



Establishment & Production Costs for Grapes in Ontario 2019 Economic Report

Ministry of Agriculture,
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Establishment and Production Costs for Grapes in Ontario 2019 Economic Report

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1. Introduction

This report tries to reflect the management practices used by growers today. Soil condition, cultivar selections, personal grower management decisions and the unique meso-climates of Ontario result in many different grower practices in training systems, pest management programs and fertilizer rates.

Three grape cultivars are summarized in this document; Vidal, Chardonnay and Cabernet Franc which reflect some of the most significant cultivars in Ontario. They represent French Hybrid and Vinifera varieties of grapes.

Objectives

The grape industry utilizes the cost of establishment and cost of production models extensively to determine the profitability of the industry and to help growers make business decisions and planting plans. Growers can use the input costs as general guidelines to help identify strengths and weaknesses in their business. The information provided benefits new growers by providing them with information on the economic costs of planting and maintaining a vineyard.

Methods and procedures

The information used in this report is derived from previous economic reports, surveys with growers and private consultants, and data from researchers, extensions and agribusiness.

Growers were asked to provide information based on a typical year. All costs are based on the production of VQA quality wines.

Input costs are organized into variable and measurable fixed costs. Variable costs include plants, seed, fertilizers, pesticides, marketing charges, hired labour, tractor and machine costs and interest on operating capital.

Production practices included in this report are based on traditional grape growing areas and will not include additional costs for burying vines etc.

Measurable fixed costs are interest on investment, depreciation and other overhead cost items such as a portion of utilities, equipment storage, insurance, accounting, farm vehicles and general maintenance.

Assumptions

The contribution margin is obtained by subtracting the total variable costs from the gross income. Contribution margin is the amount of funds that the crop contributes to cover fixed costs and provide returns for owner management and investment.

Hired Labour is charged at \$16.65 per hour, which includes benefits (Workers' Compensation, Employment Insurance and Canada Pension Plan). A blended base price of \$16.65 is used to reflect the workforce in the grape industry, which is made up of both local and offshore labour. Offshore labour includes an allowance for additional costs such as air flight, housing, local transportation.

Hired machine operator labour is charged at \$ 26.20 per hour (includes benefits).

Machinery and equipment costs are based on a commercial farm size of 50 acres.

Machinery costs are calculated based on the purchase price for 2019, useful life, annual use and trade-in value.

Interest on investment is calculated at 3.0%, which is the average interest rate paid by chartered banks on Guaranteed Investment Certificates.

The interest rate applied to the operating capital is based on the prime lending rate of 3.95% plus 1.0% = 4.95%.

Interest on operating capital is compounded annually until the vineyard generates revenue to first pay down the accumulated interest and then the outstanding principal. Operating capital includes cost of materials, fuel, repairs, labour and other cash items but does not include farm overhead expenses.

Fuel costs are based on the size of each tractor, truck or self-propelled machine used in production. The following farm-gate fuel prices are used: gasoline \$1.10 per litre and diesel \$1.00 per litre. Fuel costs are net of all 2019 provincial and federal rebates.

Yields are given as both a low and high range to reflect the wide differences of commercial production and conditions for each farm.

Yields used are 25% of annual yield for year 3 and 50% for year 4 (high range).

Chardonnay and Cabernet Franc vines are spaced at 9 x 4 feet and 1210 vines per acre. 1 acre = 9 rows with approximately 134 vines per row.

Vidal vines are spaced at 9 x 5 feet and 968 vines per acre. 1 acre = 9 rows with approximately 108 vines per row.

The training system for Vinifera grapes is a vertical shoot position system (i.e. Pendelbogen), while French Hybrid grapes are trained to four-cane kniffin.

The establishment of the vineyard covers a 4.5 year period: a half-year for pre-plant preparation, one year for planting and three years for the vine to grow to full cropping potential.

Crop Services includes several items such as petiole and soil sampling, pest monitoring, etc.

The establishment costs will need to be recovered over the productive life of the vineyard. An estimate of the annual costs to recover establishment costs is included in the Total Establishment Costs section for each variety. They are amortized over the 21 years of full production at a rate of interest of 3.0%.

Land costs and carrying charges are not included as part of the establishment or production costs because of the extreme variance in land prices.

Land ownership and rental prices vary considerably from farm to farm depending on road location, services, soil types, access to water, and potential for urban development or establishing a new winery. For this reason, a space is provided to insert land rental cost in the variable cost section and land ownership in the fixed cost section. Costs should be added into vineyard establishment and cost of production.

A management allowance is not included as a cost.

All labour costs are charged to the project whether the owner performs the task or whether it was hired out.

These assumptions reflect the current practices in the industry and do not necessarily represent recommendations from the contributors. Newer plantings of these varieties may involve higher vine densities, alternative training systems and other innovative cultural practices.

Due to rounding, figures may not add to the total

shown.

Changes for the 2019 Economic Report

The Concord grape cultivar was not included in the 2019 report due to a declining market for labrusca grape varieties.

Yields – High yield for Vidal was decreased from 2014 to 9.5 tonnes (- 0.5t decrease).

Custom ploughing was combined into Land Preparation in the pre plant year.

Minimum wage in Ontario increased from \$11 to \$14 per hour from 2014 to 2019. Hand labour wages in this report rose 23.8% while skilled machine operator wages climbed 27.2% since 2014.

Based on the Nebraska Tractor Test Laboratory results from 2008 to 2017, the fuel consumption rate was increased from 0.167 litres per HP-hour to 0.244 litres per HP-hour.

An additional 90 hp tractor was included in the machinery investment inventory.

Gross revenue per tonne increased an average of 4% since 2014 for the wine grape varieties.

The prices listed are the 2018 minimum negotiated price for each cultivar sold through the Grape Growers of Ontario. The 2019 prices were not available at the time of publication.

Calcium ammonium nitrate replaced Ammonium nitrate as the nitrogen fertilizer source.

The Cost of Production graphs in the 2014 report were in nominal dollars, in 2019 all years have been adjusted for inflation to be reported in 2019 dollars. This provides a more accurate reflection of how revenue and costs have changed over time.

The authors assume no liability or responsibility as a result of the reader relying or acting upon the information contained herein. Any use or misuse of the information is the sole responsibility of the reader.

VINIFERA AND HYBRID GRAPES



2. Cabernet Franc

Preplant Year

Variable Costs	Cost per acre (\$)	
	Actual	Budget
Labour: Machinery operator, 4.5 hrs		118
Cover crop		38
Machine costs :Repairs and maintenance		36
Fuel		91
Consulting fees		80
Land rental		
Land preparation (levelling etc.)		1607
Tile drainage (9 foot)		4588
Interest on operating capital		162
Total Variable Costs		6558
Fixed Costs		
Machine costs: Depreciation		56
Interest on investment		16
Other overhead		270
Land ownership		
Measurable Fixed Costs		342
Total Measurable "Preplant Year" Costs		6899

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Machine:					
Discing, cultivating (3.5x)	2.8	73	80	52	205
Sub soiling	1.0	26	27	14	68
Sow cover crop	0.7	18	20	14	53
Total Machinery Operator	4.5	118	127	80	325

*Includes maintenance, fuel and repair

Planting Year

	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 29.0 hrs		483
Machine operator, 20.1 hrs		527
Fertilizer: Calcium ammonium nitrate 0 kg		0
Muriate of potash, 0 kg		0
Insecticides		0
Fungicides		28
Grape vines		3811
Custom trellis: Materials, labour		6243
Training: Stakes, material		950
Cover crop seed		38
Machine costs: Repairs and maintenance		209
Fuel		392
Custom planting		792
Irrigation		287
Consulting fees		80
Interest on operating capital		1010
Land rental		
Total Variable Costs		14848
Fixed Costs		
Machine costs: Depreciation		297
Interest on investment		84
Other overhead		540
Land ownership		
Measurable Fixed Costs		921
Total Measurable "Planting Year" Costs		15769

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Weed control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	15.0	250			250
Total Hand Labour	29.0	483			483
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (4x)	1.3	34	53	55	142
Fertilizing (0x)	0.0	0	0	0	0
Sow cover crop	0.7	18	20	16	54
Mowing (4x)	2.8	73	78	47	198
Hilling up	1.5	39	41	25	105
Vineyard maintenance	3.0	79	88	55	222
Picking up vines & supplies	2.0	52	49	24	126
Total Machinery Operator	20.1	527	600	427	1554

*Includes maintenance, fuel and repair

Second Year

	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 30.0 hr		500
Machine operator, 25.0 hr		655
Fertilizer: Calcium ammonium nitrate, 0 kg		0
Muriate of potash, 0 kg		0
Insecticides		61
Fungicides		204
Herbicides		39
Replacement vines, 2%		112
Cover crop seed		19
Machine costs: Repairs and maintenance		258
Fuel		473
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Consulting fees		80
Interest on operating capital		1237
Land rental		
Total Variable Costs		4825
Fixed Costs		
Machine costs: Depreciation		365
Interest on investment		107
Other overhead		540
Land ownership		
Measurable Fixed Costs		1012
Total Measurable "Second Year" Costs		5837

Operation Costs

Operation	Labour	Labour	Machine	Fixed	Total
Hand					
Weed Control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	16.0	266			266
Total Hand Labour	30.0	500			500
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Spraying (2x)	1.4	37	38	21	96
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (8x)	2.6	68	107	110	285
Fertilizing (0x)	0.0	0	0	0	0
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	51	25	154
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	2.0	52	59	37	148
Total Machinery Operator	25.0	655	731	526	1913

*Includes maintenance, fuel and repair

Third Year

1.25 tonne (25% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 63.0 hrs		1049
Machine operator, 28.1 hrs		736
Fertilizer: Calcium ammonium nitrate, 12 kg		9
Muriate of potash, 40 kg		28
Insecticides		121
Fungicides		401
Herbicides		50
Replacement vines, 1%		56
Cover crop seed		19
Machine Costs: Repairs and maintenance		307
Fuel		586
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Bird control		212
Board license and R&D fees (\$21.45 per tonne)		27
Crop insurance		79
Consulting fees (soil,leaf, spray)		80
Interest on operating capital		1543
Land rental		
Total Variable Costs		6490
Fixed Costs		
Machine costs: Depreciation		412
Interest on investment		128
Other overhead		540
Land ownership		
Measurable Fixed Costs		1080
Total Measurable "Third Year" Costs		7570
Contribution Margin		
Gross Income (\$1766 per tonne)		2208
Total Variable Costs		6490
Contribution Margin (no land costs)		-4283

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	7.0	117			117
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	12.0	200			200
Bunch thinning	12.0	200			200
Other operations	2.0	33			33
Hand harvest	10.0	167			167
Total Hand Labour	63.0	1049			1049
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	105	164	169	438
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	87	75	214
Harvest pick up and delivery	5.0	131	163	58	352
Total Machinery Operator	28.1	736	893	605	2234

*Includes maintenance, fuel and repair

Fourth Year

2.5 tonne (50% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 60.0 hrs		999
Machine operator, 23.1 hrs		605
Fertilizer: Calcium ammonium nitrate, 31 kg		23
Muriate of potash, 50 kg		35
Insecticides		183
Fungicides		610
Herbicides		50
Replacement vines, 1%		56
Cover crop seed		19
Machine costs: Repairs and maintenance		266
Fuel		445
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Bird control		212
Custom harvest/delivery		248
Board license and R&D fees (\$21.45 per tonne)		54
Crop insurance		158
Consulting fees (soil, leaf, spray)		80
Interest on operating capital		1769
Land rental		
Total Variable Costs		6999
Fixed Costs		
Machine costs: Depreciation		376
Interest on investment		114
Other overhead		540
Land ownership		
Measurable Fixed Costs		1030
Total Measurable "Fourth Year" Costs		8029
Contribution Margin		
Gross Income (\$1766 per tonne)		4415
Total Variable Costs		6999
Contribution Margin (no land costs)		-2584

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	9.0	150			150
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	12.0	200			200
Bunch thinning	15.0	250			250
Other operations	4.0	67			67
Total Hand Labour	60.0	999			999
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	105	164	169	438
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	67	75	194
Total Machinery Operator	23.1	605	711	547	1862

*Includes maintenance, fuel and repair

Total Establishment Cost

	Actual	Budget
Preplant year		6899
Planting year		15769
Second year		5837
Third year		6998
Fourth year		7713
Total		43216

Excludes Board fees, harvest costs and does not include revenues for years 3 and 4.
Does not include land costs.

	Actual	Budget
Annual cost to recover establishment costs		2203 per year

(amortized over remaining 21 years of vineyard life)

Mature Vineyard: Annual cost

		Cost per acre (\$)	
	Your Farm	Yield	Yield
Variable Costs		3.5 Tonne	5 Tonne
Labour: Hand, 63 hrs		1049	1049
Machine operator 30.9 hrs		809	809
Fertilizer: Calcium ammonium nitrate, 37 kg		27	27
Muriate of potash, 60 kg		41	41
Insecticides		183	183
Fungicides		610	610
Herbicides		50	50
Replacement vines 1%		56	56
Cover crop seed		19	19
Wind machine		389	389
Machine costs: Repairs & maintenance		383	383
Fuel		621	621
Custom pruning \$.48/vine		581	581
Custom tying - \$.24/vine		290	290
Tying material		29	29
Irrigation		287	287
Bird control		212	212
Custom harvest/delivery		347	495
Board license and R&D fees (\$21.45 per tonne)		75	107
Crop insurance		222	317
Consulting fees (soil, leaf, spray)		80	80
Interest on operating capital		315	328
Land rental			
Total Variable Costs		6675	6964
Fixed Costs			
Machine costs: Depreciation		514	514
Interest on investment		179	179
Other overhead		540	540
Land ownership			
Measurable Fixed Costs		1233	1233
Total Measurable Cost		7908	8197
Contribution Margin			
Gross Income (\$1766 per tonne)		6181	8830
Total Variable Costs		6675	6964
Contribution Margin (no land costs)		-494	1866

Mature Vineyard: Annual Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	9.0	150			150
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	13.0	216			216
Bunch thinning	17.0	283			283
Other operations	4.0	67			67
Total Hand Labour	63.0	1049			1049
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	104	163	167	434
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Subsoiling/aerating	1.0	26	27	35	88
Vineyard maintenance	5.0	131	146	92	370
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.5	66	108	94	268
Pre-pruning	0.8	21	37	34	92
Leaf removal (3.0x)	2.0	52	85	69	207
Brush shredding/flail	1.5	39	45	33	117
Total Machinery Operator	30.9	809	1004	771	2583

*Includes maintenance, fuel and repair

Table 1. Break Even and Profitability Worksheet

3.5 tonne/acre yield

Year	Yield	Revenue	Variable	Fixed	Total	Net Cash	Accum.
Pre-plant	0%	0	6554	342	6896	-6896	-6896
Planting	0%	0	14848	921	15769	-15769	-22664
2	0%	0	4825	1012	5837	-5837	-28501
3	25%	2208	6491	1080	7570	-5363	-33864
4	50%	4415	6999	1030	8029	-3614	-37478
5	100%	6181	8313	1233	9546	-3365	-40843
6	100%	6181	8419	1233	9651	-3470	-44313
7	100%	6181	8529	1233	9762	-3581	-47895
8	100%	6181	8645	1233	9878	-3697	-51592
9	100%	6181	8767	1233	10000	-3819	-55412
10	100%	6181	8896	1233	10128	-3947	-59359
11	100%	6181	9030	1233	10263	-4082	-63441
12	100%	6181	9171	1233	10404	-4223	-67664

There is no breakeven at the 3.5 tonne/acre yield level (does not include land costs).

5 tonne/acre yield

Year	Yield %	Revenue	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow	Accum. Profit
Pre-plant	0%	0	6554	342	6896	-6896	-6896
Planting	0%	0	14848	921	15769	-15769	-22664
2	0%	0	4825	1012	5837	-5837	-28501
3	25%	2208	6491	1080	7570	-5363	-33864
4	50%	4415	6999	1030	8029	-3614	-37478
5	100%	8830	8603	1233	9836	-1006	-38484
6	100%	8830	8591	1233	9824	-994	-39478
7	100%	8830	8580	1233	9813	-983	-40461
8	100%	8830	8567	1233	9800	-970	-41431
9	100%	8830	8554	1233	9787	-957	-42388
10	100%	8830	8541	1233	9773	-943	-43331
11	100%	8830	8526	1233	9759	-929	-44260
12	100%	8830	8511	1233	9744	-914	-45175

There is no breakeven at 5.0 tonne/acre yield level (Does not include land costs)

Table 2. Break Even Yield to Cover Variable Costs

Yield MT/ac	Revenue	Variable costs excluding harvest and operating interest costs	Harvest costs	Operating interest	Total Variable Costs	Contribution Margin
2.9	5,121	5,986	349	311	6,646	-1,525
3.0	5,298	5,986	361	312	6,659	-1,361
3.1	5,475	5,986	373	312	6,672	-1,197
3.2	5,651	5,986	385	313	6,684	-1,033
3.3	5,828	5,986	397	314	6,697	-869
3.4	6,004	5,986	410	314	6,710	-705
3.5	6,181	5,986	422	315	6,722	-541
3.6	6,358	5,986	434	315	6,735	-377
3.7	6,534	5,986	446	316	6,748	-213
3.8	6,711	5,986	458	317	6,760	-49
3.9	6,887	5,986	470	317	6,773	115
4.0	7,064	5,986	482	318	6,786	278
4.1	7,241	5,986	494	318	6,798	442
4.2	7,417	5,986	506	319	6,811	606

Breakeven yield to cover annual variable costs is 4.0 tonnes / acre.

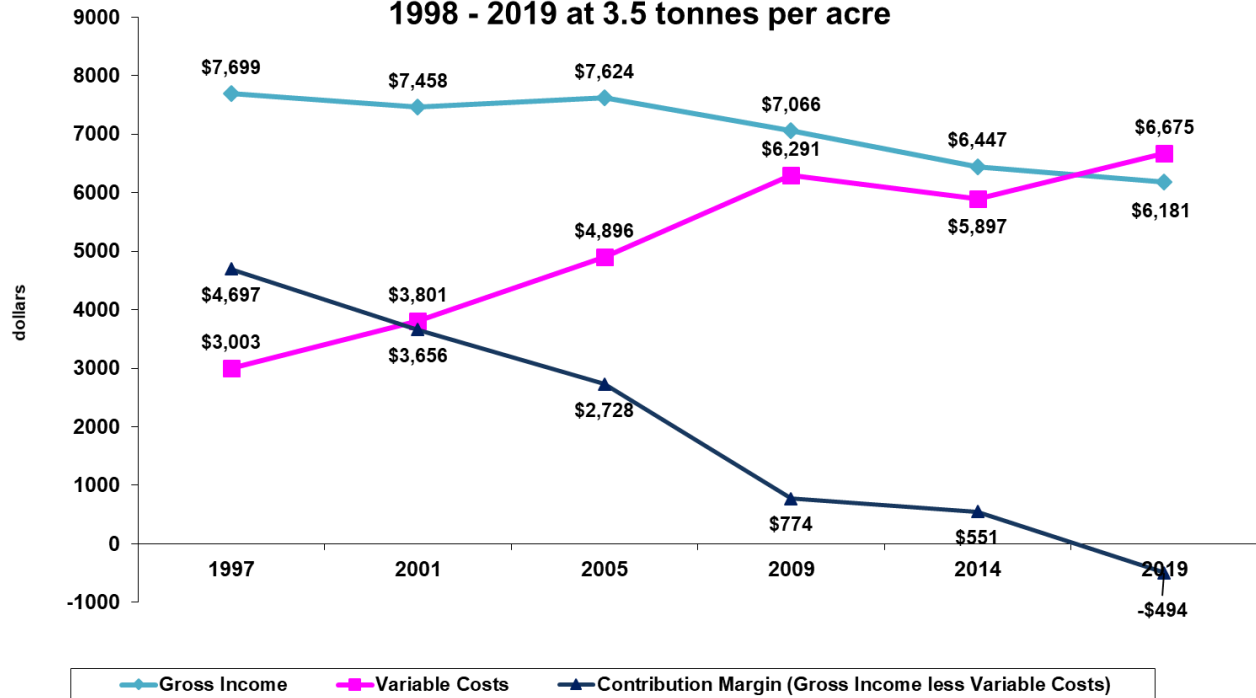
Table 3. Break Even Yield to Cover Total Costs

Yield MT/ac	Revenue	Annual costs excl. harvest and operating interest costs	Harvesting costs	Operating interest	Annualized Est. Costs	Total Costs with Est. Costs	Net Cash Flow
5.0	8830	7,219	602	324	2203	10348	-1518
5.1	9007	7,219	614	324	2203	10361	-1354
5.2	9183	7,219	626	325	2203	10374	-1190
5.3	9360	7,219	638	326	2203	10386	-1026
5.4	9536	7,219	650	326	2203	10399	-862
5.5	9713	7,219	662	327	2203	10412	-699
5.6	9890	7,219	675	327	2203	10424	-535
5.7	10066	7,219	687	328	2203	10437	-371
5.8	10243	7,219	699	329	2203	10449	-207
5.9	10419	7,219	711	329	2203	10462	-43
6.0	10596	7,219	723	330	2203	10475	121
6.1	10773	7,219	735	330	2203	10487	285
6.2	10949	7,219	747	331	2203	10500	449
6.3	11126	7,219	759	332	2203	10513	613

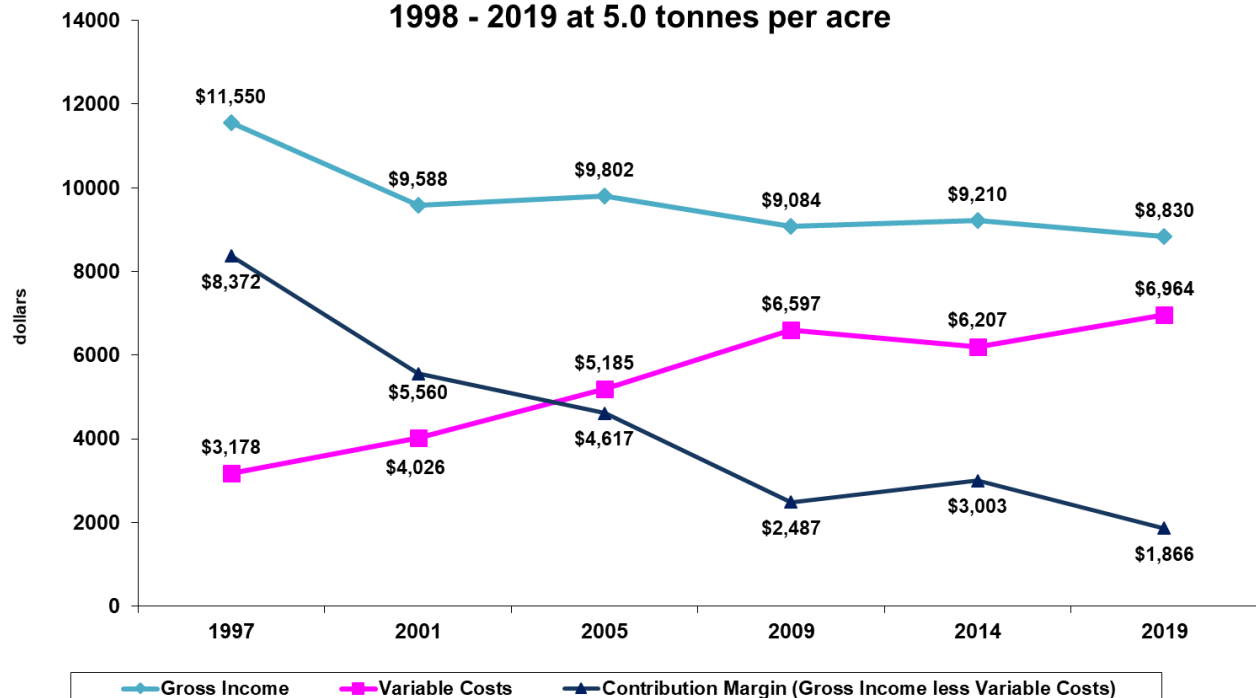
Breakeven yield to cover total annual costs is 6.0 tonnes / acre.

(Includes annualized establishment costs, does not include land costs)

Graph 1. Cabernet Franc Cost of Production
(Inflation adjusted = 2019 \$)
1997 at 3.0 tonnes per acre and
1998 - 2019 at 3.5 tonnes per acre



Graph 2. Cabernet Franc Cost of Production
(Inflation adjusted = 2019 \$)
1997 at 4.5 tonnes per acre and
1998 - 2019 at 5.0 tonnes per acre



3. Chardonnay

Preplant Year

Variable Costs	Cost per acre (\$)	
	Actual	Budget
Labour: Machinery operator, 4.5 hrs		118
Cover crop		38
Machine costs: Repairs and maintenance		36
Fuel		91
Consulting fees		80
Land rental		
Land preparation (levelling etc.)		1607
Tile drainage (9 foot)		4588
Interest on operating capital		162
Total Variable Costs		6558
Fixed Costs		
Machine costs: Depreciation		56
Interest on investment		16
Other overhead		270
Land ownership		
Measurable Fixed Costs		342
Total Measurable "Preplant Year" Costs		6899

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Machine					
Discing, cultivating (3.5x)	2.8	73	80	52	205
Sub soiling	1.0	26	27	14	68
Sow cover crop	0.7	18	20	14	53
Total Machinery Operator	4.5	118	127	80	325

*Includes maintenance, fuel and repair

Planting Year

Variable Costs	Cost per acre (\$)	
	Actual	Budget
Labour: Hand, 29.0 hrs		483
Machine operator, 20.1 hrs		527
Fertilizer: Calcium ammonium nitrate 0 kg		0
Muriate of potash, 0 kg		0
Insecticides		0
Fungicides		28
Grape vines		3811
Custom trellis: Materials, labour		6243
Training: Stakes, material		950
Cover crop seed		38
Machine costs: Repairs and maintenance		209
Fuel		392
Custom planting		792
Irrigation		287
Consulting fees		80
Interest on operating capital		1010
Land rental		
Total Variable Costs		14849
Fixed Costs		
Machine costs: Depreciation		297
Interest on investment		84
Other overhead		540
Land ownership		
Measurable Fixed Costs		921
Total Measurable "Planting Year" Costs		15770

Operation Costs

Operation	Labour	Labour	Machine	Fixed	Total
Hand					
Weed control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	15.0	250			250
Total Hand Labour	29.0	483			483
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (4x)	1.3	34	53	55	142
Fertilizing (0x)	0.0	0	0	0	0
Sow cover crop	0.7	18	20	16	54
Mowing (4x)	2.8	73	78	47	198
Hilling up	1.5	39	41	25	105
Vineyard maintenance	3.0	79	88	55	222
Picking up vines & supplies	2.0	52	49	24	126
Total Machinery Operator	20.1	527	600	427	1554

*Includes maintenance, fuel and repair

Second Year

Variable Costs	Cost per acre (\$)	
	Actual	Budget
Labour: Hand, 30.0 hr		500
Machine operator, 25.0 hr		655
Fertilizer: Calcium ammonium nitrate, 0 kg		0
Muriate of potash, 0 kg		0
Insecticides		61
Fungicides		204
Herbicides		39
Replacement vines, 2%		112
Cover crop seed		19
Machine costs: Repairs and maintenance		258
Fuel		473
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Consulting fees		80
Interest on operating capital		1237
Land rental		
Total Variable Costs		4825
Fixed Costs		
Machine costs: Depreciation		365
Interest on investment		107
Other overhead		540
Land ownership		
Measurable Fixed Costs		1012
Total Measurable "Second Year" Costs		5837

Operation Costs

Operation	Labour	Labour	Machine	Fixed	Total
Hand					
Weed control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	16.0	266			266
Total Hand Labour	30.0	500			500
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Spraying (2x)	1.4	37	38	21	96
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (8x)	2.6	68	107	110	285
Fertilizing (0x)	0.0	0	0	0	0
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	51	25	154
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	2.0	52	59	37	148
Total Machinery Operator	25.0	655	731	526	1913

*Includes maintenance, fuel and repair

Third Year

1.5 tonne (25% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 63.0 hrs		1049
Machine operator, 28.1 hrs		736
Fertilizer: Calcium ammonium nitrate, 12 kg		9
Muriate of potash, 40 kg		28
Insecticides		121
Fungicides		401
Herbicides		50
Replacement vines, 1%		56
Cover crop seed		19
Machine costs: Repairs and maintenance		307
Fuel		586
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Bird control		105
Board license and R&D fees (\$19.90 per tonne)		30
Crop insurance		83
Consulting fees (soil, leaf, spray)		80
Interest on operating capital		1538
Land rental		
Total Variable Costs		6386
Fixed Costs		
Machine costs: Depreciation		412
Interest on investment		128
Other overhead		540
Land ownership		
Measurable Fixed Costs		1080
Total Measurable "Third Year" Costs		7465
Contribution Margin		
Gross Income (\$1549 per tonne)		2324
Total Variable Costs		6386
Contribution Margin (no land costs)		-4062

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	7.0	117			117
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	12.0	200			200
Bunch thinning	12.0	200			200
Other operations	2.0	33			33
Hand harvest	10.0	167			167
Total Hand Labour	63.0	1049			1049
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	105	164	169	438
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	87	75	214
Harvest pick up and delivery	5.0	131	163	58	352
Total Machinery Operator	28.1	736	893	605	2234

*Includes maintenance, fuel and repair

Fourth Year

3 tonne (50% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 60.0 hrs		999
Machine operator, 23.1 hrs		605
Fertilizer: Calcium ammonium nitrate, 31 kg		23
Muriate of potash, 50 kg		35
Insecticides		183
Fungicides		610
Herbicides		50
Replacement vines, 1%		56
Cover crop seed		19
Machine Costs: Repairs and maintenance		266
Fuel		445
Custom pruning - \$.48/vine		581
Custom tying - \$.24/vine		290
Tying material		29
Irrigation		287
Bird control		105
Custom harvest/delivery		297
Board license and R&D fees (\$19.90 per tonne)		60
Crop insurance		167
Consulting fees (soil, leaf, spray)		80
Interest on operating capital		1756
Land rental		
Total Variable Costs		6943
Fixed Costs		
Machine costs: Depreciation		376
Interest on investment		114
Other overhead		540
Land ownership		
Measurable Fixed Costs		1030
Total Measurable "Fourth Year" Costs		7973
Contribution Margin		
Gross Income (\$1549) per tonne)		4647
Total Variable Costs		6943
Contribution Margin (no land costs)		-2296

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	9.0	150			150
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	12.0	200			200
Bunch thinning	15.0	250			250
Other operations	4.0	67			67
Total Hand Labour	60.0	999			999
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	105	164	169	438
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	67	75	194
Total Machinery Operator	23.1	605	711	547	1862

*Includes maintenance, fuel and repair

Total Establishment Cost

	Actual	Budget
Preplant year		6899
Planting year		15770
Second year		5837
Third year		6890
Fourth year		7598
Total		42994

Excludes Board fees, harvest costs and does not include revenues for years 3 and 4.
Does not include land costs.

	Actual	Budget
Annual cost to recover establishment costs		2173 per year

(amortized over remaining 21 years of vineyard life)

Mature Vineyard: Annual Costs

		Cost per acre (\$)	
	Your Farm	Yield	Yield
Variable Costs		4 Tonne	6 Tonne
Labour: Hand, 63.0 hrs		1049	1049
Machine operator 30.9 hrs		809	809
Fertilizer: Calcium ammonium nitrate, 37 kg		27	27
Muriate of potash, 60 kg		42	42
Insecticides		183	183
Fungicides		610	610
Herbicides		50	50
Replacement vines 1%		56	56
Cover crop seed		19	19
Wind machine		389	389
Machine costs: Repairs & maintenance		383	383
Fuel		621	621
Custom pruning \$.48/vine		581	581
Custom tying - \$.24/vine		290	290
Tying material		29	29
Irrigation		287	287
Bird control		105	105
Custom harvest/delivery		396	594
Board license and R&D fees (\$19.90 per tonne)		80	119
Crop insurance		222	333
Consulting fees (soil, leaf, spray)		80	80
Interest on operating capital		312	330
Land rental			
Total Variable Costs		6620	6987
Fixed Costs			
Machine costs: Depreciation		514	514
Interest on investment		179	179
Other overhead		540	540
Land ownership			
Measurable Fixed Costs		1233	1233
Total Measurable Cost		7853	8220
Contribution Margin			
Gross Income (\$1549 per tonne)		6196	9294
Total Variable Costs		6620	6987
Contribution Margin (no land costs)		-424	2307

Mature Vineyard: Annual Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	9.0	150			150
Shoot thin, positioning, tucking	20.0	333			333
Leaf removal	13.0	216			216
Bunch thinning	17.0	283			283
Other operations	4.0	67			67
Total Hand Labour	63.0	1049			1049
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	104	163	167	434
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	3.0	79	81	50	209
Subsoiling/aerating	1.0	26	27	35	88
Vineyard maintenance	5.0	131	146	92	370
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.5	66	108	94	268
Pre pruning	0.8	21	37	34	92
Leaf removal (2.0x)	2.0	52	85	69	207
Brush shredding/flail	1.5	39	45	33	117
Total Machinery Operator	30.9	809	1004	771	2583

*Includes maintenance, fuel and repair

Table 4. Break Even and Profitability Worksheet

4 tonne/acre yield

Year	Yield %	Revenue	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow	Accum. Profit
Pre-plant	0%	0	6554	342	6896	-6896	-6896
Planting	0%	0	14848	921	15769	-15769	-22665
2	0%	0	4825	1012	5837	-5837	-28501
3	25%	2324	6386	1080	7466	-5142	-33643
4	50%	4647	6943	1030	7973	-3326	-36969
5	100%	6196	8233	1233	9466	-3270	-40239
6	100%	6196	8334	1233	9567	-3371	-43610
7	100%	6196	8440	1233	9673	-3477	-47087
8	100%	6196	8551	1233	9784	-3588	-50675
9	100%	6196	8668	1233	9901	-3705	-54380
10	100%	6196	8790	1233	10023	-3827	-58207
11	100%	6196	8918	1233	10151	-3955	-62162
12	100%	6196	9053	1233	10286	-4090	-66252

There is no breakeven at the 4 tonne/acre yield level (does not include land costs).

6 tonne/acre yield

Year	Yield %	Revenue	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow	Accum. Profit
Pre-plant	0%	0	6554	342	6896	-6896	-6896
Planting	0%	0	14848	921	15769	-15769	-22665
2	0%	0	4825	1012	5837	-5837	-28501
3	25%	2324	6386	1080	7466	-5142	-33643
4	50%	4647	6943	1030	7973	-3326	-36969
5	100%	9294	8599	1233	9832	-538	-37508
6	100%	9294	8565	1233	9798	-504	-38012
7	100%	9294	8529	1233	9762	-468	-38480
8	100%	9294	8491	1233	9724	-430	-38910
9	100%	9294	8451	1233	9684	-390	-39300
10	100%	9294	8410	1233	9643	-349	-39649
11	100%	9294	8366	1233	9599	-305	-39954
12	100%	9294	8320	1233	9553	-259	-40213

There is no breakeven at the 6 tonne/acre yield level (does not include land costs).

Table 5. Break Even Yield to Cover Variable Costs

Yield MT/ac	Revenue	Variable costs excluding harvest and operating interest costs	Harvesting costs	Operating interest	Total Variable Costs	Contribution Margin
3.2	4,957	5,888	380	308	6,576	-1,619
3.3	5,112	5,888	392	308	6,588	-1,477
3.4	5,267	5,888	404	309	6,601	-1,334
3.5	5,422	5,888	416	309	6,613	-1,192
3.6	5,576	5,888	428	310	6,626	-1,050
3.7	5,731	5,888	440	310	6,638	-907
3.8	5,886	5,888	452	311	6,651	-765
3.9	6,041	5,888	464	312	6,663	-622
4.0	6,196	5,888	476	312	6,676	-480
4.1	6,351	5,888	487	313	6,688	-337
4.2	6,506	5,888	499	313	6,701	-195
4.3	6,661	5,888	511	314	6,713	-53
4.4	6,816	5,888	523	315	6,726	90
4.5	6,971	5,888	535	315	6,738	232

Breakeven yield to cover annual variable costs is 4.4 tonnes / acre.

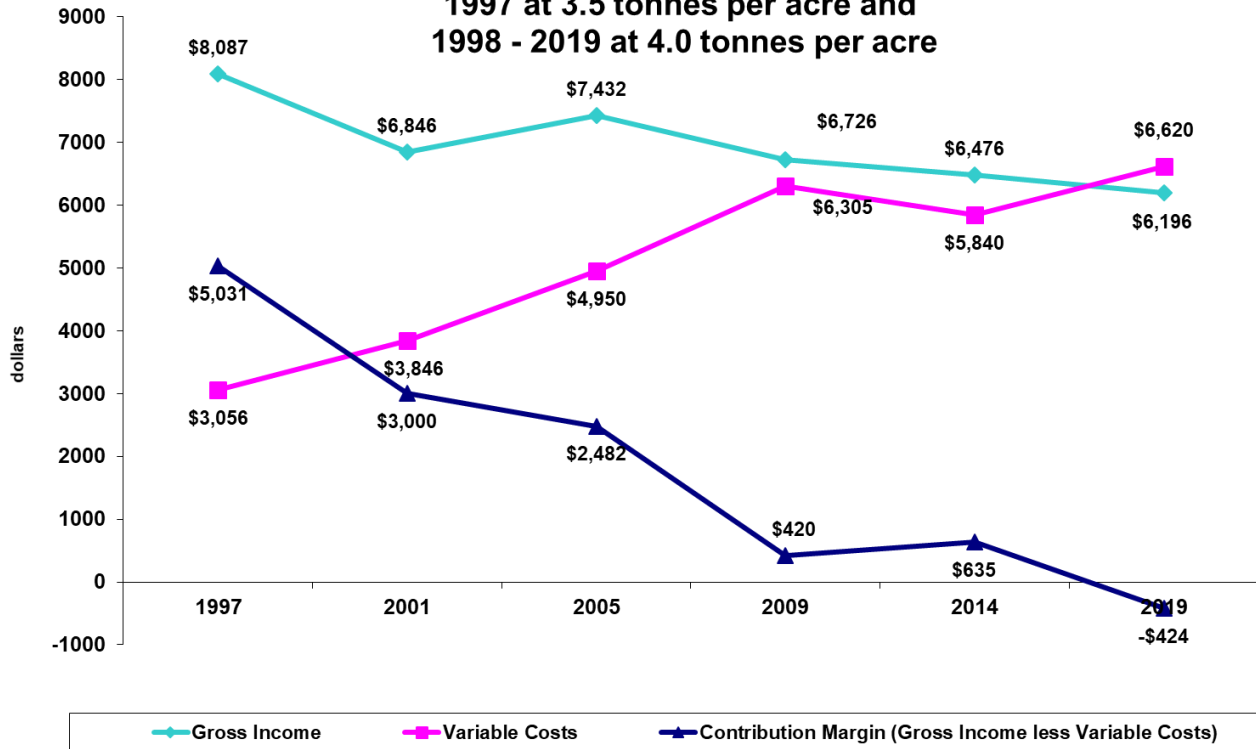
Table 6. Break Even Yield to Cover Total Costs

Yield MT/ac	Revenue	Annual costs excluding harvest and operating interest costs	Harvesting costs	Operating interest	Annualized Est. Costs	Total Costs with Est. Costs	Net Cash Flow
5.7	8829	7,121	678	322	2173	10294	-1465
5.8	8984	7,121	690	323	2173	10307	-1323
5.9	9139	7,121	702	323	2173	10319	-1180
6.0	9294	7,121	713	324	2173	10332	-1038
6.1	9449	7,121	725	325	2173	10344	-895
6.2	9604	7,121	737	325	2173	10357	-753
6.3	9759	7,121	749	326	2173	10369	-611
6.4	9914	7,121	761	326	2173	10382	-468
6.5	10069	7,121	773	327	2173	10394	-326
6.6	10223	7,121	785	328	2173	10407	-183
6.7	10378	7,121	797	328	2173	10419	-41
6.8	10533	7,121	809	329	2173	10432	102
6.9	10688	7,121	820	329	2173	10444	244
7.0	10843	7,121	832	330	2173	10457	386

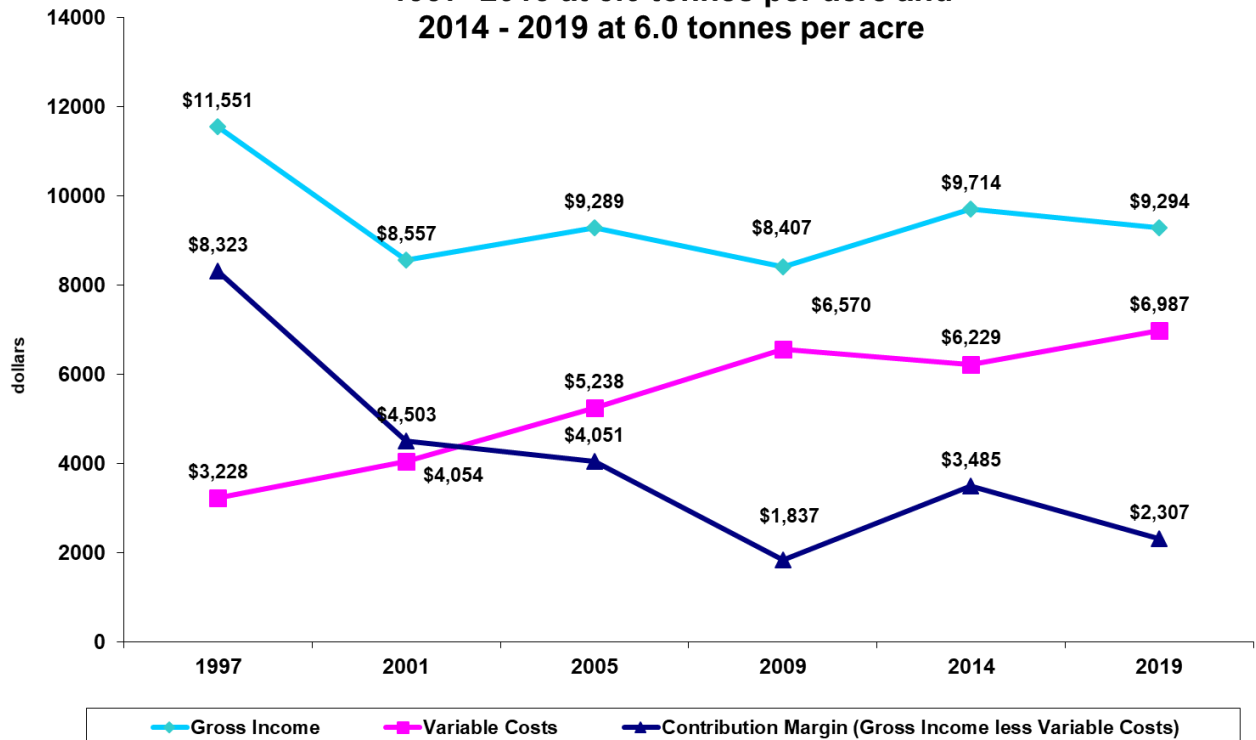
Breakeven yield to cover total annual costs is 6.8 tonnes / acre.

(Includes annualized establishment costs, does not include land costs)

Graph 3. Chardonnay Cost of Production
(Inflation adjusted = 2019 \$)
1997 at 3.5 tonnes per acre and
1998 - 2019 at 4.0 tonnes per acre



Graph 4. Chardonnay Cost of Production
(Inflation adjusted = 2019 \$)
1997- 2013 at 5.0 tonnes per acre and
2014 - 2019 at 6.0 tonnes per acre



4. Vidal

Preplant Year

	Cost per acre (\$)	
	Actual	Budget
Variable Costs		
Labour: Machinery operator, 4.5 hrs		118
Cover crop		38
Machine costs: Repairs and maintenance		36
Fuel		91
Consulting fees		62
Land rental		
Land preparation (levelling etc.)		1607
Tile drainage (9 foot)		4588
Interest on operating capital		162
Total Variable Costs		6540
Fixed Costs		
Machine costs: Depreciation		56
Interest on investment		16
Other overhead		270
Land ownership		
Measurable Fixed Costs		342
Total Measurable "Preplant Year" Costs		6881

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Machine					
Discing, cultivating (3.5x)	2.8	73	80	52	205
Sub soiling	1.0	26	27	14	68
Sow cover crop	0.7	18	20	14	53
Total Machinery Operator	4.5	118	127	80	325

*Includes maintenance, fuel and repair

Planting Year

Variable Costs	Cost per acre (\$)	
	Actual	Budget
Labour: Hand, 29.0 hrs		483
Machine operator, 18.6 hrs		487
Fertilizer: Calcium ammonium nitrate 0 kg		0
Muriate of potash, 0 kg		0
Insecticides		0
Fungicides		28
Grape vines		3049
Custom trellis: Materials, labour		6242
Training: Stakes, material		760
Cover crop seed		38
Machine costs: Repairs and maintenance		198
Fuel		362
Custom planting		687
Irrigation		287
Consulting fees		62
Interest on operating capital		952
Land rental		
Total Variable Costs		13635
Fixed Costs		
Machine costs: Depreciation		280
Interest on investment		79
Other overhead		540
Land ownership		
Measurable Fixed Costs		899
Total Measurable "Planting Year" Costs		14534

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Weed control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	15.0	250			250
Total Hand Labour	29.0	483			483
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (4x)	1.3	34	53	55	142
Fertilizing (0x)	0.0	0	0	0	0
Sow cover crop	0.7	18	20	16	54
Mowing (4x)	2.8	73	78	47	198
Hilling up	0.0	0	0	0	0
Vineyard maintenance	3.0	79	88	55	222
Picking up vines & supplies	2.0	52	49	24	126
Total Machinery Operator	18.6	487	560	402	1449

*Includes maintenance, fuel and repair

Second Year

	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 29.0 hr		483
Machine operator, 23.0 hr		603
Fertilizer: Calcium ammonium nitrate, 25 kg		18
Muriate of potash, 20 kg		14
Insecticides		61
Fungicides		204
Herbicides		39
Replacement vines, 2%		90
Cover crop seed		19
Machine Costs: Repairs and maintenance		244
Fuel		463
Custom pruning - \$.50/vine		484
Custom tying - \$.28/vine		271
Tying material		58
Irrigation		287
Consulting fees		62
Interest on operating capital		1167
Land rental		
Total Variable Costs		4567
Fixed Costs		
Machine costs: Depreciation		359
Interest on investment		105
Other overhead		540
Land ownership		
Measurable Fixed Costs		1005
Total Measurable "Second Year" Costs		5571

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Weed control: Hand hoeing	14.0	233			233
Summer training, tying, trunk est	15.0	250			250
Total Hand Labour	29.0	483			483
Machine					
Weed control: Grape hoeing (3x)	6.0	157	192	148	497
Spraying (2x)	1.4	37	38	21	96
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (8x)	2.6	68	107	110	285
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	0.0	0	0	0	0
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	2.0	52	59	37	148
Total Machinery Operator	23.0	603	707	519	1828

*Includes maintenance, fuel and repair

Third Year

2.4 tonne (25% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 13.0 hrs		216
Machine operator, 20.1 hrs		526
Fertilizer: Calcium ammonium nitrate, 50 kg		37
Muriate of potash, 60 kg		41
Insecticides		121
Fungicides		401
Herbicides		50
Replacement vines, 1%		45
Cover crop seed		19
Machine costs: Repairs and maintenance		245
Fuel		405
Custom pruning - \$.50/vine		484
Custom tying - \$.28/vine		271
Tying material		58
Irrigation		287
Custom harvest/delivery		235
Bird control		105
Board license and R&D fees (\$13.70 per tonne)		33
Crop insurance		26
Consulting fees (soil, leaf, spray)		62
Interest on operating capital		1406
Land rental		
Total Variable Costs		5072
Fixed Costs		
Machine costs: Depreciation		342
Interest on investment		104
Other overhead		540
Land ownership		
Measurable Fixed Costs		986
Total Measurable "Third Year" Costs		6058
Contribution Margin		
Gross Income (\$661 per tonne)		1570
Total Variable Costs		5072
Contribution Margin (no land costs)		-3502

Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	7.0	117			117
Shoot thin, positioning, tucking	4.0	67			67
Leaf removal	0.0	0			0
Bunch thinning	0.0	0			0
Other operations	2.0	33			33
Hand harvest	0.0	0			0
Total Hand Labour	13.0	216			216
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	104	164	169	437
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	0.0	0	0	0	0
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	87	75	214
Total Machinery Operator	20.1	526	649	497	1672

*Includes maintenance, fuel and repair

Fourth Year

4.75 tonne (50% Yield)	Cost per acre (\$)	
Variable Costs	Actual	Budget
Labour: Hand, 13.0 hrs		216
Machine operator, 20.1 hrs		526
Fertilizer: Calcium ammonium nitrate, 74 kg		54
Muriate of potash, 70 kg		48
Insecticides		183
Fungicides		610
Herbicides		50
Replacement vines, 1%		45
Cover crop seed		19
Machine costs: Repairs and maintenance		245
Fuel		385
Custom pruning - \$.50/vine		484
Custom tying - \$.28/vine		271
Tying material		58
Irrigation		287
Bird control		105
Custom harvest/delivery		470
Board license and R&D fees (\$13.70 per tonne)		65
Crop insurance		52
Consulting fees (soil, leaf, spray)		62
Interest on operating capital		1608
Land rental		
Total Variable Costs		5843
Fixed Costs		
Machine costs: Depreciation		342
Interest on investment		104
Other overhead		540
Land ownership		
Measurable Fixed Costs		986
Total Measurable "Fourth Year" Costs		6829
Contribution Margin		
Gross Income (\$661) per tonne)		3140
Total Variable Costs		5843
Contribution Margin (no land costs)		-2703

Operation Costs

Operation	Labour	Labour	Machine	Fixed	Total
Hand					
Suckering	7.0	117			117
Shoot thin, positioning, tucking	4.0	67			67
Leaf removal	0.0	0			0
Bunch thinning	0.0	0			0
Other operations	2.0	33			33
Total Hand Labour	13.0	216			216
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	104	164	169	437
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.7	18	20	16	54
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	0.0	0	0	0	0
Vineyard maintenance	3.0	79	88	55	222
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.0	52	67	75	194
Total Machinery Operator	20.1	526	629	497	1652

*Includes maintenance, fuel and repair

Total Establishment Cost

	Actual	Budget
Preplant year		6881
Planting year		14534
Second year		5571
Third year		5777
Fourth year		6267
Total		39030

Excludes Board fees, harvest costs and does not include revenues for years 3 and 4.
Does not include land costs.

	Actual	Budget
Annual cost to recover establishment costs		2281 per year

(amortized over remaining 21 years of vineyard life)

Mature Vineyard: Annual Costs

		Cost per acre (\$)	
	Your Farm	Yield	Yield
Variable Costs		7.5 Tonne	9.5 Tonne
Labour: Hand, 16.0 hrs		266	266
Machine operator 24.0 hrs		629	629
Fertilizer: Calcium ammonium nitrate, 99 kg		72	72
Muriate of potash, 80 kg		55	55
Insecticides		183	183
Fungicides		610	610
Herbicides		50	50
Replacement vines 1%		45	45
Cover crop seed		19	19
Wind machine		389	389
Machine costs: Repairs & maintenance		287	287
Fuel		483	483
Custom pruning \$.50/vine		484	484
Custom tying - \$.28/vine		271	271
Tying material		58	58
Irrigation		287	287
Bird control		105	105
Custom harvest/delivery		743	941
Board License and R&D Fees (\$13.70 per tonne)		103	130
Crop insurance		82	104
Consulting fees (soil, leaf, spray)		62	62
Interest on operating capital		261	274
Land rental			
Total Variable Costs		5544	5804
Fixed Costs			
Machine costs: Depreciation		396	396
Interest on investment		144	144
Other overhead		540	540
Land ownership			
Measurable Fixed Costs		1080	1080
Total Measurable Cost		6624	6884
Contribution Margin			
Gross Income (\$661 per tonne)		4958	6280
Total Variable Costs		5544	5804
Contribution Margin (no land costs)		-587	476

Mature Vineyard: Annual Operation Costs

Operation	Labour (hours)	Labour Costs	Machine Costs*	Fixed Costs	Total Costs
Hand					
Suckering	7.0	117			117
Shoot thin, positioning, tucking	5.0	83			83
Leaf removal	0.0	0			0
Bunch thinning	0.0	0			0
Other operations	4.0	67			67
Total Hand Labour	16.0	266			266
Machine					
Weed control: Spraying (3x)	2.1	55	57	32	144
Discing, cultivating (3.5x)	2.8	73	80	57	210
Pesticide spraying (12x)	4.0	105	164	169	438
Fertilizing (2x)	1.0	26	27	17	70
Sow cover crop	0.6	16	17	13	46
Mowing (5x)	3.5	92	97	58	247
Hilling up and removal	0.0	0	0	0	0
Subsoiling/aerating	1.0	26	29	35	90
Vineyard maintenance	4.0	105	117	74	296
Replacing vines	1.0	26	29	18	74
Hedging (2.5x)	2.5	66	108	94	268
Leaf removal (0x)	0.0	0	0	0	0
Brush shredding/flail	1.5	39	45	33	117
Total Machinery Operator	24.0	629	772	599	2000

*Includes maintenance, fuel and repair

Table 7. Break Even and Profitability Worksheet

7.5 tonne/acre yield

Year	Yield %	Revenue	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow	Accum. Profit
Pre-plant	0%	0	6535	342	6877	-6877	-6877
Planting	0%	0	13634	899	14533	-14533	-21410
2	0%	0	4566	1005	5571	-5571	-26981
3	25%	1570	5072	986	6058	-4488	-31469
4	50%	3140	5842	986	6828	-3688	-35157
5	100%	4958	7076	1080	8156	-3199	-38356
6	100%	4958	7181	1080	8261	-3304	-41660
7	100%	4958	7291	1080	8371	-3414	-45073
8	100%	4958	7407	1080	8487	-3529	-48602
9	100%	4958	7528	1080	8608	-3650	-52253
10	100%	4958	7655	1080	8735	-3778	-56030
11	100%	4958	7788	1080	8869	-3911	-59942
12	100%	4958	7929	1080	9009	-4051	-63993

There is no breakeven at the 7.5 tonne/acre yield level (does not include land costs).

9.5 tonne/acre yield

Year	Yield %	Revenue	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow	Accum. Profit
Pre-plant	0%	0	6535	342	6877	-6877	-6877
Planting	0%	0	13634	899	14533	-14533	-21410
2	0%	0	4566	1005	5571	-5571	-26981
3	25%	1570	5072	986	6058	-4488	-31469
4	50%	3140	5842	986	6828	-3688	-35157
5	100%	6280	7335	1080	8415	-2136	-37293
6	100%	6280	7388	1080	8468	-2188	-39481
7	100%	6280	7442	1080	8523	-2243	-41724
8	100%	6280	7500	1080	8580	-2301	-44025
9	100%	6280	7560	1080	8641	-2361	-46386
10	100%	6280	7624	1080	8704	-2424	-48811
11	100%	6280	7690	1080	8770	-2491	-51302
12	100%	6280	7760	1080	8840	-2561	-53862

There is no breakeven at the 9.5 tonne/acre yield level (does not include land costs).

Table 8. Break Even Yield to Cover Variable Costs

Yield MT/ac	Revenue	Variable costs excluding harvest and operating interest costs	Harvesting costs	Operating interest	Total Variable Costs	Contribution Margin
7.7	5,090	4,449	868	263	5,579	-490
7.8	5,156	4,449	879	263	5,591	-435
7.9	5,222	4,449	890	264	5,603	-381
8.0	5,288	4,449	902	264	5,615	-327
8.1	5,354	4,449	913	265	5,627	-272
8.2	5,420	4,449	924	265	5,638	-218
8.3	5,486	4,449	935	266	5,650	-164
8.4	5,552	4,449	947	267	5,662	-110
8.5	5,618	4,449	958	267	5,674	-55
8.6	5,685	4,449	969	268	5,686	-1
8.7	5,751	4,449	980	268	5,698	53
8.8	5,817	4,449	992	269	5,709	107
8.9	5,883	4,449	1,003	269	5,721	162
9.0	5,949	4,449	1,014	270	5,733	216

Breakeven yield to cover annual variable costs is 8.7 tonnes / acre.

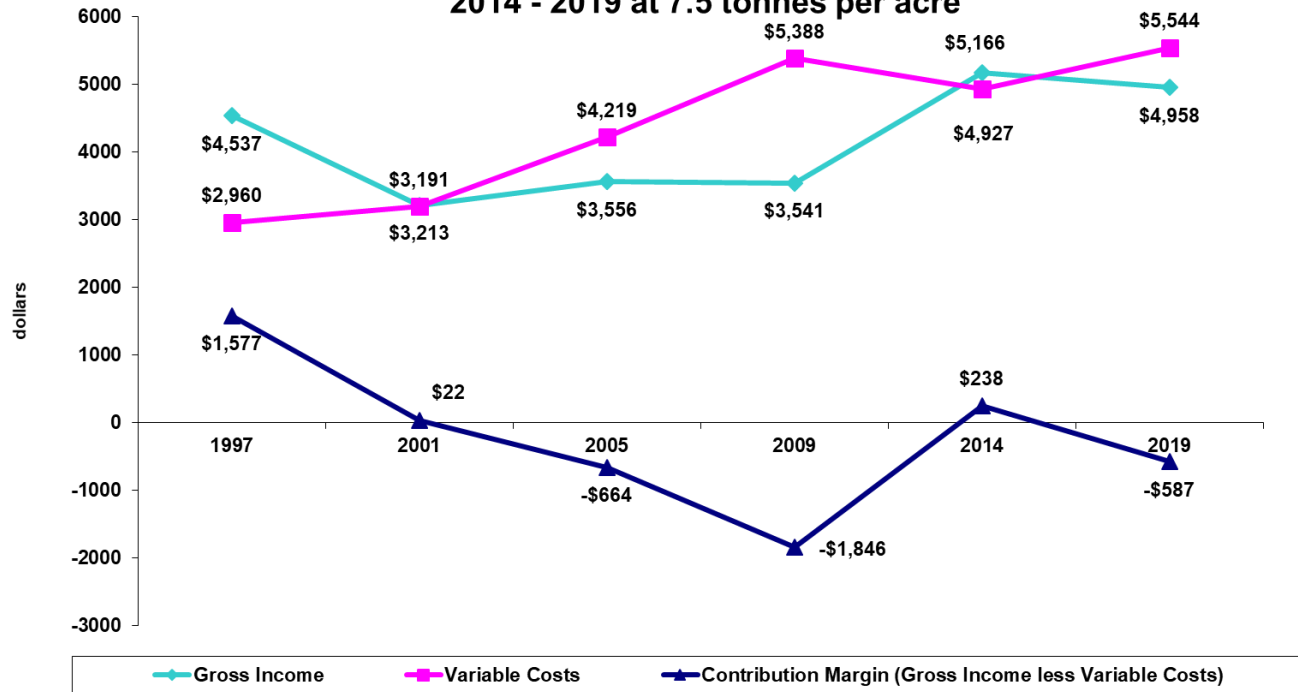
Table 9. Break Even Yield to Cover Total Costs

Yield MT/ac	Revenue	Annual costs excluding harvest and operating interest costs	Harvesting costs	Operating interest	Annualized Est. Costs	Total Costs with Est. Costs	Net Cash Flow
13.0	8593	5,529	1,465	292	2281	9567	-974
13.2	8725	5,529	1,488	293	2281	9591	-866
13.4	8857	5,529	1,510	294	2281	9615	-757
13.6	8990	5,529	1,533	296	2281	9638	-649
13.8	9122	5,529	1,555	297	2281	9662	-540
14.0	9254	5,529	1,578	298	2281	9686	-432
14.2	9386	5,529	1,600	299	2281	9709	-323
14.4	9518	5,529	1,623	300	2281	9733	-215
14.6	9651	5,529	1,645	301	2281	9757	-106
14.8	9783	5,529	1,668	302	2281	9780	2
15.0	9915	5,529	1,691	303	2281	9804	111
15.2	10047	5,529	1,713	304	2281	9828	220
15.4	10179	5,529	1,736	306	2281	9851	328
15.6	10312	5,529	1,758	307	2281	9875	437

Breakeven yield to cover total annual costs is 14.8 tonnes / acre.

(Includes annualized establishment costs, does not include land costs)

Graph 5. Vidal Cost of Production
(Inflation adjusted = 2019 \$)
1997 - 2013 at 5.0 tonnes per acre and
2014 - 2019 at 7.5 tonnes per acre



Graph 6. Vidal Cost of Production
(Inflation adjusted = 2019 \$)
1997 - 2013 at 7.0 tonnes per acre and
2014 at 10.0 tonnes per acre and 2019 at 9.5 tonnes

