

Financial Planning Information For Replanting and Establishing a VINIFERA Wine Grape Planting

Okanagan Region

Revised August 2023



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The Government of British Columbia and the Investment Agriculture Foundation of BC are pleased to participate in the production of this study. We are committed to working with our industry partners to address issues of importance to the agriculture and agri-food industry in British Columbia. Opinions expressed in this report are those of the authors and not necessarily those of the Investment Agriculture Foundation or the Government of British Columbia.

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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 direct expenses and income for replanting and establishing a Vinifera wine grape planting and are intended to be used as a planning tool in preparing an overall financial and business plan. 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 sensitivity analysis that looks at the impact on potential returns from changes in three key variables: wine grape prices, yields and canopy management labour hours, as well as a discussion on risk assessment.

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. **In this report, contribution margin does not allocate indirect expenses for overhead, interest, and other fixed costs as well as for living expenses, loan repayment, and return to management and investment. These indirect expenses 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 financially feasible and economically sound?

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. Information to guide this process can be found on the [BC Wine Grape Council](#) and [BC Grapegrowers' Association](#) websites.

This study can be used to evaluate both a new planting and a replant situation. The cost of removing and disposing of the old vines and trellis system is included in the planting year as a custom operation at \$3,500 per acre. Land acquisition and any land clearing, road building, water source development, securing of power and telephone utilities or other improvements, are not included in this enterprise analysis. Specific capital investment assumptions are listed in Table 10.

All figures are in year 2023 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 varietal obsolescence. However, the variety's market life could be shorter or longer, depending on global wine demand and supply.

Income tax considerations associated with vineyard ownership have not been considered.

FARM SIZE

The total farm acreage for this study is 12 acres. The establishment and production expenses for this vineyard enterprise are based on replanting an existing 10 acre vineyard planted 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 is assumed to be in a good location suitable for grape production. Before investing in a new planting or vineyard, it is recommended that a thorough site assessment been done by an [agrologist](#) along with the preparation of a business plan that includes not only the financial assessment and risk factors, but also the goals and objectives of the operator and needs of wineries and consumers.

In 2022 there were 625 winery operated vineyards in British Columbia with an average of 14.09 acres per vineyard, and 609 independent grower operated vineyards averaging 6.36 acres per vineyard. These averages reflect the fact that there are many small vineyards and a few very large ones.

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 three years emphasis is placed on development of strong vines suited to the production of high quality grapes that maximize returns.

This vineyard is trained to the standard single curtain vertical trellis system. Rows are 302.5 feet long and are spaced 7 feet apart creating 21 rows per acre. Steel posts are 20 feet apart in the row with ground anchors at the end posts. Vines are spaced at 3 feet in the row. This spacing of rows and vines results in 2,074 vines per acre. High-quality certified vines ([CGCN](#)) grafted on a suitable rootstock were purchased at \$7.25 each. Costs for grafted vines may vary depending on the availability of specific variety clones or rootstocks used. Grafted vines were chosen because the rootstocks provide growth control and protection from some of the nematodes found in this area, as well as for grape phylloxera concerns. Planting of self-rooted vines, costing less than grafted vines is an option.

An estimated 5% 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 vineyard is cane pruned, requiring tying.

Production begins when vines are in their third leaf with a yield of 1.0 ton (2,000 lb.) 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 2.0 tons. The vineyard reaches mature production in year five at a projected average of 5.0 tons per acre. At 2,074 vines per acre, only 4.82 pounds of fruit per vine are required to produce 5.0 tons per acre.

This average reflects yield variations due to climate and other risk factors. Larger yields per vine would be required to maintain 5.0 tons per acre at lower densities, with smaller per vine yields required if planting density was increased.

Projected direct income and expenses in year five reflect an average mature vineyard. The price for Vinifera grapes used in this study is \$3,000 per ton, based on the BC Wine Grape Council 2022 Crop Assessment Report weighted average prices. The average price for the top 10 planted varieties in the 2022 BC Grape Acreage Report was \$2,961 per short ton (see Appendix 2). It is important to use the specific varieties being considered in your vineyard when forecasting prices.

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 BC, 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.

An important consideration in developing and managing this vineyard is obtaining a sustainability certification through the [Sustainable Winegrowing British Columbia | BCWGC](#) Program. It is a voluntary scheme based on accepted best practices. Sustainable practices encompass rigorous grape growing standards, and caring for the health of the environment, people involved and maintaining and improving the longevity and profitability of the farm business.

WATER AND IRRIGATION

The irrigation water for this vineyard is supplied to the property by a local irrigation district. It may be important to ensure that works from the irrigation district are in place and that the district has the current capacity to supply the property. In other situations, vineyards are irrigated from wells located on the farm property. If you are looking at investing in a vineyard or are operating one that utilizes well water to irrigate, it is important to ensure that the property has a current groundwater license associated with the well. Water licenses, either from wells or surface water, are attached to a property.

As of March 1, 2022 all wells for irrigation are legally required to be licensed as per the British Columbia Water Sustainability Act. If a property does have a well but is not yet licensed, a groundwater licence application can be completed and irrigation initiated once the license is issued. In the Okanagan, groundwater scarcity can be a concern in some areas. Prior to investing in a property or applying for a licence, it is recommended to enquire with the provincial authorities on groundwater availability and licensing for the aquifer connected to the well location. See [Licensing Groundwater](#) in BC for specific information.

NUTRITION, PESTS, DISEASE AND WILDLIFE 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. Soil sampling is done on a regular basis. (Average every 2 years)

This vineyard utilizes Integrated Pest Management (IPM); a systematic decision-making process for the effective, economical and environmentally-sound suppression of pests (insects, mites, diseases, weeds, and problem wildlife).

There is considerable variation in the materials and rates required for the prevention and control of the various pests and diseases that impact wine grapes due to vineyard site location, varieties planted, and annual climate changes. This study uses an average crop protection regime to estimate the associated costs of materials, labour and machinery use.

Bird control is managed through an annual bird monitoring service as well as with the use of bird netting. A perimeter fence was installed around the vineyard to keep out deer. There are no projected costs to deal with other potential wildlife problems.

It is recommended that you refer to the [Best Practices Guide for Grapes](#) and the BC Ministry of Agriculture and Food's [General Grapes](#) and [Pest and Disease Control](#) websites for more information related to your specific situation.

PRODUCTION INSURANCE AND OTHER GOVERNMENT PROGRAMS

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.

A suite of business risk management programs is available through the Sustainable Canadian Agricultural Partnership to assist farmers in managing disaster events, including wildfires. See information about [Insurance and Income Protection](#) on the BC Ministry of Agriculture and Food's website.

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 5.0 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. It would be prudent to consult a professional agrologist to establish a suitable grass mix for your site.

This study used an overwintering mix of Fall Rye, Hairy Vetch and Winter Peas. It will reliably grow in spring and uses the available fall and winter moisture, reducing the need for supplemental irrigation. Once mowed, the residue covers the soil and does not create any competition for grape vines during the season.

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 and moisture conservation, and it warms the soil early in the year encouraging early root growth. A cultivator, weed sprayer and hand weeding with a trimmer are used to control weeds 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)	0.0
Plant Spacing (ft.)	3.0	Yield - Year 3 (tons/acre)	1.0
Row Spacing (ft.)	7.0	Yield - Year 4 (tons/acre)	2.0
Planting Density (Vines/acre)	2,074	Yield - Year 5 (tons/acre)	5.0
Percent of Vines Replanted - (Yr. 2)	5.0%	Price (\$/ton)	3,000
Row Length (ft.)	302.5	Bin Weight in Pounds	900
Number of Rows/acre	21	Contract Harvest (\$/bin)	80.00
<i>Vertical Shoot Positioning (VSP) System</i>		Bin Hauling/Handling (\$/ton)	100
# 8 ft. Row Posts/acre	315	General Items (Misc. Expenses)	3%
# 9 ft. End Posts/acre	42	Wine Grape Council (\$/ton)	10.00
# Anchors (metal Rod)/acre	42		
# Wires/row – 12.5 gauge	1		
# Wires/row - 14 gauge	7	<u>Annual Costs (10 Acre Vineyard):</u>	
12.5 gauge wire- feet/spool	3,750	Grapegrowers Association	150
14.0 gauge wire-feet/spool	5,800	Sustainable Winegrowing BC	200
#Gripples/acre	168	Bird Control (Voluntary)	100

Input Costs			\$	unit	\$/acre
Vines (CGCN- Virus Free)	2,074	#	7.25	plant	15,038.57
Steel Posts (row)	315	#	18.20	post	5,733.00
Steel Posts (end)	42	#	32.21	post	1,357.02
Anchors	42	#	9.55	anchor	401.10
High Tensile Wire * 12.5 gauge	1.7	spools	195.00	spool	331.50
14 gauge	7.7	spools	195.00	spool	1,501.50
Gripples (21 small @ \$1.41/ 147 medium @ \$1.58)					261.25
Custom Survey/Stake	1	#	100.00	acre	100.00
Stakes (bamboo)	2,074	#	0.48	stake	992.59
Post Install (Custom Operation)	3.45	hours	150.00	hour	518.23
Milk Cartons	2,074	#	0.18	each	382.42
Tape- Year 1	52	rolls	1.17	roll (60 ft.)	60.67
Tape- Years 2 - 5	23	rolls	1.17	roll (60 ft.)	27.03
Fertilizer (per acre cost estimate)			150.00	acre	150.00
Fuel Costs	Diesel		1.70	litre	
	Gas		1.75	litre	
Irrigation Water Costs (Irrigation District)			300	acre	
Hired Labour Costs (100% hired)					
Base Rate:			25.00	/hour	
Total Hourly Rate (including payroll taxes):			30.26	/hour	

* 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 planting densities and acreages.

Cover Crop			\$	Unit	\$/acre
Fall Rye	12.3	kg/acre	1.44	kg	17.67
Hairy Vetch	3.6	kg/acre	7.92	kg	28.80
Winter Peas	9.1	kg/acre	3.60	kg	32.73
Total Cover Crop Material Costs					79.20

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	\$152	\$152	\$152	\$152	\$152
Production Insurance	-	-	\$165	\$359	\$588
Total	\$262	\$262	\$492	\$686	\$915

* *These premiums are based on a planting density of 2,074 vines/acre and yields of 1.0, 2.0 and 5.0 tons per acre in years 3, 4 and 5 respectively. Premiums reflect averages for a 30% deductible on probable yield at 100% insurable value and a 5% deductible on vine loss.*

Production Insurance rates vary with each situation. A Production Insurance Representative should be contacted to determine appropriate values for each situation.

For further information visit the [BC Ministry of Agriculture and Food Website](#).

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 and buildings complement for the total 10 acre vineyard. **This is based on the assumption that the land has already been acquired** and the owner is assessing the additional capital requirements to replant and re-establish the vineyard and purchase the machinery, buildings and equipment 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

Planting Density: 2,074 Vines/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	_____	1.0	_____	2.0	_____	5	_____	8.00
Price (\$/ton)	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000
Total Direct Income	0	_____	0	_____	3,000	_____	6,000	_____	15,000	_____	24,000
Direct Expenses											
Vine/Trellis Removal	3,500	_____		_____		_____		_____		_____	
Vines *	15,037	_____		_____		_____		_____		_____	15,037
Support System *	10,578	_____		_____		_____		_____		_____	10,578
Replanting 5.0%		_____	821	_____		_____		_____		_____	821
Plant Nutrients	1,025	_____	150	_____	150	_____	150	_____	150	_____	1,625
Crop Protection	491	_____	201	_____	207	_____	207	_____	207	_____	1,313
Machinery Fuel/Oil	1,074	_____	697	_____	783	_____	713	_____	713	_____	3,981
R&M	177	_____	198	_____	255	_____	368	_____	368	_____	1,366
Hired Labour	7,894	_____	2,408	_____	5,989	_____	7,130	_____	7,345	_____	30,765
Contract Harvesting		_____		_____	278	_____	556	_____	1,389	_____	2,222
Marketing	35	_____	35	_____	45	_____	55	_____	85	_____	255
Equipment Rentals	1,031	_____	13	_____	23	_____	23	_____	23	_____	1,113
Other Supplies (Prod'n. In	1,519	_____	581	_____	619	_____	684	_____	739	_____	4,142
Total Direct Expenses	42,360	_____	5,104	_____	8,350	_____	9,885	_____	11,019	_____	76,717
Contribution Margin	-42,360	_____	-5,104	_____	-5,350	_____	-3,885	_____	3,981	_____	-52,717

* May be considered Capital Items.

**TABLE 2
PLANTING YEAR CASH OUTLAY ESTIMATES
10 ACRE VINEYARD DEVELOPMENT ***

Vinifera Wine Grape Establishment and Production

Density: 2,074 Vines/acre

Direct Expenses

Vine/Trellis Removal	35,000
Vines	150,365
Support System	105,778
Nutrients/Pesticides/Herbicides	15,159
Machinery Fuel/Oil	10,740
R&M	1,771
Hired Labour	78,940
Equipment Rentals	10,312
Other Supplies	15,538
Total Direct Expenses	423,603

Capital Items

Irrigation System	116,097
Machinery & Buildings	335,705
Total Capital Items	451,802

ESTIMATED OUTLAY 875,404

* This information reflects the added capital to start a new 10 acre vineyard and purchase the complement of machinery and 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 costs, 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 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.

Other financial planning resources and support programs include:

1. [Agrifood Business Planning Program](#). Provides funding towards business planning and services and coaching for individuals from a qualified business consultant.
2. [Enterprise Budgets](#). Budgets that comprise a simple listing of income and expenses, based on a set of assumptions and project the costs and returns of growing and selling a particular crop or livestock over a period of time.
3. [Small Farm Business Accelerator Pilot Program](#). Supports cost-shared purchasing of commercial farm infrastructure and equipment need to accelerate the revenue growth of farm businesses.
4. [Knowledge and Technology Transfer Program](#). A cost-shared reimbursement program intended to strategically support B.C.'s producers and processors to innovate and adapt to changing environmental, production and market conditions through practical, applied knowledge and skill development.

TABLE 3										
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN										
Vinifera Grape Establishment- Year 1 (Planting)										
Planting Density: 2,074 Vines/Acre										
Operation Description	Machinery Times Number * Done			Machinery Items			Labour		Other	Total Direct
				Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel \$/Acre	Hrs/Ac	\$/Acre	Materials \$/Acre	Expenses \$/Acre
Post/Wire/Vine Removal & Disposal (Custom)									3,500.00	3,500.00
Cultivation- Rip/Disc (rent \$125/hr)	1	1		4.50	4.50	145.03	4.5	136.17	250.00	531.20
Rock Picking	1	2	1	2.00	2.00	64.67	8.0	242.08		306.75
Soil Sampling (1 per acre)									75.00	75.00
Survey/Stake (Custom Oper'n)	0	1							100.00	100.00
Augering (Auger Rent&Bits)	1	1		17.00	17.00	547.90	17.0	514.43	150.00	1,212.33
Vinifera Vines	0	1							15,036.50	15,036.50
Planting & Staking/Bamboo Tying	1	1		1.00	1.00	32.23	138.3	4,184.02	992.45	5,208.70
Spreading Posts (Post Cost)	1	2	1	2.30	2.30	74.37	2.3	69.60	7,090.02	7,233.99
Anchors/Installation	0	1					10.5	317.74	401.10	718.84
Post Install (Custom Oper'n- \$150/hr)	0	1		3.45					518.23	518.23
Wire Spreading/Application	0	1					35.0	1,059.12	2,094.25	3,153.37
Irrigation Maintenance/ H2O Taxes	12	13	34	12.00	408.00	18.72	2.8	84.73	300.00	403.45
Fertilizer Applic./Compost-Ammendments	1	5	1	0.60	0.60	20.31	0.6	18.16	950.00	988.46
Canopy Management	0	1					23.3	705.07	60.72	765.79
Hand Weeding/Weed Whacker	9	1		3	3	4.31	3.0	90.78		95.09
Fungicide Application	1	6	3	1.2	3.6	146.08	3.6	108.94	108.53	363.55
Bird Monitor (Total Vineyard) \$100			1							0.00
Milk Cartons/ General use of RTV	11	1		7.00	7.00	74.81	7.00	211.82	382.37	669.00
Irrig/Comp-Rental		1							13.00	13.00
Memberships (BCGA / SWBC) \$350 (Total Vineyard)									35.00	35.00
Wine Grape Council Levy \$10 /ton										0.00
Vine/Production Insurance									26.20	26.20
Use of Pickup	10	1		5.00	5.00	122.66	5.0	151.30		273.97
Miscellaneous Expenses									1,131.85	1,131.85
TOTALS						1251.09	260.9	7,893.96	33,215.22	42,360.27
Expected Income- Vinifera Grapes:	0.0	Ton(s)/acre at	\$3,000 per Ton						Total Direct Income	0.00
									Total Direct Expenses	42,360.27
									CONTRIBUTION MARGIN	-42,360.27

* See Capital Investment Table for Description

TABLE 4
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 2
Planting Density: 2,074 Vines/Acre

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					14.0	423.65		423.65
Dormant Tying (plastic tape)		1					10.0	302.61	27.03	329.63
Replanting/Re-staking/cartons	5.0%	1					6.9	208.80	820.57	1,029.36
Cultivating	1	7	2	1.2	2.4	80.17	2.4	72.63		152.79
Seed Cover Crop (Drill Rental)	1	1		1.6	1.6	51.57	1.6	48.42	79.20	179.18
Mow Cover Crop	1	3	2	0.88	1.76	61.09	1.8	53.26		114.35
Fertilizer Application	1	5	1	0.6	0.6	20.31	0.6	18.16	150.00	188.46
Canopy Management	1	8	1				11.7	354.05		354.05
Pesticide/Insecticide Application	1	6		1.2						0.00
Irrigation Maintenance/ H2O Taxes	12	13	34	12	408	18.72	2.8	84.73	300.00	403.45
Fungicide & Foliar Application	1	6	8	1.2	9.6	389.56	9.6	290.50	135.86	815.92
Rock Picking	1	2	1	1	1	32.33	2.0	60.52		92.86
Weed Spraying	1	4	1	1.2	1.2	39.43	1.2	36.31	65.52	141.26
Hand Weeding/Weed Whacker	9		1	3	3	4.31	3.0	90.78		95.09
Irrigation/Comp-Rental			1						13.00	13.00
Bird Monitor (Total Vineyard)	\$100									0.00
General use of RTV	11		1	7	7	74.81	7.0	211.82		286.63
Bird Netting (Install/Remove + RTV use)	11	16	1							0.00
Contract Harvest	\$80 /bin	1	2	1						0.00
Bin Hauling/Handling	\$100 /ton									0.00
Memberships (BCGA / SWBC)	\$350 (Total Vineyard)								35.00	35.00
Wine Grape Council Levy	\$10 /ton									0.00
Vine/Production Insurance									26.20	26.20
Use of Pickup	10		1	5	5	122.66	5.0	151.30		273.97
Miscellaneous Expenses									148.65	148.65
TOTALS						894.96	79.6	2,407.53	1,801.02	5,103.50
Expected Income- Vinifera Grapes:	0.0	Ton(s)/acre at	\$3,000	per Ton					Total Direct Income	0.00
									Total Direct Expenses	5,103.50
									CONTRIBUTION MARGIN	-5,103.50

* See Capital Investment Table for Description

TABLE 5
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 3
Planting Density: 2,074 Vines/Acre

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					29.2	883.61		883.61
Mow Prunings	1	3	1	1.2	1.2	41.65	1.2	36.31		77.97
Dormant Tying			1				10.0	302.61	27.03	329.63
Mow Cover Crop	1	3	2	0.88	1.76	61.09	2.5	75.65		136.74
Fertilizer Application	1	5	1	0.6	0.6	20.31	0.6	18.16	150.00	188.46
Cultivating	1	7	2	1.2	2.4	80.17	2.4	72.63		152.79
Canopy Management	1	8	1	2.3	2.3	81.21	107.4	3,249.98		3,331.19
Irrigation Maintenance/ H2O Taxes	12	13	34	12	408	18.72	2.8	84.73	300.00	403.45
Fungicide & Foliar Application	1	6	8	1.2	9.6	389.56	9.6	290.50	135.86	815.92
Pesticide/Insecticide Application	1	6	1	1.2	1.2	48.69	1.2	36.31	5.60	90.61
Vine/Production Insurance									49.20	49.20
Weed Spraying	1	4	1	1.2	1.2	39.43	1.2	36.31	65.52	141.26
Hand Weeding/Weed Whacker	9		1	2.5	2.5	3.59	2.5	75.65		79.24
Bird Netting (Install/Remove + RTV use)	11	16	1	3.5	3.5	56.71	15.3	463.39		520.09
Bin Hauling/Handling \$100 /ton									100.00	100.00
Contract Harvest \$80.00 /bin	1	2	1						177.78	177.78
Memberships (BCGA / SWBC) \$350 (Total Vineyard)									35.00	35.00
Wine Grape Council Levy \$10.00 /ton									10.00	10.00
Irrig/Comp-Rental			1						13.00	13.00
General use of RTV	11		1	7	7	74.81	7.0	211.82		286.63
Bird Monitor (Total Vineyard) \$100									10.00	10.00
Use of Pickup	10		1	5	5	122.66	5.0	151.30		273.97
Miscellaneous Expenses									243.20	243.20
TOTALS						1,038.61	197.9	5,988.95	1,322.18	8,349.74
Expected Income- Vinifera Grapes:		1.0	Ton(s)/acre at	\$3,000	per Ton				Total Direct Income	3,000.00
									Total Direct Expenses	8,349.74
									CONTRIBUTION MARGIN	-5,349.74

* See Capital Investment Table for Description

TABLE 6
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 4
Planting Density: 2,074 Vines/Acre

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				40.8	1,234.63		1,234.63
Mow Prunings	1	3	1	1.2	1.2	41.65	1.2	36.31	77.97
Dormant Tying		1				11.7	354.05	27.03	381.07
Mow Cover Crop	1	3	2	0.88	1.76	61.09	2.5	75.65	136.74
Fertilizer Applic.	1	5	1	0.6	0.6	20.31	0.6	18.16	188.46
Vine/Production Insurance								68.60	68.60
Canopy Management	1	8	1	3.5	3.5	123.58	131.8	3,988.33	4,111.91
Irrigation Maintenance/ H2O Taxes	12	13	34	12	408	18.72	2.8	84.73	300.00
Fungicide & Foliar Application	1	6	8	1.2	9.6	389.56	9.6	290.50	135.86
Weed Spraying	1	4	1	1.2	1.2	39.43	1.2	36.31	65.52
Hand Weeding/Weed Whacker	9		1	2.5	2.5	3.59	2.5	75.65	79.24
Pesticide/Insecticide Application	1	6	1	1.2	1.2	48.69	1.2	36.31	5.60
Cultivating	1	7	2	1.2	2.4	80.17	2.4	72.63	152.79
Bird Netting (Install/Remove + RTV use)	11	16	1	3.5	3.5	56.71	15.3	463.39	520.09
General use of RTV	11		1	7	7	74.81	7.0	211.82	286.63
Bin Hauling/Handling								200.00	200.00
Contract Harvest	1		1					355.56	355.56
Memberships (BCGA / SWBC)	\$350	(Total Vineyard)						35.00	35.00
Wine Grape Council Levy	\$10.00	/ton						20.00	20.00
Bird Monitor (Total Vineyard)	\$100							10.00	10.00
Irrig/Comp-Rental			1					13.00	13.00
Use of Pickup	10		1	5	5	122.66	5.0	151.30	273.97
Miscellaneous Expenses								287.91	287.91
TOTALS						1,080.98	235.6	7,129.77	1,674.07
Expected Income- Vinifera Grapes:	2.0	Tons/acre at	\$3,000	per Ton				Total Direct Income	6,000.00
								Total Direct Expenses	9,884.81
								CONTRIBUTION MARGIN	-3,884.81

* See Capital Investment Table for Description

TABLE 7
DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN
Vinifera Grape Establishment- Year 5 (Full Production)
Planting Density: 2,074 Vines/Acre

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				40.8	1,234.63		1,234.63
Mow Prunings	1	3	1.2	1.2	41.65	1.2	36.31		77.97
Dormant Tying		1				12.8	387.33	27.03	414.36
Mow Cover Crop	1	3	0.88	1.76	61.09	2.5	75.65		136.74
Vine/Production Insurance								91.50	91.50
Fertilizer Application	1	5	0.6	0.6	20.31	0.6	18.16	150.00	188.46
Cultivating	1	7	1.2	2.4	80.17	2.4	72.63		152.79
Canopy Management	1	8	3.5	3.5	123.58	137.8	4,169.90		4,293.48
Irrigation Maintenance/ H2O Taxes	12	13	12	408	18.72	2.8	84.73	300.00	403.45
Fungicide & Foliar Application	1	6	1.2	9.6	389.56	9.6	290.50	135.86	815.92
Pesticide/Insecticide Application	1	6	1.2	1.2	48.69	1.2	36.31	5.60	90.61
Weed Spraying	1	4	1.2	1.2	39.43	1.2	36.31	65.52	141.26
Hand Weeding/Weed Whacker	9		2.5	2.5	3.59	2.5	75.65		79.24
Bird Netting (Install/Remove + RTV use)	11	16	3.5	3.5	56.71	15.3	463.39		520.09
General use of RTV	11		7	7	74.81	7.0	211.82		286.63
Bin Hauling/Handling 100 /ton								500.00	500.00
Contract Harvest \$80 /bin	1	1						888.89	888.89
Memberships (BCGA / SWBC) \$350 (Total Vineyard)								35.00	35.00
Wine Grape Council Levy \$10 /ton								50.00	50.00
Bird Monitor (Total Vineyard) \$100	1	1						10.00	10.00
Irrig/Comp-Rental		1						13.00	13.00
Use of Pickup	10	1	5	5	122.66	5.0	151.30		273.97
Miscellaneous Expenses								320.94	320.94
TOTALS					1,080.98	242.7	7,344.62	2,593.33	11,018.93
Expected Income- Vinifera Grapes:	5.00	Tons/acre at	\$3,000	per Ton				Total Direct Income	15,000.00
								Total Direct Expenses	11,018.93
								CONTRIBUTION MARGIN	3,981.07

* 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 in the 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 harvesting and bin hauling/handling are done on a contract basis and are not included in these hours. Costs for harvesting and hauling/handling can be found in the detailed operations tables in Section III.**

For this financial planning model, all labour is hired at a rate of \$25.00/hour (\$30.26 inclusive). 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 number of techniques including shoot thinning, leaf removal, bunch thinning, tying, tucking, suckering and hedging, etc. which affect production and fruit quality. It is expected that operations are done in an efficient and effective manner.

Table 8 summarizes the labour hours per acre for various operations for this vineyard over the five year establishment period. Planting year one shows an estimated 260.9 hours of labour including installation of the trellis support system (47.8 hours) and planting vines (155.3 hours). These two operations comprise just under 78% of hired labour hours. Projected annual labour hours per acre are 79.6 in year two, 197.9 in year three, 235.6 in year four and 242.7 in year five at full average production.

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, planting density, 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 23.3 hours in year one, 11.7 hours in year two, 107.4 hours in year three, 131.8 hours in year four, and 137.8 hours in year five (average full production).

Table 9 summarizes the total hired labour hours for the 10 acre vineyard, along with estimated number of weeks based on a 40 hour week. A significant 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 and timely labour resources are available to satisfy operational requirements and make adjustments for individual circumstances.

TABLE 8
LABOUR TIME ESTIMATES SUMMARY
Annual Hours/Acre- Various Operations (Years 1 - 5)
Planting Density 2,074 Vines/Acre

Labour Operation	Year 1		Labour Operation	Year 2		Year 3		Year 4		Year 5	
	Annual Labour <i>hr/Ac</i>	Your Est. <i>hr/Ac</i>		Annual Labour <i>hr/Ac</i>	Your Est. <i>hr/Ac</i>	Annual Labour <i>hr/Ac</i>	Your Est. <i>hr/Ac</i>	Annual Labour <i>hr/Ac</i>	Your Est. <i>hr/Ac</i>	Annual Labour <i>hr/Ac</i>	Your Est. <i>hr/Ac</i>
Ripping	2.5	_____	Pruning	14.0	_____	29.2	_____	40.8	_____	40.8	_____
Discing	2.0	_____	Mow Prunings	-	_____	1.2	_____	1.2	_____	1.2	_____
Cultivating/harrowing	0.0	_____	Replanting	6.9	_____		_____		_____		_____
Fertilizer Application	0.6	_____	Cultivate	2.4	_____	2.4	_____	2.4	_____	2.4	_____
Fungicide Application	3.6	_____	Seed Cover Crop	1.6	_____		_____		_____		_____
Rock Picking	8.0	_____	Dormant Tying	10.0	_____	10.0	_____	11.7	_____	12.8	_____
Augering	17.0	_____	Mow Cover Crop	1.8	_____	2.5	_____	2.5	_____	2.5	_____
Planting/Stake/Tying	138.3	_____	Fertilizer Application	0.6	_____	0.6	_____	0.6	_____	0.6	_____
Spreading Posts	2.3	_____	Fungicide/Foliar Application	9.6	_____	9.6	_____	9.6	_____	9.6	_____
Anchor Install	10.5	_____	Canopy Management *		_____		_____		_____		_____
Wire Spreading / Install	35.0	_____	Moving Wires	-	_____	11.7	_____	11.7	_____	11.7	_____
Canopy Management	23.3	_____	Vertical Shoot Pstr/Tuck	2.3	_____	39.7	_____	44.3	_____	46.7	_____
Weeding (Trimmer)	3.0	_____	De-Leafing	-	_____	15.2	_____	29.2	_____	29.2	_____
Irrigation Maintenance	2.8	_____	Shoot Thinning	-	_____	11.7	_____	14.0	_____	15.2	_____
RTV Operation/Use	7.0	_____	Hedging	-	_____	2.3	_____	3.5	_____	3.5	_____
Pickup Operation	5.0	_____	Suckering	5.9	_____	5.8	_____	5.8	_____	5.8	_____
			Bunch Thinning	3.5	_____	21.0	_____	23.3	_____	25.7	_____
			Weed Spraying	1.2	_____	1.2	_____	1.2	_____	1.2	_____
			Pesticide Application	-	_____	1.2	_____	1.2	_____	1.2	_____
			Rock Picking	2.0	_____	-	_____	-	_____	-	_____
			Bird Netting Install/Remove	-	_____	15.3	_____	15.3	_____	15.3	_____
			Weeding (Trimmer)	3.0	_____	2.5	_____	2.5	_____	2.5	_____
			Irrigation Maintenance	2.8	_____	2.8	_____	2.8	_____	2.8	_____
			RTV Operation/Use	7.0	_____	7.0	_____	7.0	_____	7.0	_____
			Pickup Operation	5.0	_____	5.0	_____	5.0	_____	5.0	_____
Total Hours/Acre	260.9		Total Hours/Acre	79.6		197.9		235.6		242.7	

* 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)
Planting Density 2,074 Vines/Acre

Labour Operation	Year 1		Labour Operation	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*
			Pruning	140	3.5	292	7.3	408	10.2	408	10.2
Ripping	25	0.63	Mow Prunings	-	-	12	0.3	12	0.3	12	0.3
Discing	20	0.50	Replanting	69	1.7	-	-	-	-	-	-
Cultivating/harrowing	0	0.00	Cultivate	24	0.6	24	0.6	24	0.6	24	0.6
Fertilizer Application	6	0.15	Seed Cover Crop	16	0.4	-	-	-	-	-	-
Fungicide Application	36	0.90	Dormant Tying	100	2.5	100	2.5	117	2.9	128	3.2
Rock Picking	80	2.00	Mow Cover Crop	18	0.4	25	0.6	25	0.6	25	0.6
Augering	170	4.25	Fertilizer Application	6	0.2	6	0.2	6	0.2	6	0.2
Planting/Stake/Bamboc	1,383	34.57	Fungicide/Foliar Application	96	2.4	96	2.4	96	2.4	96	2.4
Spreading Posts	23	0.58	Canopy Management *	-	-	-	-	-	-	-	-
Anchor Install	105	2.63	Moving Wires	-	-	117	2.9	117	2.9	117	2.9
Wire Spreading / Install	350	8.75	Vertical Shoot Pstr/Tuck	23	0.6	397	9.9	443	11.1	467	11.7
Canopy Management	233	5.83	De-Leafing	-	-	152	3.8	292	7.3	292	7.3
Weeding (Trimmer)	30	0.75	Shoot Thinning	-	-	117	2.9	140	3.5	152	3.8
Irrigation Maintenance	28	0.70	Hedging	-	-	23	0.6	35	0.9	35	0.9
RTV Operation/Use	70	1.75	Suckering	59	1.5	58	1.5	58	1.5	58	1.5
Pickup Operation	50	1.25	Bunch Thinning	35	0.9	210	5.3	233	5.8	257	6.4
			Weed Spraying	12	0.3	12	0.3	12	0.3	12	0.3
			Pesticide Application	-	-	12	0.3	12	0.3	12	0.3
			Rock Picking	20	0.5	-	-	-	-	-	-
* 40 hours			Bird Netting Install/Remove	-	-	153	3.8	153	3.8	153	3.8
			Weeding (Trimmer)	30	0.8	25	0.6	25	0.6	25	0.6
			Irrigation Maintenance	28	0.7	28	0.7	28	0.7	28	0.7
			RTV Operation/Use	70	1.8	70	1.8	70	1.8	70	1.8
			Pickup Operation	50	1.3	50	1.3	50	1.3	50	1.3
Total for 10 Acres	2,609	65.2	Total for 10 Acres	796	19.9	1,979	49.5	2,356	58.9	2,427	60.7

* 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 with the exception of the pick-up truck. 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 \$451,809 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 \$90,362 to \$18,072 respectively. The vineyard model here is based on a 10 acre planting with the depreciable asset investment at an estimated \$45,181 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 80 HP	86,000	15	8,600	224.7	2.90	32.23
2 Rear & Front Bin Forks	21,000	15	2,100	6.6	0.10	0.10
3 Mower-Flail Chopper(70")	12,000	15	8,400	21.3	2.48	2.48
4 Sprayer- 100 Gal.	7,000	10	700	9.6	0.63	0.63
5 Fertilizer Spreader- 900lb.	3,500	15	350	6.0	1.61	1.61
6 Air Blast Sprayer(100 Gal.) 3pt.	19,000	15	1,900	84.0	8.35	8.35
7 Cultivator	8,400	15	200	19.2	1.17	1.17
8 Hedger (Hydraulic)	10,300	15	1,030	23.3	3.08	3.08
9 Weed Whacker	700	6	0	33.8	0.04	1.44
10 1/2 Ton Pick-Up (Used)	18,000	5	3,600	50.0	1.35	24.53
11 RTV (Side by Side)	17,000	8	6,800	91.0	3.71	10.69
12 Irrigation System (Overhead)	50,500	10	0	650.0	1.15	1.15
13 Irrigation Sytem (Drip+Filtr)	65,597	10	0	4,080.0	0.28	0.28
Subtotal (Hourly Equipment)	318,997		33,680			
				Repair \$/Yr		
14 Small Tools	5,000	10	0	50		
15 Storage shed	20,000	30	0	400		
16 Bird Netting (side)	19,305	10	0	193		
17 Deer Fence (perimeter)	38,500	30	0			
19 Worker Housing	50,000	30	0			
TOTAL	451,802					

Fuel Consumption Factors	HP	Consumption		\$/litre
		litre/hp	litres/hr	
Mach. #				
1 Tractor	80	0.216		1.70
10 1/2 Ton Pick-Up (Used)			12.63	1.75
11 RTV (Side by Side)			2.5	1.75
12 Weed Whacker			0.82	1.75

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

Machinery List	Year 1 (Planting)		Year 2		Year 3		Year 4		Year 5 (Full Prod'n)		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	31.0	310	18.2	182	20.3	203	21.5	215	21.5	215	225
2 Rear & Front Bin Forks	2.3	23	1.0	10	0.0	0	0.0	0	0.0	0	7
3 Mower-Flail Chopper(70")	0.0	0	1.8	18	3.0	30	3.0	30	3.0	30	21
4 Sprayer- 100 Gal.	0.0	0	1.2	12	1.2	12	1.2	12	1.2	12	10
5 Fertilizer Spreader- 900lb.	0.6	6	0.6	6	0.6	6	0.6	6	0.6	6	6
6 Air Blast Sprayer(100 Gal.) 3pt.	3.6	36	9.6	96	9.6	96	9.6	96	9.6	96	84
7 Cultivator	0.0	0	2.4	24	2.4	24	2.4	24	2.4	24	19
8 Hedger (Hydraulic)	0.0	0	0.0	0	2.3	23	3.5	35	3.5	35	19
9 Weed Whacker											
10 1/2 Ton Pick-Up (Used)	5.0	50	5.0	50	5.0	50	5.0	50	5.0	50	50
11 RTV (Side by Side)	7.0	70	7.0	70	10.5	105	10.5	105	10.5	105	91
12 Irrigation System (Overhead)	65.0	650	65.0	650	65.0	650	65.0	650	65.0	650	650
13 Irrigation Sytem (Drip+Fltr)	408.0	4,080	408.0	4,080	408.0	4,080	408.0	4,080	408.0	4,080	4,080

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 of yields and a grape price using the BC Wine Grape Council's 2022 Crop Assessment Report prices for the top 10 varieties planted in BC. The industry weighted average price for these varieties used for the production of wine by BC Wineries was \$2,961/ton. A rounded \$3,000/short ton was used for this study. As the price of grapes is variable and changes from year to year, caution should be exercised in applying this information to specific farm situations. To assist in this, there are tables in the Appendices summarizing the 2022 wine grape acres and prices.

Given that wineries do not have to buy a vineyard's grapes, producers should have a contract 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 wine grape yields, and may be further impacted by the variation in 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 5.0 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 mitigate yield risks. For more information contact a [Production Insurance](#) representative from the local BC Ministry of Agriculture and Food 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, labour availability 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 shows a negative margin balance of \$24,515/acre after 15 years. Based on the assumptions used; this planting has not paid back the initial replant and establishment costs or 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 four years, then the enterprise begins contributing positively to farm cash flow in the fifth year at \$3,981 per acre for the average full production years.

The purchase of machinery, equipment and buildings is **not** included in this financial 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; and may include the upgrading of old overhead and drip 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. This margin becomes positive at \$4,485/acre if price increases to \$3,500/ton with yields at 5.0 tons/acre for the average full production years. It also is positive at \$5,226/acre if the average full production yields increase to 6.0 tons/acre with price fixed at \$3,000.

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 \$3,000 per ton level and labour cost at \$30.26/hour. The changes to the accumulated margin appears to be more sensitive to the change in yield than labour costs for canopy management. A 20% increase or decrease in yields results in an impact of 121% on the accumulated margin balance. A 20% increase or decrease in the canopy labour hours impacts the margin by 46%.

These tables can be used to provide a quick determination of how the 15 year accumulated contribution margin changes with the stated ranges of prices, yields and canopy management labour hours; a best case/worse case analysis. The impact of labour cost per hour is also an important factor to consider.

TABLE 12
CUMULATIVE CONTRIBUTION MARGIN SUMMARY (Cashflow Projection)

\$ per Acre

Vinifera Wine Grape Establishment and Production

Planting Density: **2,074** Vines/Acre

	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	1.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Price (\$/ton)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Total Direct Income	0	0	3,000	6,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Direct Expenses															
Vine/Trellis Removal	3,500														
Vines *	15,037	821													
Support System *	10,578														
Plant Nutrients	1,025	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Pesticides/Herbicides	491	201	207	207	207	207	207	207	207	207	207	207	207	207	207
Machinery Fuel/Oil	1,074	697	783	713	713	713	713	713	713	713	713	713	713	713	713
R&M	177	198	255	368	368	368	368	368	368	368	368	368	368	368	368
Hired Labour	7,894	2,408	5,989	7,130	7,345	7,345	7,345	7,345	7,345	7,345	7,345	7,345	7,345	7,345	7,345
Contract Harvesting			278	556	1,389	1,389	1,389	1,389	1,389	1,389	1,389	1,389	1,389	1,389	1,389
Marketing	35	35	45	55	85	85	85	85	85	85	85	85	85	85	85
Equipment Rentals	1,031	13	23	23	23	23	23	23	23	23	23	23	23	23	23
Other Supplies (Crop Ins.)	1,519	581	619	684	739	739	739	739	739	739	739	739	739	739	739
Total Direct Expenses	42,360	5,104	8,350	9,885	11,019	11,019	11,019	11,019	11,019	11,019	11,019	11,019	11,019	11,019	11,019
Contribution Margin	-42,360	-5,104	-5,350	-3,885	3,981	3,981	3,981	3,981	3,981	3,981	3,981	3,981	3,981	3,981	3,981
Irrigation System *	11,610														
Beginning Balance	0	-53,970	-59,073	-64,423	-68,308	-64,327	-60,346	-56,365	-52,383	-48,402	-44,421	-40,440	-36,459	-32,478	-28,496
Interest 0.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accumulated Margin (balance)	-53,970	-59,073	-64,423	-68,308	-64,327	-60,346	-56,365	-52,383	-48,402	-44,421	-40,440	-36,459	-32,478	-28,496	-24,515

* 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
 Density: 2,074 Vines/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
1,500	-137,998	-131,377	-127,400	-124,757	-122,105	-118,136	-111,515	-104,895	-98,274
1,600	-134,398	-127,227	-122,920	-120,057	-117,185	-112,886	-105,715	-98,545	-91,374
1,800	-127,198	-118,927	-113,960	-110,657	-107,345	-102,386	-94,115	-85,845	-77,574
2,000	-119,998	-110,627	-105,000	-101,257	-97,505	-91,886	-82,515	-73,145	-63,774
Average Price									
2,100	-116,398	-106,477	-100,520	-96,557	-92,585	-86,636	-76,715	-66,795	-56,874
2,300	-109,198	-98,177	-91,560	-87,157	-82,745	-76,136	-65,115	-54,095	-43,074
\$/ton									
2,500	-101,998	-89,877	-82,600	-77,757	-72,905	-65,636	-53,515	-41,395	-29,274
2,700	-94,798	-81,577	-73,640	-68,357	-63,065	-55,136	-41,915	-28,695	-15,474
2,900	-87,598	-73,277	-64,680	-58,957	-53,225	-44,636	-30,315	-15,995	-1,674
3,000	-83,998	-69,127	-60,200	-54,257	-48,305	-39,386	-24,515	-9,645	5,226
3,200	-76,798	-60,827	-51,240	-44,857	-38,465	-28,886	-12,915	3,055	19,026
3,500	-65,998	-48,377	-37,800	-30,757	-23,705	-13,136	4,485	22,105	39,726
3,800	-55,198	-35,927	-24,360	-16,657	-8,945	2,614	21,885	41,155	60,426
4,000	-47,998	-27,627	-15,400	-7,257	895	13,114	33,485	53,855	74,226

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

Density: 2,074 Vines/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%	-69,892	-55,021	-46,094	-40,151	-34,199	-25,280	-10,409	4,462	19,332
80%	-72,713	-57,842	-48,914	-42,971	-37,020	-28,101	-13,230	1,641	16,511
85%	-75,534	-60,663	-51,735	-45,792	-39,841	-30,922	-16,051	-1,180	13,690
90%	-78,355	-63,484	-54,557	-48,614	-42,662	-33,743	-18,872	-4,001	10,869
95%	-81,176	-66,306	-57,378	-51,435	-45,483	-36,564	-21,694	-6,823	8,048
100%	-83,998	-69,127	-60,200	-54,257	-48,305	-39,386	-24,515	-9,645	5,226
105%	-86,820	-71,949	-63,022	-57,078	-51,127	-42,208	-27,337	-12,466	2,404
109%	-89,078	-74,207	-65,279	-59,336	-53,384	-44,465	-29,595	-14,724	147
112%	-90,771	-75,900	-66,972	-61,029	-55,078	-46,159	-31,288	-16,417	-1,546
115%	-92,464	-77,593	-68,666	-62,723	-56,771	-47,852	-32,981	-18,111	-3,240
120%	-95,286	-80,416	-71,488	-65,545	-59,593	-50,674	-35,804	-20,933	-6,062
125%	-98,109	-83,238	-74,311	-68,368	-62,416	-53,497	-38,626	-23,755	-8,885
130%	-100,932	-86,061	-77,133	-71,190	-65,238	-56,320	-41,449	-26,578	-11,707

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 \$3,000/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. The total direct expenses for 10 acres are \$110,188 or \$2,204 per ton of grapes produced. The total hired labour cost is \$73,446 (\$41,699 canopy management and \$31,447 general) which accounts for 66.7% of the direct expenses, followed by contract harvesting at 12.6%, and other supplies and crop protection at 6.7% and 6.5% respectively. While these values will vary for different vineyards, it is important to recognize the cost breakdown in terms of their impact on the contribution margin. In this case, improving labour efficiencies might result in cost savings.

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.

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 23% reduction in the price from \$3,000 per ton to \$2,300 per ton (at 5.0 tons/acre) results in an 88% decrease in the margin to \$4,431/acre. A 20% decrease in yield to 4.0 tons (with price fixed at \$3,000/ton) results in a 68% reduction in the contribution margin to \$12,774/acre.

In terms of canopy management labour hours, increasing the annual hours per acre from 137.8 to 151.6 hours per acre, reduces the contribution margin by 12.5% to \$35,380/acre. Conversely, reducing the hours to 124 increases the margin by 11% to \$44,242/acre. 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 expanded by looking at the probability and impact of key risk factors on 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 15
CONTRIBUTION MARGIN
Average Full Production Year
10 Acre Vinifera Wine Grape Planting
Density: 2,074 Vines/acre

Direct Income			Vineyard	Per Ton	% of Total
Yield	5.0	tons/acre			
Price	3,000	\$/ton			
Total Direct Income			150,000	3,000	100.0%
Direct Expenses					
Plant Nutrients			1,500	30.00	1.4%
Crop Protection			2,070	41.40	1.9%
Machinery	Fuel/Oil		7,130	142.60	6.5%
	R&M		3,680	73.60	3.3%
Hired Labour	Canopy Management		41,699	833.98	37.8%
	General		31,747	634.95	28.8%
Contract Harvesting			13,888	277.76	12.6%
Marketing			850	17.00	0.8%
Equipment Rentals			230	4.60	0.2%
Other Supplies			7,395	147.89	6.7%
Total Direct Expenses			110,188	2,203.77	100.0%
Contribution Margin			39,812	796.23	26.5%

* Note:Contribution Margin is 26.5% of Income

TABLE 16
IMPACT OF YIELD AND PRICE CHANGES
ON FULL PRODUCTION YEAR CONTRIBUTION MARGIN *
10 Acre Vineyard Okanagan Valley
 Planting Density 2,074 Vines/Acre

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	
1,500	-59,264	-53,245	-49,629	-47,226	-41,207	-35,188	-29,170	-23,151	-17,132	
1,600	-56,264	-49,745	-45,829	-43,226	-36,707	-30,188	-23,670	-17,151	-10,632	
1,800	-50,264	-42,745	-38,229	-35,226	-27,707	-20,188	-12,670	-5,151	2,368	
2,000	-44,264	-35,745	-30,629	-27,226	-18,707	-10,188	-1,670	6,849	15,368	
2,100	-41,264	-32,245	-26,829	-23,226	-14,207	-5,188	3,830	12,849	21,868	
Average	2,300	-35,264	-25,245	-19,229	-15,226	-5,207	4,812	14,830	24,849	34,868
Price	2,500	-29,264	-18,245	-11,629	-7,226	3,793	14,812	25,830	36,849	47,868
\$/ton	2,700	-23,264	-11,245	-4,029	774	12,793	24,812	36,830	48,849	60,868
	2,900	-17,264	-4,245	3,571	8,774	21,793	34,812	47,830	60,849	73,868
	3,000	-14,264	-745	7,371	12,774	26,293	39,812	53,330	66,849	80,368
	3,200	-8,264	6,255	14,971	20,774	35,293	49,812	64,330	78,849	93,368
	3,500	736	16,755	26,371	32,774	48,793	64,812	80,830	96,849	112,868
	3,800	9,736	27,255	37,771	44,774	62,293	79,812	97,330	114,849	132,368
	4,000	15,736	34,255	45,371	52,774	71,293	89,812	108,330	126,849	145,368

* With Canopy Management Labour at 137.8 hours/acre

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

10 Acre Vineyard Okanagan Valley
 Planting Density 2,074 Vines/Acre

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
	103.4	-3,188	10,330	18,446	23,849	37,368	50,887	64,406	77,925	91,443
	110.2	-5,403	8,116	16,232	21,634	35,153	48,672	62,191	75,710	89,229
	117.1	-7,618	5,901	14,017	19,420	32,938	46,457	59,976	73,495	87,014
Canopy	124.0	-9,833	3,686	11,802	17,205	30,723	44,242	57,761	71,280	84,799
Mgt.	130.9	-12,048	1,470	9,587	14,989	28,508	42,027	55,546	69,065	82,583
Hours	137.8	-14,264	-745	7,371	12,774	26,293	39,812	53,330	66,849	80,368
per Acre	144.7	-16,479	-2,960	5,156	10,558	24,077	37,596	51,115	64,634	78,153
(Avg.	151.6	-18,695	-5,176	2,940	8,343	21,862	35,380	48,899	62,418	75,937
Full	158.5	-20,911	-7,392	724	6,127	19,646	33,165	46,683	60,202	73,721
Prod'n.	165.4	-23,127	-9,608	-1,492	3,911	17,430	30,949	44,467	57,986	71,505
Year)	172.3	-25,343	-11,824	-3,708	1,695	15,214	28,732	42,251	55,770	69,289
	179.1	-27,559	-14,040	-5,924	-521	12,997	26,516	40,035	53,554	67,073

* With Price at \$3,000/ton

TABLE 18
IMPACT OF PRICE AND CANOPY MANAGEMENT LABOUR HOUR CHANGES
ON FULL PRODUCTION YEAR CONTRIBUTION MARGIN *

10 Acre Vineyard Okanagan Valley
 Planting Density 2,074 Vines/Acre

Average Price (\$/ton)

		1,500	1,800	2,000	2,500	2,800	3,000	3,200	3,600	4,000
	103.4	-24,113	-9,113	887	25,887	40,887	50,887	60,887	80,887	100,887
	110.2	-26,328	-11,328	-1,328	23,672	38,672	48,672	58,672	78,672	98,672
	117.1	-28,543	-13,543	-3,543	21,457	36,457	46,457	56,457	76,457	96,457
Canopy	124	-30,758	-15,758	-5,758	19,242	34,242	44,242	54,242	74,242	94,242
Mgt.	130.9	-32,973	-17,973	-7,973	17,027	32,027	42,027	52,027	72,027	92,027
Hours	137.8	-35,188	-20,188	-10,188	14,812	29,812	39,812	49,812	69,812	89,812
per Acre	144.7	-37,404	-22,404	-12,404	12,596	27,596	37,596	47,596	67,596	87,596
(Avg.	151.6	-39,620	-24,620	-14,620	10,380	25,380	35,380	45,380	65,380	85,380
Full	158.5	-41,835	-26,835	-16,835	8,165	23,165	33,165	43,165	63,165	83,165
Prod'n.	165.4	-44,051	-29,051	-19,051	5,949	20,949	30,949	40,949	60,949	80,949
Year)	172.3	-46,268	-31,268	-21,268	3,732	18,732	28,732	38,732	58,732	78,732
	179.1	-48,484	-33,484	-23,484	1,516	16,516	26,516	36,516	56,516	76,516

* With Yield at 5.0 tons/acre

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 impacts 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 the target of 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 risks. 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 are 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.

Potential Sources of Risk - Vineyard Wine Grape Enterprise

Markets / Marketing	Varietal Selection	Grape Quality / Price
Contract Requirements	Weather/Climate/Environment	Financial / Investments
Inflation/Interest rates	Labour- Supply and Skills	Management / Business
Land Suitability / Soil / Water	Disease / Crop Protection	Supply of Vines / Grapes
Technology / Innovation	Production methods	Political / Social
Biodiversity M	Human Resources / Family	Politics / Policies / Regulations
Pest and Disease 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 above and identify potential issues within them that could 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 low impact. This can help in putting a focus on managing risks with the greatest likelihood of occurrence and impact on the success of the vineyard.

A risk 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.

Additional resources on managing risk and financial programs can be found on various websites. A few references are listed below:

- BC Ministry of Agriculture and Food:
[Risk Management for Farming](#)
[Insurance and Income Protection](#)
- [Farm Management Canada](#)
- [Investment Agriculture Foundation](#)

APPENDICES

Appendix 1 - Net Farm Income Worksheet

NET FARM INCOME WORKSHEET

10 Acre Vineyard Okanagan Valley (Average Full Production Year)					Your Farm Estimates
	Planting Density	2,074	Vines/Acre		
Income			Vineyard	Per Ton	
	Yield	Price	50.0 tons		
	5.0 /Ac.	\$3,000 /ton	\$ 150,000		
	TOTAL		\$ 150,000	\$ 3,000	
Direct Expenses					
	Plant Nutrients		\$ 1,500	\$ 30.00	
	Crop Protection		\$ 2,070	\$ 41.40	
	Machinery Fuel/Oil		\$ 7,130	\$ 142.60	
		R&M	\$ 3,680	\$ 73.60	
	Labour	Canopy Management	\$ 41,699	\$ 833.98	
		General	\$ 31,747	\$ 634.95	
	Contract Harvesting		\$ 13,888	\$ 277.76	
	Marketing		\$ 850	\$ 17.00	
	Equipment Rentals		\$ 230	\$ 4.60	
	Other Supplies		\$ 7,395	\$ 147.89	
	Total Direct Expenses		\$ 110,188	\$ 2,203.77	
	CONTRIBUTION MARGIN		\$ 39,812	\$ 796	
Indirect Expenses (Fixed Costs)					
	Accounting & legal				
	Bank charges				
	Insurance				
	Taxes/licences				
	Utilities				
	Auto expenses				
	Office & Supplies				
	Other				
	Other				
	Total Indirect (Fixed) Expenses				
	Net Return over Expenses <i>(Contribution Margin minus Total Indirect Expenses)</i>				
	Depreciation (Equipment & Buildings)				
	Net Farm Income				

Appendix 2 - 2022 BC Wine Grape Acreage and Prices

The following 2 tables summarize the red and white varietal planted acres from the 2022 B.C. Wine Grape Acreage Report.

B.C. RED WINE GRAPES- 2022 *							
RED VARIETY	ACREAGE	% of REDS	% of B.C. GRAPES	RED VARIETY	ACREAGE	% of REDS	% of B.C. GRAPES
Merlot	1,861.17	26.36%	14.68%	Castel *	5.67	0.08%	0.04%
Pinot Noir	1,655.75	23.45%	13.06%	Tannat	5.63	0.08%	0.04%
Cabernet Sauvignon	972.69	13.77%	7.67%	Mourvedre	5.11	0.07%	0.04%
Cabernet Franc	939.82	13.31%	7.41%	Dunkelfelder	5.04	0.07%	0.04%
Syrah	654.65	9.27%	5.16%	Barbera	4.32	0.06%	0.03%
Gamay Noir	256.46	3.63%	2.02%	Dolcetto	4.25	0.06%	0.03%
Malbec	149.56	2.12%	1.18%	Petit Sirah	3.07	0.04%	0.02%
Maréchal Foch *	126.38	1.79%	1.00%	Concord **	3.00	0.04%	0.02%
Petit Verdot	106.08	1.50%	0.84%	Dornfelder	2.99	0.04%	0.02%
Zweigelt	43.79	0.62%	0.35%	Rotberger	2.80	0.04%	0.02%
Pinot Meunier	32.21	0.46%	0.25%	Teroldego	2.61	0.04%	0.02%
Zinfandel	23.06	0.33%	0.18%	Touriga Nacional	2.50	0.04%	0.02%
Tempranillo	21.30	0.30%	0.17%	Nebbiolo	2.37	0.03%	0.02%
Pinotage	18.96	0.27%	0.15%	Rosette *	2.00	0.03%	0.02%
Grenache	18.36	0.26%	0.14%	Chambourcin *	1.63	0.02%	0.01%
Carmenere	15.89	0.23%	0.13%	Gamay de Bouze	1.00	0.01%	0.01%
Marquette *	15.40	0.22%	0.12%	Gamay Fréaux	1.00	0.01%	0.01%
Sangiovese	14.30	0.20%	0.11%	Montepulciano	1.00	0.01%	0.01%
Blattner Cabernet Foch *	13.81	0.20%	0.11%	Alicante	0.94	0.01%	0.01%
Baco Noir *	12.30	0.17%	0.10%	Agria	0.84	0.01%	0.01%
Léon Millot *	9.58	0.14%	0.08%	St. Laurent	0.60	0.01%	0.00%
Frontenac Noir *	9.55	0.14%	0.08%	Cinsault	0.40	0.01%	0.00%
Blattner Brickett Red *	8.69	0.12%	0.07%	Regent *	0.40	0.01%	0.00%
Lemberger **	8.40	0.12%	0.07%	Refosco	0.39	0.01%	0.00%
Blattner Cabernet Libre *	7.29	0.10%	0.06%	Lucie Kuhlman *	0.30	0.00%	0.00%
Chancellor *	6.60	0.09%	0.05%				
* Total Red Hybrid					219.60	3.11%	1.73%
** Total Red Labrusca					11.40	0.16%	0.09%
Total Red Vinifera					6,830.91	53.87%	53.87%
Total Red Grapes					7,061.90	100.00%	55.69%
Total B.C. Wine Grapes					12,681.44		

* Source: 2022 B.C. Wine Grape Acreage Report

B.C. WHITE WINE GRAPES- 2022 *

WHITE VARIETY	ACREAGE	% of WHITES	% of B.C. GRAPES	WHITE VARIETY	ACREAGE	% of WHITES	% of B.C. GRAPES
Pinot Gris	1,306.27	23.25%	10.30%	La Crescent *	11.91	0.21%	0.09%
Chardonnay	1,246.99	22.19%	9.83%	Müller Thurgau	11.53	0.21%	0.09%
Riesling	665.49	11.84%	5.25%	Sylvaner	9.90	0.18%	0.08%
Gewürztraminer	659.09	11.73%	5.20%	Optima	9.56	0.17%	0.08%
Sauvignon Blanc	439.80	7.83%	3.47%	Marsanne	7.88	0.14%	0.06%
Pinot Blanc	242.29	4.31%	1.91%	Zengo	7.00	0.12%	0.06%
Viognier	235.15	4.18%	1.85%	Albarino	6.75	0.12%	0.05%
Muscat	112.40	2.00%	0.89%	Reichensteiner	5.00	0.09%	0.04%
Ehrenfelser	65.02	1.16%	0.51%	Oraniensteiner	4.96	0.09%	0.04%
Sémillon	61.74	1.10%	0.49%	Madeleine Sylvaner	4.50	0.08%	0.04%
Siegerrebe	54.56	0.97%	0.43%	L'Acadie Blanc *	3.80	0.07%	0.03%
Bacchus	52.22	0.93%	0.41%	Traminer	3.56	0.06%	0.03%
Ortega	49.16	0.87%	0.39%	Orange Muskat	3.18	0.06%	0.03%
Auxerrois	46.22	0.82%	0.36%	Trebbiano	3.03	0.05%	0.02%
Vidal *	45.95	0.82%	0.36%	Malvasia	3.00	0.05%	0.02%
Chenin Blanc	36.44	0.65%	0.29%	Verdejo Verdelho	2.30	0.04%	0.02%
Kerner	31.75	0.56%	0.25%	Verdelet *	1.80	0.03%	0.01%
Schönburger	31.39	0.56%	0.25%	Perle of C'saba	0.75	0.01%	0.01%
Roussanne	27.47	0.49%	0.22%	Seyval Blanc *	0.60	0.01%	0.00%
Chasselas	25.78	0.46%	0.20%	Savagnin	0.59	0.01%	0.00%
Petit Milo *	23.90	0.43%	0.19%	Petite Arvine	0.58	0.01%	0.00%
Madeleine Angevine	15.62	0.28%	0.12%	Epicure *	0.40	0.01%	0.00%
Frontenac Blanc/Gris *	14.94	0.27%	0.12%	Rkatsiteli	0.04	0.00%	0.00%
Grüner Veltliner	14.88	0.26%	0.12%	Siegfriedrebe	0.01	0.00%	0.00%
Sovereign Opal *	12.41	0.22%	0.10%				
* Total White Hybrids					115.71	2.06%	0.91%
Total White Vinifera					5,503.82	97.94%	43.40%
Total White Grapes					5,619.53	100.00%	44.31%
Total B.C. Wine Grapes					12,681.44		

* Source: 2022 B.C. Wine Grape Acreage Report

The following table shows the top 10 planted B.C. wine grape varieties by acre and the average price per ton weighted for tonnage. The average price for these top 10 varieties is \$2,961/ton.

Top 10 B.C. Wine Grape Varietals- 2022		
Varietal	Planted Acres	Price/ton
Merlot	1,861	3,119
Pinot Noir	1,656	3,328
Pinot Gris	1,306	2,475
Chardonnay	1,247	2,625
Cabernet Sauvignon	973	3,498
Cabernet Franc	940	3,247
Riesling	665	2,559
Gewürztraminer	659	2,501
Syrah	655	3,708
Sauvignon Blanc	440	2,553
Average Price (\$/ton)		2,961

More detail and information on B.C. Wine Grape acreage and prices can be found in the following reports on which the above tables are based.

[2022 B.C. Wine Grape Acreage Report](#) (BC Wine Grape Council)

[Annual Crop Assessment- 2022 Vintage](#) (BC Wine Grape Council)

Appendix 3 - Vine Spacing and Plant Densities per Acre

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

Appendix 4 – Contribution Margin Summary for Alternative Planting Densities

The following 2 tables provide the projected 5 year contribution margins for alternative vine and row spacing from the 3 foot by 7 foot spacing used in this study. The major cost difference lies in the planting and second years resulting from the change in density.

8 X 4 Spacing											
CONTRIBUTION MARGIN ESTIMATES SUMMARY											
Vinifera Grape Establishment \$ per Acre											
Planting Density: 1,361 Vines/Acre											
	Year 1	Your	Year 2	Your	Year 3	Your	Year 4	Your	Year 5	Your	5 Year
	<i>Planting</i>	<i>Estimates</i>		<i>Estimates</i>		<i>Estimates</i>		<i>Estimates</i>	<i>Full Prod'n</i>	<i>Estimates</i>	<i>Totals</i>
Direct Income											
Yield (tons)	0.0	_____	0.0	_____	1.0	_____	2.0	_____	4.5	_____	7.50
Price (\$/ton)	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000
Total Direct Income	0	_____	0	_____	3,000	_____	6,000	_____	13,500	_____	22,500
Direct Expenses											
Vine/Trellis Removal	3,500	_____		_____		_____		_____		_____	
Vines *	9,867	_____		_____		_____		_____		_____	9,867
Support System *	8,876	_____		_____		_____		_____		_____	8,876
Replanting 5.0%		_____	538	_____		_____		_____		_____	538
Plant Nutrients	1,025	_____	150	_____	150	_____	150	_____	150	_____	1,625
Crop Protection	359	_____	201	_____	207	_____	207	_____	207	_____	1,182
Machinery Fuel/Oil	869	_____	622	_____	688	_____	629	_____	629	_____	3,437
R&M	135	_____	160	_____	208	_____	301	_____	301	_____	1,106
Hired Labour	5,947	_____	2,145	_____	5,248	_____	6,186	_____	6,368	_____	25,894
Contract Harvesting		_____		_____	278	_____	556	_____	1,250	_____	2,083
Marketing	35	_____	35	_____	45	_____	55	_____	80	_____	250
Equipment Rentals	957	_____	13	_____	23	_____	23	_____	23	_____	1,039
Other Supplies (Prod'n. In	1,215	_____	554	_____	585	_____	643	_____	694	_____	3,691
Total Direct Expenses	32,786	_____	4,420	_____	7,432	_____	8,750	_____	9,702	_____	63,089
Contribution Margin	-32,786	_____	-4,420	_____	-4,432	_____	-2,750	_____	3,798	_____	-40,589

* May be considered Capital Items.

7 X 4 Spacing
CONTRIBUTION MARGIN ESTIMATES SUMMARY
Vinifera Grape Establishment \$ per Acre
Planting Density: 1,556 Vines/Acre

	Year 1 <i>Planting</i>	Your Estimates	Year 2	Your Estimates	Year 3	Your Estimates	Year 4	Your Estimates	Year 5 <i>Full Prodn</i>	Your Estimates	5 Year Totals
Direct Income											
Yield (tons)	0.0	_____	0.0	_____	1.0	_____	2.0	_____	4.5	_____	7.50
Price (\$/ton)	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000	_____	3,000
Total Direct Income	0	_____	0	_____	3,000	_____	6,000	_____	13,500	_____	22,500
Direct Expenses											
Vine/Trellis Removal	3,500	_____		_____		_____		_____		_____	
Vines *	11,281	_____		_____		_____		_____		_____	11,281
Support System *	10,330	_____		_____		_____		_____		_____	10,330
Replanting 5.0%		_____	616	_____		_____		_____		_____	616
Plant Nutrients	1,025	_____	150	_____	150	_____	150	_____	150	_____	1,625
Crop Protection	395	_____	201	_____	207	_____	207	_____	207	_____	1,218
Machinery Fuel/Oil	957	_____	697	_____	783	_____	713	_____	713	_____	3,863
R&M	160	_____	193	_____	251	_____	364	_____	364	_____	1,332
Hired Labour	6,728	_____	2,356	_____	5,989	_____	7,130	_____	7,345	_____	29,547
Contract Harvesting		_____		_____	278	_____	556	_____	1,250	_____	2,083
Marketing	35	_____	35	_____	45	_____	55	_____	80	_____	250
Equipment Rentals	1,031	_____	13	_____	23	_____	23	_____	23	_____	1,113
Other Supplies (Prod'n. In	1,339	_____	571	_____	617	_____	681	_____	732	_____	3,939
Total Direct Expenses	36,781	_____	4,833	_____	8,343	_____	9,878	_____	10,864	_____	70,697
Contribution Margin	-36,781	_____	-4,833	_____	-5,343	_____	-3,878	_____	2,636	_____	-48,197

* May be considered Capital Items.