ 126 medium @ \$1.23)						175.68
Custom Survey/Stake	1	#	80.00	acre	80.00	
Stakes (bamboo)	1,361	#	0.062	stake	84.40	
Post Install (Custom Operation)	2.96	#	85.00	hour	251.71	
Milk Cartons	1,361	#	0.12	ea.	167.11	
Tape- Year 1	2,042	ft.	0.0119	ft.	24.23	
Tape- Years 2 - 5	20	rolls	0.66	roll	13.20	
Fertilizer (per acre cost estimate)			100.00	acre	100.00	
Fuel Costs	Diesel		1.29	litre		
	Gas		1.29	litre		
Irrigation Water Costs (Irrigation District)			150	acre		
Hired Labour Rate (20% Operator/80% General):			13.00	hr.		
(CPP/EI/Benefits):			2.73	hr.		
Total Hired Labour Cost:			15.73	hr.		

* The total number of wire spools is based on planting a 10 acre vineyard rounded up to allow for the purchase of whole spools. Wire cost per acre is calculated by dividing this total by 10. These costs should be adjusted for different sized planting acreages.

Powdery Mildew/Botrytis Control*	Rate Applied	Cost	\$	\$/acre
Microthiol Disperss (Yr. 1/ 3 applic.)	1.7 kg/acre	3.12	kg	15.91
Microthiol Disperss (Yr. 2-5/ 4 applic.)	1.7 kg/acre	3.12	kg	21.22
Synthetic Fungicide 1 (Yr. 2-5/ 2 app)	128 grams/acre	0.24	g	61.44
Synthetic Fungicide 2 (Yr. 2-5/ 2 app)	81 grams/acre	0.18	g	29.16
Foliar Application				
Bortrac (Yr. 2-5/ 2 applications)	0.4 litres/acre	7.56	litre	6.05
Zintrac (Yr. 2-5/ 2 applications)	0.4 litres/acre	13.05	litre	10.44
Pesticide Application				
Pounce EC (Prod'n. Yrs./ 1 applic.)	0.07 litres/acre	60.48	litre	4.23
Herbicide Application				
Glufosinate (Yr. 1/ 2 applications)	1.10 litres/acre	5.00	litre	11.00
Glyphosate (Yr. 2-5/ 3 applications)	0.56 litres/acre	4.83	litre	8.11

**Note: You can manage these costs by adjusting materials that will control both powdery mildew and botrytis. It will depend on growing conditions and grape variety. See the Best Practices Guide for Grape Growers.*

Cover Crop		\$	Unit	\$/acre
Crested Wheat Grass	6.0 kg	7.62	kg	45.73
Sheep Fescue	3.2 kg	6.06	kg	19.38
Perennial Ryegrass	4.0 kg	4.38	kg	17.54
Total Cover Crop Costs				82.65

Production Insurance *

Annual Grower Premiums (10 acre Vineyard)

	Year 1	Year 2	Year 3	Year 4	Year 5 +
Plan Premium	\$110	\$110	\$110	\$110	\$110
Vine Insurance	\$148.15	\$148.15	\$148.15	\$148.15	\$148.15
Production Insurance	-	-	\$335.48	\$538.34	\$673.58
Total	\$258.15	\$258.15	\$593.63	\$796.49	\$931.73

* *Production Insurance rates vary with each situation. A BCAGRI Production Insurance Representative should be contacted to determine appropriate values for each situation. Premiums reflect averages for a 30% deductible on probable yield at 100% insurable value and a 5% deductible on vine loss. For further information visit the BC Ministry of Agriculture website at http://www.agf.gov.bc.ca/production_insurance/*

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, cash flow statement and business plan.

Table 2 provides a look at the planting year cash outlay estimates for direct expenses and the machinery complement for the 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		0.0		2.0		3.5		4.5		10.00
Price (\$/ton)	2,100		2,100		2,100		2,100		2,100		2,100
Total Direct Income	0		0		4,200		7,350		9,450		21,000
Direct Expenses											
Vines *	4,764										4,764
Support System *	4,648										4,648
Irrigation System *	4,350										4,350
Replanting 3.0%			150								150
Plant Nutrients	175		100		100		100		100		575
Crop Protection	285		137		141		141		141		845
Machinery Fuel/Oil	567		353		409		402		416		2,147
R&M	183		177		209		255		237		1,061
Hired Labour	2,970		1,107		2,752		3,263		3,373		13,465
Contract Harvesting					244		428		550		1,222
Marketing	25		25		45		60		70		225
Equipment Rentals	542		23		23		23		23		634
Other Supplies (Crop Ins.)	631		352		347		390		411		2,132
Total Direct Expenses	19,141		2,425		4,270		5,061		5,321		36,218
Contribution Margin	-19,141		-2,425		-70		2,289		4,129		-15,218

* May be considered Capital Items.

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

Direct Expenses

Vines		47,644
Support System		46,479
Nutrients/Pesticides/Herbicides		4,600
Machinery	Fuel/Oil	5,672
	R&M	1,833
Total Labour (100% Hired)		29,703
Equipment Rentals		5,422
Other Supplies (Includes Crop Ins.)		6,559
Total Direct Expenses		147,911

Capital Items

Irrigation System		43,500
Machinery & Buildings		115,370
Total Capital Items		158,870

ESTIMATED OUTLAY **306,781**

* 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 financial projections for establishing a Vinifera wine grape planting in the Okanagan. The information is organized by specific operations and details machinery item use and costs, 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.

This information is intended to be used as a starting point from which to develop costs and returns for individual vineyard enterprises and associated financial and farm business plans. This Vinifera establishment model is based on a consensus of prevailing production practices, costs and returns at the date of publication. Specific circumstances will likely vary, and producers should develop their own budget to reflect individual production goals, costs and market expectations. 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 to management and investment. These items are not included in this study.

Financial planning information and other farm enterprise budgets can be accessed online at <http://www.agf.gov.bc.ca/busmgmt/budgets/> or obtained from your local office of the B.C. Ministry of Agriculture. You can also find additional Farm Business Management information, including Farm Business Advisory Services, on SmartFarmBC at <http://www.smartfarmbc.ca>.

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

Operation Description	Machinery Times		Machinery Items			Labour		Other	Total Direct	
	Number *	Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre	
Ripping (rent \$125/day)	1	1	2.50	2.50	36.97	2.5	39.33	25.00	101.30	
Custom Work (Discing \$125/day)	1	1	2.00	2.00	29.58	2.0	31.46	25.00	86.04	
Rock Picking	1	2	1	2.00	2.00	29.73	21.0	330.33	360.06	
Soil Sampling (1 per acre)	0	0						75.00	75.00	
Survey/Stake (Custom Oper'n)	0	1						80.00	80.00	
Augering (Auger Rent&Bits)	1	1	12.00	12.00	177.47	12.0	188.76	125.00	491.23	
Vinifera Vines	0	1						4,764.38	4,764.38	
Planting & Staking/Bamboo Tying	1	1	1.00	1.00	14.79	64.0	1,007.18	84.40	1,106.37	
Spreading Posts (Post Cost)	1	2	1	2.00	2.00	29.73	2.0	31.46	3,216.59	
Anchors/Installation	0	1				9.0	141.57	315.00	456.57	
Post Install (Custom Oper'n- \$85/hr)	0	1						251.71	251.71	
Wire Spreading/Application	0	1				30.0	471.90	1,093.06	1,564.96	
Irrigation(Ovrhd/Drip-Maint./H2o Taxes)	11	12	34	12.00	408.00	106.04	2.8	44.04	150.00	300.08
Fertilizer Application	1	5	1	0.50	0.50	7.92	0.5	7.87	100.00	115.78
Tying & Suckering (Canopy Mgt.)	0	1				20.0	314.60	24.23	338.83	
Cultivation (Harrow-Rent \$125/day)	1	1	1.00	1.00	14.79	1.0	15.73	12.50	43.02	
Bird Monitor (Ann Cst-Vineyard)	0	1						10.00	10.00	
Weeding /Weed Spray	1	4	2	1.50	3.00	45.86	3.0	47.19	11.00	104.05
Fungicide Application	1	6	7	1.00	7.00	130.00	7.0	110.11	106.90	347.02
Milk Cartons/ General use of ATV	10	1		7.00	7.00	35.93	7.0	110.11	167.11	313.14
Irrig/Comp-Rntl	0	1						13.00	13.00	
Wine Inst./Grape Assoc. \$250 (Total Vineyard)								25.00	25.00	
Grape Council Levy 10 /ton	0	0							0.00	
Vine/Production Insurance	0	0						25.82	25.82	
Use of Pickup	9	1		5.00	5.00	91.66	5.0	78.65	170.31	
Miscellaneous Expenses	0	0						430.81	430.81	
TOTALS					750.48	188.8	2,970.28	11,070.30	14,791.06	
Expected Income- Vinifera Grapes:	0.0	Tons per acre	a	\$2,100	per Ton			Total Direct Income	0.00	
								Total Direct Expenses	14,791.06	
								CONTRIBUTION MARGIN	-14,791.06	

* See Capital Investment Table for Description

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

Operation Description	Machinery Times			Machinery Items			Labour		Other	Total Direct
	Number *	Done		Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre
Pruning		1					12.0	188.76		188.76
Dormant Tying (plastic tape)		1					10.0	157.30	13.20	170.50
Replanting/Re-staking/cartons	3.0%	1					4.0	62.92	150.48	213.40
Rotovating	1	7	2	1	2	31.05	2.0	31.46		62.51
Seed Cover Crop(Drill Rental)	1		1	1.6	1.6	23.66	1.6	25.17	82.65	131.48
Mow Cover Crop	1	3	2	0.75	1.5	24.23	2.5	39.33		63.55
Fertilizer Application	1	5	1	0.5	0.5	7.92	0.5	7.87	100.00	115.78
Canopy Mgt. (Tying & Suckering)	1	8	1				10.0	157.30		157.30
Pesticide/Insecticide Application	1	6		1						0.00
Irrigation(Ovrhd/Drip-Maint./H2o Taxes)	11	12	34	12	408	106.04	2.8	44.04	150.00	300.08
Fungicide & Foliar Application	1	6	8	1	8	148.57	8.0	125.84	128.69	403.10
Rock Picking	1	2	1	1	1	14.87	2.0	31.46	10.00	56.33
Weed Spraying	1	4	3	1	3	45.86	3.0	47.19	8.11	101.16
Irrig/Comp-Rntl			1						13.00	13.00
Bird Monitor (Ann Cst-Vineyard)			1						10.00	10.00
General use of ATV	10		1	7	7	35.93	7.0	110.11		146.04
Bird Netting (Install/Remove + ATV use)	10	14	1							0.00
Cntrct Harvest	\$55 /bin	1	2	1						0.00
Bin Handling	900 lb./bin	1	2	1						0.00
Wine Inst./Grape Assoc.	\$250		(Total Vineyard)						25.00	25.00
Grape Council Levy										0.00
Vine/Production Insurance									25.82	25.82
Use of Pickup		9	1	5	5	91.66	5.0	78.65		170.31
Miscellaneous Expenses									70.62	70.62
TOTALS						529.78	70.40	1,107.39	787.57	2,424.74
Expected Income- Vinifera Grapes:		0.0	Tons per acre a	\$2,100 per Ton					Total Direct Income	0.00
									Total Direct Expenses	2,424.74
									CONTRIBUTION MARGIN	-2,424.74

* See Capital Investment Table for Description

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

Operation Description	Machinery Times			Machinery Items			Labour		Other	Total Direct	
	Number *	Done		Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre	
Pruning (hand)		1					25.0	393.25		393.25	
Mow Prunings	1	3	1	1	1	16.15	1.0	15.73		31.88	
Dormant Tying			1				10.0	157.30	13.20	170.50	
Mow Cover Crop	1	3	2	0.75	1.5	24.23	2.5	39.33		63.55	
Fertilizer Application	1	5	1	0.5	0.5	7.92	0.5	7.87	100.00	115.78	
Rotovating	1	7	2	1	2	31.05	2.0	31.46		62.51	
Canopy Mgt.(Shoot Thin, Leaf Removal, Bur	1	8	1	2	2	33.29	92.0	1447.16		1,480.45	
Irrigation(Ovrhd/Drip-Maint./H2o Taxes)	11	12	34	12	408	106.04	2.8	44.04	150.00	300.08	
Fungicide & Foliar Application	1	6	8	1	8	148.57	8.0	125.84	128.69	403.10	
Pesticide/Insecticide Application	1	6	1	1	1	18.57	1.0	15.73	4.23	38.54	
Vine/Production Insurance									59.36	59.36	
Weed Spraying	1	4	3	1	3	45.86	3.0	47.19	8.11	101.16	
Bird Netting (Install/Remove + ATV use)	10	14	1	3	3	28.66	13.1	206.46		235.11	
Bin Handling 900 lb./bin	1	2	1	2	2	29.73	2.0	31.46		61.19	
CntrctHarvest \$55.00 /bin	1	2	1						244.44	244.44	
Wine Inst./Grape Assoc. \$250 (Total Vineyard)									25.00	25.00	
Grape Council Levy \$10.00 /ton									20.00	20.00	
										0.00	
Irrig/Comp-Rntl			1						13.00	13.00	
General use of ATV	10		1	7	7	35.93	7.0	110.11		146.04	
Bird Monitor (Ann Cst-Vineyard)			1						10.00	10.00	
Use of Pickup	9		1	5	5	91.66	5.0	78.65		170.31	
Miscellaneous Expenses									124.36	124.36	
TOTALS						617.66	174.9	2,751.57	900.40	4,269.63	
Expected Income- Vinifera Grapes:	2.0 Tons per acre at \$2,100 per Ton							Total Direct Income		4,200.00	
									Total Direct Expenses		4,269.63
* See Capital Investment Table for Description										CONTRIBUTION MARGIN	-69.63

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

Operation Description	Machinery Times		Machinery Items			Labour		Other	Total Direct	
	Number *	Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre	
Pruning (hand)		1				35.0	550.55		550.55	
Mow Prunings	1	3	1	1	16.15	1.0	15.73		31.88	
Dormant Tying		1				10.0	157.30	13.20	170.50	
Mow Cover Crop	1	3	2	0.75	1.5	24.23	2.5	39.33	63.55	
Fertilizer Applic.	1	5	1	0.5	0.5	7.92	0.5	7.87	100.00	
Vine/Production Insurance								79.65	79.65	
Canopy Mgt.(Shoot Thin, Leaf Removal, Bun	1	8	1	3	3	49.94	113.0	1777.49	1,827.43	
Irrigation(Ovrhd/Drip-Maint./H2o Taxes)	11	12	34	12	408	106.04	2.8	44.04	150.00	
Fungicide & Foliar Application	1	6	8	1	8	148.57	8.0	125.84	128.69	
Weed Spraying	1	4	3	1	3	45.86	3.0	47.19	8.11	
Pesticide/Insecticide Application	1	6	1	1	1	18.57	1.0	15.73	4.23	
Rotovating	1	7	2	1	2	31.05	2.0	31.46	62.51	
Bird Netting (Install/Remove + ATV use)	10	14	1	3	3	28.66	13.1	206.46	235.11	
General use of ATV	10		1	7	7	35.93	7.0	110.11	146.04	
Bin Handling	1	2	1	3.5	3.5	52.03	3.5	55.06	107.08	
CntrctHarvest	1		1					427.78	427.78	
Wine Inst./Grape Assoc. \$250 (Total Vineyard)								25.00	25.00	
Grape Council Levy \$10.00 /ton								35.00	35.00	
Bird Monitor (Ann Cst-Vineyard)	1		1					10.00	10.00	
Irrig/Comp-Rntl			1					13.00	13.00	
Use of Pickup	9		1	5	5	91.66	5.0	78.65	170.31	
Miscellaneous Expenses								147.42	147.42	
TOTALS						656.60	207.4	3,262.80	1,142.08	5,061.48
Expected Income- Vinifera Grapes:		3.5	Tons per acre a \$2,100 per Ton						Total Direct Income	7,350.00
								Total Direct Expenses	5,061.48	
								CONTRIBUTION MARGIN	2,288.52	

* See Capital Investment Table for Description

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

Operation Description	Machinery Times			Machinery Items			Labour		Other	Total Direct
	Number *	Done		Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre
Pruning (hand)		1					35.0	550.55		550.55
Mow Prunings	1	3	1	1	1	16.15	1.0	15.73		31.88
Dormant Tying			1				11.0	173.03	13.20	186.23
Mow Cover Crop	1	3	2	0.75	1.5	24.23	2.5	39.33		63.55
Vine/Production Insuranc									93.17	93.17
Fertilizer Application	1	5	1	0.5	0.5	7.92	0.5	7.87	100.00	115.78
Rotovating	1	7	2	1	2	31.05	2.0	31.46		62.51
Canopy Mgt.(Shoot Thin	1	8	1	3	3	49.94	118.0	1856.14		1906.08
Irrigation(Ovrhd/Drip-Mai	11	12	34	12	408	106.04	2.8	44.04	150.00	300.08
Fungicide & Foliar Appli	1	6	8	1	8	148.57	8.0	125.84	128.69	403.10
Pesticide/Insecticide Ap	1	6	1				1.0	15.73	4.23	19.96
Weed Spraying	1	4	3	1	3	45.86	3.0	47.19	8.11	101.16
Bird Netting (Install/Rem	10	14	1	3	3	28.66	13.1	206.46		235.11
General use of ATV	10		1	7	7	35.93	7.0	110.11		146.04
Bin Handling 900 lb./bin	1	2	1	4.5	4.5	66.90	4.5	70.79		137.68
CntrctHarvest \$55 /bin	1		1						550.00	550.00
Wine Inst./Grape Assoc. \$250 (Total Vineyard)									25.00	25.00
Grape Council Levy \$10 /ton									45.00	45.00
Bird Monitor (Ann Cst-Vineyard) \$100	1		1						10.00	10.00
Irrig/Comp-Rntl			1						13.00	13.00
Use of Pickup	9		1	5	5	91.66	5.0	78.65		170.31
Miscellaneous Expenses									154.99	154.99
TOTALS						652.90	214.4	3,372.91	1,295.39	5,321.19
Expected Income- Vinifera Grapes:	4.50	Tons per acre at \$2,100 per Ton							Total Direct Income	9,450.00
								Total Direct Expenses	5,321.19	
								CONTRIBUTION MARGIN	4,128.81	

* See Capital Investment Table for Description

IV. Labour Time Estimates and 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 and 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 \$15.73/hour (inclusive). This rate is a blended to 20% operator and 80% general labour to reflect different labour skill requirements including a crew lead. Stages of vine growth for canopy management and other labour intensive tasks have a narrow window of time when they are required for good horticultural management. Canopy management includes a range of techniques which affect fruit quality. It is expected that operations are done in an efficient and effective 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 moving wires, vertical shoot positioning and tucking, de-leafing, hedging, suckering and bunch thinning in years three to five. Labour hours per acre for canopy management in this study are 20 hours in year one, 10 hours in year two, 92 hours in year three, 113 hours in year four, and 118 hours in year five (average full production).

Table 9 summarizes the total labour hours for this 10 acre vineyard over the five year planning period. Estimated annual hours are: 1,888 in the planting year, 704 in year two, 1,749 in year three and 2,074 in year four. For the average full production year labour hours total 2,144. This equates to about one 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 estimates in order to identify if sufficient labour 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.
	hr/Ac	hr/Ac		hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac
Ripping	2.5		Pruning	12.0		25.0		35.0		35.0	
Discing	2.0		Mow Prunings	-		1.0		1.0		1.0	
Cultivating/harrowing	1.0		Replanting	4.0		-					
Weed Spraying	3.0		Rotovate	2.0		2.0		2.0		2.0	
Fertilizer Application	0.5		Seed Cover Crop	1.6		-					
Fungicide Application	7.0		Dormant Tying	10.0		10.0		10.0		11.0	
Rock Picking	21.0		Mow Cover Crop	2.5		2.5		2.5		2.5	
Augering	12.0		Fertilizer Application	0.5		0.5		0.5		0.5	
Planting/Stake/Tying	64.0		Fungicide/Foliar Application	8.0		8.0		8.0		8.0	
Spreading Posts	2.0		Canopy Management *								
Anchor Install	9.0		Moving Wires	-		10.0		10.0		10.0	
Wire Spreading/Install	30.0		Vertical Shoot Pstr/Tuck	2.0		34.0		38.0		40.0	
Canopy Management	20.0		De-Leafing	-		13.0		25.0		25.0	
Irrigation Work	2.8		Shoot Thinning	-		10.0		12.0		13.0	
ATV Operation/Use	7.0		Hedging	-		2.0		3.0		3.0	
Pickup Operation	5.0		Suckering	5.0		5.0		5.0		5.0	
			Bunch Thinning	3.0		18.0		20.0		22.0	
			Weed Spraying	3.0		3.0		3.0		3.0	
			Pesticide Application	-		1.0		1.0		1.0	
			Rock Picking	2.0		-		-		-	
			Bird Netting Instll/Rmove	-		13.1		13.1		13.1	
			Irrigation Work	2.8		2.8		2.8		2.8	
			ATV Operation/Use	7.0		7.0		7.0		7.0	
			Pickup Operation	5.0		5.0		5.0		5.0	
			Bin Handling (Harvest/Yardin	-		2.0		3.5		4.5	
Total Hours/Acre	188.8		Total Hours/Acre	70.4		174.9		207.4		214.4	

* There is a significant range of labour hours for Canopy Management operations.

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

Labour Operation	Year 1 Annual Labour		Labour Operation	Year 2 Annual Labour		Year 3 Annual Labour		Year 4 Annual Labour		Year 5 Annual Labour	
	hours	weeks*		hours	weeks*	hours	weeks*	hours	weeks*	hours	weeks*
Ripping	25	0.63	Pruning	120	3.0	250	6.3	350	8.8	350	8.8
Discing	20	0.50	Mow Prunings	-	-	10	0.3	10	0.3	10	0.3
Cultivating/harrowing	10	0.25	Replanting	40	1.0	-	-	-	-	-	-
Weed Spraying	30	0.75	Rotovate	20	0.5	20	0.5	20	0.5	20	0.5
Fertilizer Application	5	0.13	Seed Cover Crop	16	0.4	-	-	-	-	-	-
Fungicide Application	70	1.75	Dormant Tying	100	2.5	100	2.5	100	2.5	110	2.8
Rock Picking	210	5.25	Mow Cover Crop	25	0.6	25	0.6	25	0.6	25	0.6
Augering	120	3.00	Fertilizer Application	5	0.1	5	0.1	5	0.1	5	0.1
Planting/Stake/Bambo	640	16.01	Fungicide/Foliar Application	80	2.0	80	2.0	80	2.0	80	2.0
Spreading Posts	20	0.50	Canopy Management *	-	-	-	-	-	-	-	-
Anchor Install	90	2.25	Moving Wires	-	-	100	2.5	100	2.5	100	2.5
Wire Spreading/Install	300	7.50	Vertical Shoot Pstr/Tuck	20	0.5	340	8.5	380	9.5	400	10.0
Canopy Management	200	5.00	De-Leafing	-	-	130	3.3	250	6.3	250	6.3
Irrigation Work	28	0.70	Shoot Thinning	-	-	100	2.5	120	3.0	130	3.3
ATV Operation/Use	70	1.75	Hedging	-	-	20	0.5	30	0.8	30	0.8
Pickup Operation	50	1.25	Suckering	50	1.3	50	1.3	50	1.3	50	1.3
			Bunch Thinning	30	0.8	180	4.5	200	5.0	220	5.5
			Weed Spraying	30	0.8	30	0.8	30	0.8	30	0.8
			Pesticide Application	-	-	10	0.3	10	0.3	10	0.3
			Rock Picking	20	0.5	-	-	-	-	-	-
			Bird Netting Instll/Rmove	-	-	131	3.3	131	3.3	131	3.3
			ATV Operation/Use	70	1.8	70	1.8	70	1.8	70	1.8
			Irrigation Work	28	0.7	28	0.7	28	0.7	28	0.7
			Pickup Operation	50	1.3	50	1.3	50	1.3	50	1.3
			Bin Handling (Harvest/Yardin	-	-	20	0.5	35	0.9	45	1.1
Total for 10 Acres	1,888	47.2	Total for 10 Acres	704	17.6	1,749	43.7	2,074	51.9	2,144	53.6

* There is a significant range of labour hours for Canopy Management operations.

V. Machinery and 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 determined for each situation. Costs are based on quotes received from machinery dealers when these items are purchased new. 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 overall profitability.*** The \$158,870 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 \$31,774 to \$6,355 respectively. The vineyard model here is based on a 10 acre planting with the depreciable asset investment at an estimated \$15,887 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 per unit cost structure resulting in greater financial risk. The level of investment in depreciable assets in terms of operational 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	24,700	15	2,470	237	0.88	14.79
2 Rear & Front Bin Forks	9,660	15	750	30	0.08	0.08
3 Mower-Flail Chopper(70")	7,400	15	400	18	1.36	1.36
4 Weed Sprayer- 100 Gal.	3,500	10	0	30	0.50	0.50
5 Fertilizer Spreader- 900lb.	2,400	15	250	5	1.05	1.05
6 Air Blast Sprayer(100 Gal.) 3pt.	8,800	15	1,000	78	3.78	3.78
7 Rotovator	5,650	15	200	16	0.73	0.73
8 Hedger (Hydraulic)	6,500	15	650	20	1.86	1.86
9 1/2 Ton Pick-Up (Used)	10,000	5	2,000	50	0.75	18.33
10 ATV	8,500	10	1,500	88	2.24	5.13
11 Irrigation System (Overhead)	15,000	15	0	65	0.89	0.89
12 Irrigation Sytem (Drip+Fltr)	28,500	15	0	408	2.46	2.46
Subtotal (Hourly Equipment)	130,610		9,220			
					Repair \$/Yr	
Small Tools	5,000	10	0	50		
Storage shed	10,000	30	0	200		
Bird Netting (black)	13,260	10	0	133		
TOTAL	158,870					

Fuel Consumption Factors	HP	Consumption		\$/litre
		litre/hp	litres/hr	
Mach. #				
1 Tractor	50	0.216		1.29
9 1/2 Ton Pick-Up (Used)			13.63	1.29
10 ATV			2.5	1.29

TABLE 11
MACHINERY TIME ESTIMATES SUMMARY
Average Annual Hours Use- Various Operations (5 Years)
10 Acre Vineyard Operation

Machinery List	Year 1 <i>(Planting)</i>		Year 2		Year 3		Year 4		Year 5 <i>(Full Prod'n)</i>		Average Annual Hours
	hr/Ac	10 Ac	hr/Ac	10 Ac	hr/Ac	10 Ac	hr/Ac	10 Ac	hr/Ac	10 Ac	10 Ac
1 Tractor (50 HP)	33.0	330	17.6	176	21.0	210	23.5	235	23.5	235	237
2 Rear & Front Forks	4.0	40	1.0	10	2.0	20	3.5	35	4.5	45	30
3 Mower - Flail Chopper	0.0	0	1.5	15	2.5	25	2.5	25	2.5	25	18
4 Weed Sprayer - 110 gal	3.0	30	3.0	30	3.0	30	3.0	30	3.0	30	30
5 Fertilizer Spreader	0.5	5	0.5	5	0.5	5	0.5	5	0.5	5	5
6 Sprayer-100 Gal.	7.0	70	8.0	80	8.0	80	8.0	80	8.0	80	78
7 Rotovator	0.0	0	2.0	20	2.0	20	2.0	20	2.0	20	16
8 Hedger (Hydraulic)	0.0	0	0.0	0	2.0	20	3.0	30	3.0	30	16
9 Pick-Up 1/2 Ton Compact	5.0	50	5.0	50	5.0	50	5.0	50	5.0	50	50
10 ATV	7.0	70	7.0	70	10.0	100	10.0	100	10.0	100	88
11 Irrigation System Solid Set	65.0	65	65.0	65	65.0	65	65.0	65	65.0	65	65
12 Irrigation System (Drip+Fltr)	408.0	408	408.0	408	408.0	408	408.0	408	408.0	408	408

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 profitability and financial feasibility for this enterprise.

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 changes the potential return and the resulting contribution margins. It is important to assess the market or price risk associated with each variety. A broad range of price possibilities means a higher degree of risk.

The income projections for this study are based on a grower consensus average price of \$2,100/ton, and reflects a higher than average quality and demand for the varieties in this vineyard. This price is based on the overall 2013 industry weighted average price for Vinifera grape varieties purchased by British Columbia wineries of \$2,219/ton. One Standard Deviation for this weighted average price is \$381/ton. As the price of grapes is variable, caution should be exercised in applying this information to specific farm situations. To assist in this, there are tables in the Appendices summarizing the 2013 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 yield and 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 4.5 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 Production Insurance as one vehicle to manage yield risks. For more information contact a Production Insurance representative from the local B.C. Ministry of Agriculture 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 and costs required for canopy management resulting from differences in production system, soils, vineyard location and management.

There are significant variations in labour hours employed for different vineyards that will impact labour costs. Access to timely, skilled labour and the cost of labour are important factors to consider, including the need to have a crew boss to maintain good horticulture management.

The analysis on contribution margins in the next section illustrates the impact of these variables on the financial projections for this wine grape establishment model.

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 assets 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 nine. The accumulated margin balance at the end of 15 years is \$26,070 per 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 cash flow of the vineyard that would supply funds for fixed costs, depreciation and return to management and investment.

If outside capital is used to cover the negative margins in the first three years, then the enterprise begins contributing positively to farm cash flow in the fourth year starting with \$2,289 per acre and peaking at \$4,129 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 cash flow 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 cash flow 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 fixed at base assumptions. 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 the projected price declines to \$1,500/ton over the planning period, then the ending balance for the margins drops by \$33,000 to negative \$6,930 for the one acre planting keeping the yield at 4.5 tons/acre. Leaving price at \$2,100/ton, if average annual yield drops from 4.5 to 4.0 tons/acre, the 15 year accumulated balance declines by \$10,550 to \$15,520.

Table 14 illustrates the impact of changes to yield and canopy management labour hours (years 3+) on the accumulated margins, with price fixed at the \$2,100 per ton level and labour cost at \$15.73/hour. For example, if the canopy management hours increase 20%, the accumulated margin balance decreases from \$26,070 to \$21,060 with yield at the base projection of 4.5 tons/acre. As an additional consideration, if all hired labour is increased to \$17.00 per hour for the same scenario, the accumulated margin decreases from \$21,060 to \$16,741 illustrating the cost of hired labour is also an important variable that should be considered.

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

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	0.0	2.0	3.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Price (\$/ton)	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	
Total Direct Income	0	0	4,200	7,350	9,450	9,450	9,450	9,450	9,450	9,450	9,450	9,450	9,450	9,450	9,450	
Direct Expenses																
Vines *	4,764	150														
Support System *	4,648															
Plant Nutrients	175	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Pesticides/Herbicides	285	137	141	141	141	141	141	141	141	141	141	141	141	141	141	
Machinery Fuel/Oil	567	353	409	402	416	416	416	416	416	416	416	416	416	416	416	
R&M	183	177	209	255	237	237	237	237	237	237	237	237	237	237	237	
Hired Labour	2,970	1,107	2,752	3,263	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	3,373	
Contract Harvesting			244	428	550	550	550	550	550	550	550	550	550	550	550	
Marketing	25	25	45	60	70	70	70	70	70	70	70	70	70	70	70	
Equipment Rentals	542	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
Other Supplies (Crop Ins.)	631	352	347	390	411	411	411	411	411	411	411	411	411	411	411	
Total Direct Expenses	14,791	2,425	4,270	5,061	5,321	5,321	5,321	5,321	5,321	5,321	5,321	5,321	5,321	5,321	5,321	
Contribution Margin	-14,791	-2,425	-70	2,289	4,129	4,129	4,129	4,129	4,129	4,129	4,129	4,129	4,129	4,129	4,129	
Irrigation System *	4,350															
Beginning Balance	0	-19,141	-21,566	-21,635	-19,347	-15,218	-11,089	-6,960	-2,832	1,297	5,426	9,555	13,684	17,812	21,941	
Interest 0.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Accumulated Margin (balance)	-19,141	-21,566	-21,635	-19,347	-15,218	-11,089	-6,960	-2,832	1,297	5,426	9,555	13,684	17,812	21,941	26,070	

* 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

Vinifera Wine Grape Establishment and Production
\$/Acre

Average Annual Yield at Full Production (tons/acre)

	3.0	3.5	3.8	4.0	4.2	4.5	5.0	5.5	6.0
1,200	-40,231	-34,631	-31,267	-29,030	-26,788	-23,430	-17,830	-12,230	-6,629
1,300	-36,381	-30,231	-26,537	-24,080	-21,618	-17,930	-11,780	-5,630	521
1,400	-32,531	-25,831	-21,807	-19,130	-16,448	-12,430	-5,730	970	7,671
1,500	-28,681	-21,431	-17,077	-14,180	-11,278	-6,930	320	7,570	14,821
1,700	-20,981	-12,631	-7,617	-4,280	-938	4,070	12,420	20,770	29,121
1,800	-17,131	-8,231	-2,887	670	4,232	9,570	18,470	27,370	36,271
1,900	-13,281	-3,831	1,843	5,620	9,402	15,070	24,520	33,970	43,421
2,000	-9,431	569	6,573	10,570	14,572	20,570	30,570	40,570	50,571
2,100	-5,581	4,969	11,303	15,520	19,742	26,070	36,620	47,170	57,721
2,200	-1,731	9,369	16,033	20,470	24,912	31,570	42,670	53,770	64,871
2,400	5,969	18,169	25,493	30,370	35,252	42,570	54,770	66,970	79,171
2,700	17,519	31,369	39,683	45,220	50,762	59,070	72,920	86,770	100,621
2,900	25,219	40,169	49,143	55,120	61,102	70,070	85,020	99,970	114,921
3,000	29,069	44,569	53,873	60,070	66,272	75,570	91,070	106,570	122,071

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 labour hours for canopy management fixed at base assumptions. An individual financing plan, including associated fixed costs and capital purchases, should be developed to determine overall feasibility.

Values in bold denote base assumptions.

TABLE 14
IMPACT OF CHANGES IN YIELD AND CANOPY MANAGEMENT LABOUR HOURS ON
15 YEAR ACCUMULATED CONTRIBUTION MARGIN
 Vinifera Wine Grape Establishment and Production
 \$/Acre

Average Annual Yield at Full Production (tons/acre)

	3.0	3.5	3.8	4.0	4.2	4.5	5.0	5.5	6.0
75%	679	11,230	17,563	21,780	26,003	32,330	42,881	53,431	63,982
80%	-573	9,978	16,312	20,528	24,751	31,079	41,629	52,179	62,730
85%	-1,825	8,726	15,060	19,276	23,499	29,827	40,377	50,927	61,477
90%	-3,077	7,474	13,808	18,024	22,247	28,574	39,125	49,675	60,225
95%	-4,329	6,221	12,555	16,772	20,994	27,322	37,873	48,423	58,973
100%	-5,581	4,969	11,303	15,520	19,742	26,070	36,620	47,170	57,721
105%	-6,833	3,717	10,051	14,267	18,490	24,818	35,368	45,918	56,468
109%	-7,835	2,715	9,049	13,265	17,488	23,816	34,366	44,916	55,466
112%	-8,587	1,964	8,297	12,514	16,736	23,064	33,614	44,165	54,715
115%	-9,338	1,212	7,546	11,762	15,985	22,313	32,863	43,413	53,963
120%	-10,591	-40	6,293	10,510	14,732	21,060	31,610	42,160	52,710
125%	-11,843	-1,293	5,041	9,257	13,480	19,807	30,358	40,908	51,458
130%	-13,096	-2,546	3,788	8,004	12,227	18,555	29,105	39,655	50,205

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 +) with price constant at \$2,100/ton. An individual financing plan, including associated fixed costs and capital purchases, should be developed to determine overall feasibility. Values in bold denote base assumptions.

ANALYSIS- AVERAGE FULL PRODUCTION YEAR

The previous sections looked at the collective establishment and full production years over a 15 year period with some sensitivity to overall accumulated contribution margins. As part of a closer assessment of the impact of risk on the vineyard, this section focuses on an average full production year of the vineyard and looks at the sensitivity of the key profitability variables of price, yield and canopy management labour hours. Table 15 summarizes the direct income and direct expenses for an average full production year for this 10 acre vinifera wine grape planting. There is a worksheet in Appendix 1 that provides this information along with space to enter specific farm estimates in projecting a net farm income for individual situations.

The total direct expenses for 10 acres are \$53,212 or \$1,182 per ton of grapes produced. The total hired labour cost is \$33,729 (canopy management and general) which accounts for 63.4% of the direct expenses, followed by machinery costs at 12.3%, contract harvesting at 10.3% and other supplies at 7.7%. While these values will vary for different vineyards, it is important to recognize the cost breakdown in terms of the relative impact on the contribution margin. In this case, improving labour efficiencies might result in cost savings.

Table 15: Contribution Margin- 10 Acre Vineyard (Average Full Production Year)

Income		Vineyard	Per Ton	% of Total
Yield- 4.5 tons/acre		94,500	2,100	100
Price- \$2,100/ton				
Direct Expenses				
	Plant Nutrients	1,000	22.2	1.9
	Crop Protection	1,410	31.3	2.6
	Machinery- Fuel/Oil	4,159	92.4	7.8
	Machinery- R&M	2,370	52.7	4.5
	Labour- Canopy Management	18,561	412.5	34.9
	Labour- General	15,168	337.1	28.5
	Contract Harvesting	5,500	122.2	10.3
	Marketing/Association Fees	700	15.6	1.3
	Equipment Rentals	230	5.1	0.4
	Other Supplies	4,114	91.4	7.7
Total Direct Expenses		53,212	1,182	100
Contribution Margin *		41,288	917	43.7

**Note: Contribution Margin is 43.7% of Income*

VII. Impact of Changes in Key Variables

Tables 16 through 18 show the impact of changes to the key variables on the 10 acre contribution margin for an average full production year. For example, a 19% reduction in the price from \$2,100 per ton to \$1,700 per ton results in a 44% decrease in the margin of \$18,000 from \$41,288 to \$23,288. A 15.6% decrease in yield to 3.8 tons (with price fixed at \$2,100/ton) results in a 32.5% reduction in the contribution margin to \$27,863. In terms of the canopy management labour hours, increasing the annual hours per acre from 118 to 129 hours per acre reduces the contribution margin to \$39,322. Conversely, reducing the hours to 100 hours per acre increases the margin to \$44,237. Similar changes to the margin occur with changes between price per ton and canopy management labour hours in Table 18. Looking at the impact of these variables on the contribution margin is helpful in seeing which variables have the biggest impact on the margin and in adjusting financial projections to suit specific situations and expectations.

This analysis can also be looked at by considering likelihood of variations to the key risk factors of price, yield and labour costs. The tables have been divided up into sections to illustrate possible ranges for the best case, worse case and most likely case scenarios. The shaded area in the middle would be the intersection of the most likely outcomes for the two variables. The determination of where these break-outs are will vary for each situation and risk assessment and are presented simply for illustrative purposes.

TABLE 16
IMPACT OF YIELD AND PRICE CHANGES ON
FULL PRODUCTION YEAR CONTRIBUTION MARGIN *
 10 Acre Vineyard Okanagan Valley

Average Annual Yield at Full Production (tons/acre)

	3.0	3.5	3.8	4.0	4.5	5.0	5.5	6.0	6.5	
1,200	-14,487	-9,395	-6,337	-4,303	788	5,880	10,971	16,062	21,154	
1,300	-11,487	-5,895	-2,537	-303	5,288	10,880	16,471	22,062	27,654	
1,400	-8,487	-2,395	1,263	3,697	9,788	15,880	21,971	28,062	34,154	
1,500	-5,487	1,105	5,063	7,697	14,288	20,880	27,471	34,062	40,654	
1,700	513	8,105	12,663	15,697	23,288	30,880	38,471	46,062	53,654	
Average	1,800	3,513	11,605	16,463	19,697	27,788	35,880	43,971	52,062	60,154
Price	1,900	6,513	15,105	20,263	23,697	32,288	40,880	49,471	58,062	66,654
\$/ton	2,000	9,513	18,605	24,063	27,697	36,788	45,880	54,971	64,062	73,154
	2,100	12,513	22,105	27,863	31,697	41,288	50,880	60,471	70,062	79,654
	2,200	15,513	25,605	31,663	35,697	45,788	55,880	65,971	76,062	86,154
	2,400	21,513	32,605	39,263	43,697	54,788	65,880	76,971	88,062	99,154
	2,700	30,513	43,105	50,663	55,697	68,288	80,880	93,471	106,062	118,654
	2,900	36,513	50,105	58,263	63,697	77,288	90,880	104,471	118,062	131,654
	3,000	39,513	53,605	62,063	67,697	81,788	95,880	109,971	124,062	138,154

* With Canopy Management Labour at 118.0 hours/acre

TABLE 17
IMPACT OF YIELD AND CANOPY MANAGEMENT LABOUR HOUR CHANGES ON
FULL PRODUCTION YEAR CONTRIBUTION MARGIN *

10 Acre Vineyard Okanagan Valley

Average Annual Yield at Full Production (tons/acre)

		3.0	3.5	3.8	4.0	4.5	5.0	5.5	6.0	6.5
	88.5	17,428	27,020	32,778	36,612	46,203	55,795	65,386	74,978	84,569
	94.4	16,445	26,037	31,795	35,629	45,220	54,812	64,403	73,995	83,586
	100.3	15,462	25,054	30,812	34,646	44,237	53,829	63,420	73,012	82,603
Canopy	106.2	14,479	24,071	29,829	33,663	43,254	52,846	62,437	72,029	81,620
Mgt.	112.1	13,496	23,088	28,846	32,680	42,271	51,863	61,454	71,046	80,637
Hours	118.0	12,513	22,105	27,863	31,697	41,288	50,880	60,471	70,062	79,654
per Acre	123.9	11,530	21,122	26,880	30,713	40,305	49,896	59,488	69,079	78,670
(Avg.	129.8	10,547	20,138	25,897	29,730	39,322	48,913	58,504	68,096	77,687
Full	135.7	9,564	19,155	24,913	28,747	38,338	47,930	57,521	67,112	76,704
Prod'n.	141.6	8,580	18,172	23,930	27,763	37,355	46,946	56,538	66,129	75,720
Year)	147.5	7,597	17,188	22,947	26,780	36,371	45,963	55,554	65,145	74,737
	153.4	6,613	16,205	21,963	25,796	35,388	44,979	54,570	64,162	73,753

* With Price at \$2,100/ton

TABLE 18
IMPACT OF PRICE AND CANOPY MANAGEMENT LABOUR HOUR CHANGES ON
FULL PRODUCTION YEAR CONTRIBUTION MARGIN *
 10 Acre Vineyard Okanagan Valley

		Average Price (\$/ton)								
		1,100	1,300	1,500	1,700	1,900	2,100	2,300	2,500	3,000
Canopy Mgt. Hours per Acre (Avg. Full Prod'n. Year)	88.5	1,203	10,203	19,203	28,203	37,203	46,203	55,203	64,203	86,703
	94.4	220	9,220	18,220	27,220	36,220	45,220	54,220	63,220	85,720
	100.3	-763	8,237	17,237	26,237	35,237	44,237	53,237	62,237	84,737
	106.2	-1,746	7,254	16,254	25,254	34,254	43,254	52,254	61,254	83,754
	112.1	-2,729	6,271	15,271	24,271	33,271	42,271	51,271	60,271	82,771
	118.0	-3,712	5,288	14,288	23,288	32,288	41,288	50,288	59,288	81,788
	123.9	-4,695	4,305	13,305	22,305	31,305	40,305	49,305	58,305	80,805
	129.8	-5,678	3,322	12,322	21,322	30,322	39,322	48,322	57,322	79,822
	135.7	-6,662	2,338	11,338	20,338	29,338	38,338	47,338	56,338	78,838
	141.6	-7,645	1,355	10,355	19,355	28,355	37,355	46,355	55,355	77,855
147.5	-8,629	371	9,371	18,371	27,371	36,371	45,371	54,371	76,871	
153.4	-9,612	-612	8,388	17,388	26,388	35,388	44,388	53,388	75,888	

* With Yield at 4.5 tons/acre

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. IRR relates the concepts of discounting and the present value of future dollars. In this case, IRR is the discount rate that results in the benefits (direct income) being equal to the relevant costs (direct expenses) for the vineyard and is calculated using only the projected contribution margins for the planting over 15 years. The IRR for this study is 10.3%. The table in Appendix 4 summarizes the impact of changes in prices and yields on the IRR in this vineyard.

The internal rate of return can be compared to a 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 and taxation, 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.

RISK ASSESSMENT

Risk assessment forms the foundation of an effective enterprise risk management program. In enterprise risk management, a risk is defined as a possible event or circumstance that can have negative influences on the enterprise in question; in this case a new 10 acre vinifera wine grape planting.

There are critical success factors that make an investment profitable. The financial projections in this study assume good management and outcomes supporting a profitable and successful venture. Assessing the various sources of risk, their severity or impact, and the probability of occurrence is important in developing strategies to mitigate and manage risk. This section discusses potential sources of risk on the vineyard and ideas on the process to evaluate them in preparing a risk management plan as part of an overall farm business plan and financial projections.

There numerous sources of risks associated with a vinifera wine grape enterprise; both internal and external. They all could potentially have an impact on the key variables of price, yield and costs (including labour), and the contribution margin projections for the vineyard. The following list of factors is intended as a guideline to ask questions for specific vineyards and is not exhaustive.

Sources of Risk - Vineyard Wine Grape Enterprise

Markets/marketing	Varietal Selection	Grape Quality
Contract Requirements	Weather/Climate	Financial
Crop Protection	Soil	Business
Land Suitability	Disease	Supply of Grapes
Water	Production methods	Political
Crop Protection	Labour	Government Policy
Pest Control	Environment	Taxation

As each location and situation varies, it is important that an individual risk assessment be conducted. To assist in establishing the sources of risk for individual operations, take each factor and identify potential issues within them that would result in some degree of risk impacting the financial projections. From that, assess what the level of impact and probability of occurrence would be. Then determine the level of control you have and identify potential options to manage or mitigate the risks. As an example, this study uses production insurance to cover the risks of vine and crop losses. It is one of many strategies that farm managers can incorporate into their risk plan.

Another area of risk is price. Looking at the range of prices for wine grapes both within and between varieties points to a significant degree of risk. Strategies and production practices to secure markets and produce a good volume of high quality grapes that are in demand need to be established to meet the projected revenues in the vineyard.

It can also be useful to rank the risks into those with high impact and high probability and those with low probability and impact. This can help in putting a focus on managing those of greatest likelihood of occurrence and impact on the success of the vineyard.

This assessment will help in making a more informed decision on whether or not to invest in a vinifera wine grape planting as well as in managing towards a profitable vineyard enterprise.

Addition resources on managing risk can be found on various websites. A few references are listed below:

- SmartfarmBC - <http://www.smartfarmbc.ca/content/risk-management>
- Business Risk Management Programs, BC Ministry of Agriculture - <http://www.agf.gov.bc.ca/rm/index.htm>
- Farm Business Risk Assessment Profile, B.C. Ministry of Agriculture - http://www.al.gov.bc.ca/busmgmt/Bus_RiskAssessment/RiskAssessment.html
- Risk Choices, Alberta Agriculture - [http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/bmi12491](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/bmi12491)

APPENDICES

Appendix 1 - Net Farm Income Worksheet

NET FARM INCOME WORKSHEET

10 Acre Vineyard Okanagan Valley (Average Full Production Year)

Your Farm
Estimates

Income	Yield	Price	Vineyard	Per Ton	
	4.5 /Ac.	\$2,100 /ton	45.0 tons \$ 94,500		
TOTAL			\$ 94,500	\$ 2,100	<hr/>
Direct Expenses					<hr/>
Plant Nutrients			\$ 1,000	\$ 22.22	<hr/>
Crop Protection			\$ 1,410	\$ 31.34	<hr/>
Machinery Fuel/Oil			\$ 4,159	\$ 92.42	<hr/>
R&M			\$ 2,370	\$ 52.67	<hr/>
Labour Canopy Management			\$ 18,561	\$ 412.48	<hr/>
General			\$ 15,168	\$ 337.06	<hr/>
Contract Harvesting			\$ 5,500	\$ 122.22	<hr/>
Marketing			\$ 700	\$ 15.56	<hr/>
Equipment Rentals			\$ 230	\$ 5.11	<hr/>
Other Supplies (Prod'n Ins.)			\$ 4,114	\$ 91.41	<hr/>
Total Direct Expenses			\$ 53,212	\$ 1,182.49	<hr/>
CONTRIBUTION MARGIN			\$ 41,288	\$ 918	<hr/>
Indirect Expenses (Fixed Costs)					<hr/>
Accounting & legal					<hr/>
Bank charges					<hr/>
Insurance					<hr/>
Taxes/licences					<hr/>
Utilities					<hr/>
Auto expenses					<hr/>
Office & Supplies					<hr/>
Other					<hr/>
Other					<hr/>
Total Indirect (Fixed) Expenses					<hr/>
Net Return over Expenses <i>(Contribution Margin minus Total Indirect Expenses)</i>					<hr/>
Depreciation (Equipment & Buildings)					<hr/>
Net Farm Income					<hr/>

Appendix 2 - 2013 Wine Grape Variety Production

Tonnage and Average Prices from 2013 Wine Grape Crop Report

Major White Grape Varieties (by Total \$ Value)	Tons 2013	Average Price \$/ton	Low Price \$/ton	High Price \$/ton
Pinot Gris	3,224.4	2,043	800	2,750
Chardonnay	3,201.8	2,036	1,000	3,000
Gewurztraminer	1,895.7	1,904	125	3,200
Sauvignon Blanc	1,630.4	1,903	1,600	3,000
Riesling	1,360.8	1,896	860	3,500
Pinot Blanc	1,153.3	1,833	700	2,500
Viognier	605.9	2,323	1,400	3,400
Bacchus	267.1	1,957	1,200	2,200
Semillon	186.2	2,044	1,200	2,900
Misc. White Vinifera	203.0	1,500	1,500	1,500
Icewine Riesling	118.4	2,371	1,350	2,600
Ehrenfelser	141.6	1,862	1,200	3,000
Muscat	126.7	2,334	460	3,000
Icewine Chardonnay	93.8	2,068	1,200	2,650
Auxerrois	94.0	1,950	1,600	2,200
Kerner	86.4	2,040	1,600	3,000
Siegenerbe	85.2	1,949	1,400	2,500
Icewine Pinot Gris	78.1	2,036	1,905	2,900
Muller Thurgau	103.5	1,561	1,102	1,750
Icewine Sauvignon Blanc	68.5	2,111	1,834	2,600

Major White Grape Varieties (by Total \$ Value)	Tons 2013	Average Price \$/ton	Low Price \$/ton	High Price \$/ton
Chenin Blanc	103.1	1,400	-	-
Vidal	109.0	1,192	1,050	2,500
Schonburger	59.0	1,950	700	2,900
Icewine Viognier	37.3	2,201	1,400	2,650
Ortega	51.6	1,865	1,400	2,200
Rousanne	38.7	2,514	1,750	3,000
Madeleine Angevine	27.6	1,415	1,050	2,900
Icewine Semillon	11.0	2,336	2,200	3,000
Marsanne	19.9	2,137	-	-
Supressed Data	206.5	-	-	-
Total White Grapes	15,388.5	1,970	125	3,500

Source: The British Columbia Wine Grape Crop Report 2013- BDO Canada LLP

2013 Wine Grape Variety Production

Tonnage and Average Prices from 2013 Wine Grape Crop Report

Major Red Grape Varieties (by Total \$ Value)	Tons 2013	Average Price \$/ton	Low Price \$/ton	High Price \$/ton
Merlot	6,233.2	2,419	851	3,500
Cabernet Sauvignon	2,299.6	2,589	1,000	3,700
Pinot Noir	2,113.4	2,428	1,300	3,500
Cabernet Franc	1,718.4	2,504	1,500	4,300
Syrah/Shiraz	1,470.9	2,673	1,050	4,200
Gamay Noir	464.4	2,029	1,300	2,600
Malbec	300.0	2,779	1,300	3,400
Pinotage	249.8	2,491	2,000	2,500
Petit Verdot	191.4	2,475	1,825	4,250
Merechal Foch- R	222.2	1,946	1,100	2,800
Icewine Merlot	135.5	2,072	1,200	3,000
Zweigelt	73.2	2,336	1,800	2,700
Icewine Cabernet Franc	63.1	2,650	1,600	3,062
Zinfandel	58.7	1,993	1,850	3,000
Tempranillo	42.7	2,674	1,975	3,050
Dunkelfelder	57.5	1,952	1,700	3,000
Baco Noir	36.2	2,794	2,250	2,800
Icewine Zweigelt	23.8	2,563	-	-
Sangiovese	25.4	2,300	1,975	4,000
Pinot Meunier	25.5	1,753	1,400	1,900

Major Red Grape Varieties (by Total \$ Value)	Tons 2013	Average Price \$/ton	Low Price \$/ton	High Price \$/ton
Rotberger	17.1	2,000	2,000	2,000
Lemberger	15.3	2,019	1,800	2,373
Blaufrankisch	11.9	1,961	1,961	1,961
Mourvedre	7.9	2,961	-	-
Misc. Red Vinifera	7.3	2,524	-	-
Grenache	5.3	2,915	-	-
Suppressed Data	125.6	1,894	-	-
Total Red Grapes	15,995.3	2,458	851	4,300
Total All Grapes	31,383.8	2,219		

Source: The British Columbia Wine Grape Crop Report 2013 - BDO Canada LLP

Appendix 3 - 2014 B.C. Wine Grape Acreage Report

White Varieties			
Variety	Acreage	Percent of Whites	Percent of Total Grapes
Pinot Gris	1,114.25	22.15	10.86
Chardonnay	995.80	19.80	9.71
Gewurztraminer	734.96	14.61	7.17
Riesling	510.99	10.15	4.98
Sauvignon Blanc	393.87	7.82	3.84
Pinot Blanc	268.68	5.34	2.62
Viognier	222.58	4.43	2.17
Muscats	89.56	1.78	0.87
Ehrenfelser	79.32	1.58	0.77
Ortega	61.85	1.23	0.60
Siegenerrebe	51.63	1.03	0.50
Bacchus	49.47	0.98	0.48
Auxerrois	48.60	0.97	0.47
Semillon	46.94	0.93	0.46
Vidal *	42.20	0.84	0.41
Schonburger	34.46	0.69	0.34
Kerner	28.30	0.56	0.28
Chasselas	25.77	0.51	0.25
Madeleine Angevine	23.90	0.48	0.23
Roussanne	19.99	0.40	0.20

Variety	Acreage	Percent of Whites	Percent of Total Grapes
Blattner Whites *	17.16	0.34	0.17
Chenin Blanc	14.86	0.30	0.15
Muller Thurgau	14.80	0.28	0.14
Optima	14.01	0.28	0.14
Madeleine Sylvaner	13.80	0.27	0.13
Frontenac Blanc/Gris *	13.20	0.26	0.13
Reichensteiner	11.75	0.23	0.12
LaCrescent *	8.80	0.18	0.08
Sovereign Opal *	7.50	0.15	0.07
Marsanne	7.49	0.15	0.07
Gruener Veltliner	6.72	0.13	0.07
Italian, Portugese Whites	5.55	0.11	0.05
Trebbiano	5.50	0.11	0.05
Oraniensteiner	5.20	0.10	0.05
Traminer	2.35	0.05	0.02
Verdelet *	1.44	0.03	0.01
Sylvaner	0.50	0.01	0.01
Seyval Blanc *	0.50	0.01	0.01
Miscellaneous Whites	36.70	0.73	0.36
* Total White Hybrids	90.80 acres	1.8 %	
Total White Vinifera	4,940.15 acres	98.2 %	
Total White Grapes	5,030.95 acres	100.00 %	49.03 %

Red Varieties			
Variety	Acreage	Percent of Reds	Percent of Total Grapes
Merlot	1,563.71	29.90	15.24
Pinot Noir	1,073.11	20.53	10.46
Cabernet Sauvignon	755.82	14.45	7.37
Cabernet Franc	546.13	10.44	5.32
Syrah (Shiraz)	530.04	10.14	5.17
Gamay Noir	171.88	3.29	1.68
Marechal Foch *	140.59	2.68	1.36
Malbec	101.92	1.95	0.99
Petit Verdot	64.04	1.23	0.62
Zweigelt	45.79	0.88	0.45
Zinfandel	20.94	0.40	0.20
Blattner Reds *	20.14	0.39	0.20
Pinot Meunier	16.24	0.31	0.16
Tempranillo	15.94	0.30	0.15
Pinotage	15.15	0.29	0.15
Marquette *	13.23	0.25	0.13
Baco Noir *	12.76	0.24	0.12
Lemberger	10.35	0.20	0.10
Leon Millot *	9.95	0.19	0.10
Sangiovese	8.71	0.17	0.08
Carmenere	6.82	0.13	0.07
Chancellor *	6.56	0.12	0.06

Variety	Acreage	Percent of Reds	Percent of Total Grapes
Castel *	6.32	0.12	0.06
Agria	6.06	0.11	0.06
Dunkelfelder	5.93	0.11	0.06
Teroldego, Lagrein, Dolcetto	3.79	0.07	0.04
Mourvedre	3.62	0.07	0.03
Barbera	3.13	0.06	0.03
Rotberger	2.95	0.06	0.03
Grenache	2.59	0.05	0.02
Dornfelder	2.42	0.05	0.02
Frontenac Noir *	1.50	0.03	0.01
Alicante	1.00	0.02	0.01
Michurinetz	1.00	0.02	0.01
St. Croix *	0.80	0.02	0.01
Tannat	0.50	0.01	0.01
Nebbiolo	0.50	0.01	0.01
St. Laurent	0.40	0.01	0.01
Miscellaneous Reds	36.70	0.70	0.36
* Total Red Hybrids	211.85 acres	4.0 %	
Total Red Vinifera	5,017.18 acres	96.0 %	
Total Red Grapes	5,229.03 acres	100.00 %	50.96 %

**TOTAL BC WINE
GRAPES:**

10,259.98
acres

Survey Response

* 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: 2014 B.C. Wine Grape Acreage Report - August 2014

Appendix 4 - Impact of Price and Yield Changes on 15 Year Internal Rate of Return (%)

Vinifera Wine Grape Establishment and Production

Average Annual Yield at Full Production (tons/acre)

	3.0	3.5	3.8	4.0	4.5	5.0	5.5	6.0	6.5
1,200	n/a	n/a	n/a	n/a	n/a	-13.3%	-7.5%	-3.6%	-0.5%
1,300	n/a	n/a	n/a	n/a	-13.9%	-7.3%	-3.0%	0.3%	2.9%
1,400	n/a	n/a	n/a	-16.6%	-8.0%	-3.1%	0.5%	3.4%	5.9%
1,500	n/a	n/a	-13.7%	-10.0%	-4.0%	0.2%	3.4%	6.1%	8.4%
1,700	n/a	-9.0%	-4.6%	-2.4%	2.0%	5.4%	8.2%	10.7%	12.9%
1,800	-15.8%	-5.2%	-1.6%	0.4%	4.4%	7.6%	10.3%	12.7%	14.8%
1,900	-10.3%	-2.2%	1.0%	2.8%	6.5%	9.6%	12.2%	14.6%	16.7%
2,000	-6.5%	0.3%	3.2%	4.9%	8.5%	11.5%	14.0%	16.3%	18.4%
2,100	-3.5%	2.5%	5.3%	6.9%	10.3%	13.2%	15.7%	18.0%	20.0%
2,200	-1.0%	4.6%	7.2%	8.7%	12.0%	14.9%	17.4%	19.6%	21.6%
2,400	3.2%	8.1%	10.5%	12.0%	15.2%	17.9%	20.3%	22.5%	24.6%
2,700	8.3%	12.7%	14.9%	16.3%	19.3%	22.0%	24.4%	26.6%	28.6%
2,900	11.2%	15.4%	17.6%	18.9%	21.9%	24.5%	26.9%	29.1%	31.1%
3,000	12.5%	16.7%	18.8%	20.1%	23.1%	25.7%	28.1%	30.3%	32.3%

* IRR is based on the Contribution Margins, with Canopy Management Labour (Years 5+) at 118 hours/acre. Fixed costs, machinery and land investment are not included. Values in bold denote base assumptions.

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

Appendix 5 - Tonnage and Price Summary

All Varieties B.C. WINERIES

Year	Tonnage	Value	Avg \$/ton
2007	19,776.8	36,457,685	1,843
2008	22,274.9	44,986,994	2,020
2009	19,879.0	41,305,171	2,078
2010	17,732.9	38,927,327	2,195
2011	22,722.6	48,936,909	2,154
2012	27,257.2	59,375,333	2,178
2013	31,383.8	69,631,450	2,219

* Source: BC Grape Crop Reports

Appendix 6 - Vine Spacing and Plant Densities per Acre

VINIFERA GRAPES

Number of Feet between Rows

	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0
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
Number	4.5	3,227	2,420	1,936	1,613	1,383	1,210	1,076	968
of Feet	5.0	2,904	2,178	1,742	1,452	1,245	1,089	968	871
between	5.5	2,640	1,980	1,584	1,320	1,131	990	880	792
Vines	6.0	2,420	1,815	1,452	1,210	1,037	908	807	726
	6.5	2,234	1,675	1,340	1,117	957	838	745	670
	7.0	2,074	1,556	1,245	1,037	889	778	691	622
	7.5	1,936	1,452	1,162	968	830	726	645	581
	8.0	1,815	1,361	1,089	908	778	681	605	545
									495