



Viticulture, enology and marketing for cold-hardy grapes



Establishing cost of production estimates for hybrid grapes

Cornell University
Ithaca, NY

Miguel I. Gómez and Yijia Tang

Dyson School of Applied Economics and Management, Cornell University

Background and Rationale: Grape production budgets (White et al, 2010 for example) have been based on high end *vinifera* wine grapes and the costs of developing and equipping a 50 acre vineyard. We adapted the methodology and collect data based on smaller-scale vineyards and actual costs of producing hybrid grapes, which are critical for many regions targeted by the Northern Grapes Project. Growers who are considering planting new or additional vineyards need to carefully weigh the cost of planting and establishing a vineyard and the annual cost of production of a mature vineyard against the expected yields and prices to determine whether the investment per acre required to bring a vineyard into production will result in a profitable return on investment. This requires a reassessment of which varieties to plant on this acreage and which sites will support profitable wine grape production.

Methods: The methods used to construct cost estimates were a combination of 1) interviews with a panel comprised of grower representatives, and 2) economic engineering using recommended practices. In November of 2013, we met with a panel of four growers and vineyard managers. The growers went through the data prepared for the most recent estimates of the cost of establishing and growing hybrid grapes. Consensus estimates were developed for land prices, labor requirements and wage rates for the various operations in a hybrid grape vineyard and for a typical machinery complement for a full time commercial vineyard. Because this hybrid grape study was first conducted, the panel went through the machinery and labor time estimates for the 2013 *V. vinifera* study, and made recommendations for changes to hybrid grapes. The panel also provided estimates, based on their own experience in the vineyard, of the time required to perform various vineyard operations, such as tillage, spraying, mowing, etc., and hand operations such as pruning, tying & removal, and suckering.

Results: Table 1 summarizes the growing, establishment, and development costs for a hybrid vineyard. Growing costs are largest in the first year when a significant amount must be spent preparing the site, planting the vines, and constructing the trellis. Growing costs are \$1,770 per acre in years 4 through 22, and this number is transported to Table 11 to use in the computation of the costs and returns for the mature vineyard. The cost of crop insurance was added in the 2013 study at an average cost of \$109 per acre. Costs for crop insurance will actually vary a few dollars per acre depending upon the grape variety planted.

Table 1: Summary of Growing Costs for Hybrid Vineyard, Trained to HC & UK Systems, NY, 2013

Item	Year 1	Year 2	Year 3	Year 4+
Site preparation	\$5,076			
Vines & planting	\$3,706			
Trellis materials & construction	\$3,829			\$127

Replanting & Rouging		\$77	\$63	\$63
Dormant pruning & removal		\$60	\$311	\$311
Weed control	\$173	\$148	\$185	\$128
Fertilization	\$28			\$74
Canopy management		\$99	\$272	\$216
Disease & insect control	\$91	\$123	\$216	\$301
Take away & hilling up	\$72	\$246	\$220	\$166
Mowing		\$94	\$140	\$140
Bird Control			\$60	\$60
Pick-up				\$75
Crop Insurance*				\$109
Total Growing Costs	\$12,955	\$846	\$1,467	\$1,770

*Crop Insurance generally starts at the fifth year of positive production (i.e., year 8)

Table 2 summarizes the costs and returns expected from a mature vineyard. The estimated revenue per acre varies from \$3,250 to \$4,560 depending upon variety. Total costs vary from \$4,496 to \$4,937 per acre, also depending upon variety. The break-even prices and yields are shown in Table 11. A yield of 8.8 tons per acre is the break-even yield for Cayuga White. A yield of 7.4 tons per acre would be necessary to break even with Corot Noir. A yield of 7.4 tons per acre would be necessary to break even with Vidal Blanc. Vidal Blanc shows a large loss (-\$1,351) given the assumed yield and prices. To put this in perspective, it should be remembered that we assumed recommended practices throughout the model. Some growers will be able to reduce some of these costs considerably. All labor, including the owner's labor, is charged a cash wage. There is an imputed charge on all capital used.

Table 2: Costs and Returns for a mature Hybrid Vineyard, Trained HC & UK Systems, NY, 2013

Item	Cayuga White	Corot Noir	Vidal Blanc
Receipts:			
Yield target , tons per acre	8	5	5
Price, \$ per ton	\$570	\$650	\$650
Total receipts	\$4,560	\$3,250	\$3,250
Costs:			
Variable Costs:			
Growing (incl. crop insurance @\$109/Ac)	\$1,770	\$1,770	\$1,770
Interest on operating capital	\$18	\$18	\$18
Machine Harvesting (\$95/ton)	\$760	\$475	\$475
Trucking (\$30/ton)	\$240	\$150	\$150
Total variable costs	\$2,788	\$2,413	\$2,413
Fixed Costs:			
Vineyard capital recovery	\$1,063	\$1,063	\$1,063
Machinery and equipment capital recovery	\$412	\$412	\$412
Buildings capital recovery	\$62	\$62	\$62
Property taxes	\$150	\$150	\$150
Land opportunity cost	\$120	\$120	\$120
Office supplies, phone, etc.	\$60	\$60	\$60
Insurance	\$55	\$55	\$55
Management	\$228	\$163	\$157
Total fixed costs:	\$2,149	\$2,083	\$2,083
Total costs	\$4,937	\$4,496	\$4,496
Profit or loss	-\$377	-\$1,246	-\$1,246
Breakeven price (\$ /ton)	\$617	\$899	\$899
Breakeven yield (tons)	8.8	7.4	7.4

Capital Requirement

Table 3 indicates the capital investment per acre necessary to get into grape production in a representative NYS wine region, assuming a vineyard of 50 total planted acres with an additional four acres for roads, headlands, and a building; and reliance on either custom hand or machine harvesting of grapes. The table uses the value of new machinery and equipment and buildings. If a harvester is purchased, investment per acre for machinery would be considerably higher. Land costs assume a prime site close to the lake. Table 3 indicates that it would require \$30,732 per planted acre to get a vineyard into maturity in NYS under the assumptions indicated above. Established growers, with depreciated vineyards, machinery and equipment, and buildings, would have lower capital investment (book value) depending upon the age of their depreciable assets.

Growers with smaller acreage will typically have higher investment costs per acre. This is due to less efficient use of the machinery complement unless these smaller growers hire some vineyard operations to be done by custom operators and/or vineyard management companies, thus giving them the possibility of buying fewer items of machinery and equipment.

Table 3: Investment per Planted Acre of Hybrid Grapes,
New York, 2013

Assets	\$/acre
Land*	\$6,480
Machinery & equipment	\$4,107
Buildings (shop & tool shed)	\$1,380
Vineyard establishment and development	\$18,765
Total investment per acre	\$30,732

*Prime site close to the lake. Assumes 54 acres purchased (including support land) for 50 planted acres.

What the results mean:

This report can shed light on the following issues relevant to vineyard managers:

- The results can help northern grape growers identify low-cost production practices that enhance profitability of wine grape growing; in addition, through extension efforts, these results are helping improve the ability of vineyard managers to make superior production decisions.
- The cost and returns estimates derived in this publication indicate results for hybrid grapes in a representative wine region in New York State under the assumption of prime sites, the use of recommended practices, good management, 2013 prices for inputs, and prices for grapes that reflect several quality enhancing practices such as leaf pulling, cluster removal for two varieties, and limited yields.
- Potential investors should be forewarned that the current economic climate for grape growing can change. In some years, given the thin markets for certain varieties, a surplus situation can develop when grape yields increase or a few growers plant additional acres.
- The total acreage of some varieties in New York State is quite limited. With such limited acreage, a few small plantings or one large planting of these varieties can lead to a large percentage increase in grapes produced, temporarily depressing the cash market. Labor, especially with more reliance on Hispanic labor for pruning and tying, is a concern. More growers