BUDGET ANALYSIS FOR A NAPA COUNTY VINEYARD

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Bachelor of Science

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ABSTRACT

This study was undertaken to determine whether farming premium wine grapes can generate profit on a 10 acre site in Napa County, and if farming wine grapes can be a profitable long term investment.

The report utilizes two techniques for analysis of the data. The break-even analysis will be used to determine whether the operation is potentially profitable. Vineyard establishment costs were outlined in and production costs (from year 3 forward) defined. Production costs and grape revenues are weighed to determine net revenues above total costs. Monthly per acre break down of costs demonstrates how vineyard production costs fluctuate during dormancy, the growing season and harvest in the fall. A ranging analysis of grape revenue weighted against costs at varying prices and yields provides possible levels of profitability. Depreciation for all equipment purchased for the operation is used to calculate capital recovery. To determine the different levels of profitability of the operation based on various levels of yield and price, marginal cost and marginal revenue criterion was used to find various break even points and to observe points where revenue exceeds cost.

The vineyard operation was profitable over the long term on an annual basis. The establishment costs have been spread over twenty years in the analysis to make the operation feasible. After the third year the vines reach full production and annual cost was exceeded by annual grape revenues.

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Chapter 1

INTRODUCTION

In the year 2008 the wine industry in the United States was more robust than ever, and the state of California remained a leader in producing excellent quality wines. In a time when the market favors grape buyers, production of premium high quality wine grapes is the best guarantee to establish an economically feasible and profitable enterprise (Goodhue, Green,and Heien 2008, pp 1). Planting will be on 10 acres on Los Carneros Avenue at "Larry Hyde & Sons Vineyards," a family vineyard operation owned by CP Family Partnership, and farmed using hired labor and some rented equipment from other family owned vineyards. Other equipment could be purchased for use in vineyard operations as needed. The vineyard planting, a commercial venture and an ongoing investigation of grape growing at the site was conducted both to create profit and personal satisfaction. The enterprise sought to produce premium Cabernet Sauvignon grapes for sale at a price that would make farming the grapes profitable.

Since grape vines take up three years to reach physiological maturity, these initial years will be burdened with establishment costs and profitability would likely not be reached until after the vines are established and producing. The cost of setup and farming will be covered by the CP Family Partnership which will use pre-owned equipment for most operations.

Problem Statement

Can farming premium wine grapes generate profit on a 10 acre site in Napa County and would the price of the grapes be sufficient to cover the costs associated with establishment and continued farming over the long term?

Hypotheses

The 2007 average price paid per ton of grapes in Napa County was $3,256 per ton, up six percent from 2006 (Whitmer 2008). The price per ton at which Cabernet Sauvignon grapes sold at Hyde Vineyards, an adjacent family run operation, was $5,000. The estimated confidence interval for the price at which the Cabernet Sauvignon from the 10 acre site will sell is between $5,000 and $6,500 per ton. This is not a modest estimate considering the average per ton price of Cabernet Sauvignon was $4,302 in 2007 (Napa County 2007) and $4,728 in 2008 (Carson 2009). The grapes will be from better clones, better spacing, rootstalk and sun exposure, meaning that the vineyard will be unique and the grapes worth considerably more. To ensure that the price will not be influenced by crop level, per acre prices are often used either to protect growers from low yields or to protect wineries from high yields. A price of $22,750 per acre is comparable to charging $6,500 per ton with 3.5 tons per acre of crop. This per acre price will likely be the most important factor in generating profits from grape sales. Concerning profitability, it will be sufficient to generate enough revenue to create a profit or at least to break even. Gross profits, the proceeds of grape sales, will cover the cost of farming the 10 acres.

Objectives

1) To assess the profitability of planting a vineyard.
2) To examine costs associated with carrying through the vineyard land lease.
3) To evaluate these factors and determine the time path with the undertaking.

Justification

Commonly known as the largest producer of agricultural products in the United States, California accounts for 90% of U.S. wine production with almost 3.5 million tons of grapes crushed in 2006 (Goodhue, et al. 2008, pp 2). In 2007 Napa County wine grape production generated $472 million, which accounted for 97.5% of Napa County crop and livestock value (Whitmer 2008). California alone generated $25 billion in sales from its 79,631 farms in 2002, more than 45 percent of which grow fruit, tree nut and berries (USDA 2002). In 2008 114,000 tons of winegrapes were harvested, down from 180,000 in 2007 (Carson 2009), contributing to a shortage, which came at a time of rising demand. This bodes well for grape producers at a time of global financial crisis. Though scarcity of water in the future is a rising concern in California agriculture and may become an issue in the future, it will be less of a concern once the grape vines have reached full maturity and require less irrigation in both the amount and frequency of application. The result of the study should provide evidence of the feasibility of setting up such a farming operation, if it would be an economically viable or profitable operation.

Chapter 2

REVIEW OF LITERATURE

Campbell (2008) provided an overview of availability of farmland all over California at prices favorable to buyers. Napa Valley is commented on as being an area where prices have remained high and land is still being purchased even in a depressed general market. As noted in Campbell (2008), wineries are getting back into the market looking to sign long term contracts to purchase fruit from grape growers. Scarcity of water is an increasing concern for developers, and less land is being developed for housing, making relatively more land available for farming (Campbell 2008 p. 3). Cabernet Sauvignon prices in the Napa Valley rose in 2008 by 10%, perhaps to compensate for a drop from the previous year's production by 27% to 42,759 tons (Carson 2009).

O'Leary (2007) examined vineyard production costs from the view of the lender and the borrower, whether it should be granted, conditions of the loan and factors involved in the decision including debt to equity ratio, skill and character. The topic could as easily been intended for farm analysis. His conclusion was that despite appearing to be just barely liquid and not looking like a real moneymaker, vineyards can still be a good future investment. Factors such as grape revenues not always being collected by the December tax date (O'Leary 2007), a correctable problem, had prevented year to year profitability from being achieved.

Economic Feasibility

Cuellar and Huffman (2008) observed grape prices in relation to the demand for wine, which was separated into categories by color, varietal, and price segments providing empirical estimates of cross price elasticities by color, varietal and price grouping. Quantities analyzed were stock keeping units and quantity data with calculated monthly disposable income for calculation of income elasticities. Grape prices were taken from recent crush report data. They concluded results were generally consistent with the law of demand, price and quantity being inversely related (wine being classified as a "normal" good), meaning that as the income increases, so does quantity demanded, though to a lesser extent (a $10 price per 750 ml bottle threshold was used for price comparison). Despite some incongruity, that cost of grapes averaged only ten percent of the ultimate bottle cost, the data held that more expensive grapes typically go to more expensive wine, a seemingly logical connection. The focus was relevant, but also gave insight into economic evaluation of the wine and wine grape markets.

Schoefield (2008) provided an analysis of California's wine grape supply and demand for the three top varietals: Chardonnay, Merlot, and Cabernet Sauvignon. It happened that Cabernet Sauvignon had by far the highest estimated growth rate among the three based on dollar sales volume of grapes in tons. An analysis of supply and demand for this variety also showed the most promising results of the three that will likely continue to be a high demand for the grape, while new plantings are low compared to recent years. The weather and other factors may affect demand and supply. Aside from that the analysis is positive. An overview of cost and return

ratios and analysis of methods through which the profitability of a farming operation can be analyzed and estimated is provided by Kay, Edwards, and Duffy (2008).

The result of findings from those who responded to a survey issued to growers who were either putting in new vineyards or replanting old vineyards was that the variety vintners had planted most of was Cabernet Sauvignon (Walker 2003 p.1). Cabernet Sauvignon, a variety that has been increasing in popularity, will create its own demand if grown properly. After choosing a variety, other planting decisions, such as whether or not to plant a cover crop must be made. Ingels, Scow, Whisson, and Drenowsky (2005) listed some of the positive aspects of using a cover crop between rows in vineyards; erosion control, increased habitat for beneficial insect species and aesthetic appeal.

Weber, Klonsky, and De Moura (2009) provided a sample of costs to establish a vineyard and produce wine grapes, particularly Cabernet Sauvignon, in Napa County, with data collected from vineyard managers in the area of the study, meant to represent costs of a well maintained vineyard. To compare the cost of organic farming, a cost study for producing organic Cabernet Sauvignon grapes in Napa County provides a cost per acre with user input spreadsheets in addition to the findings reported in the study (Weber,Klonsky, and De Moura 2005).

Related Scientific Studies

Ruel and Walker (2006) examined various native species of native grape vine, propagated at the UC Davis experimental greenhouse, and the effect of exposure to Peirce's Disease (PD) through the X. fastidiosa strain taken from diseased vines in the Stag's Leap

District of Napa Valley. The hypothesis was that verified disease resistance would be based on geographic location of the original grape vine.

One issue with determining whether the vines showed PD resistance is that a symptom of PD is disruption of the vine's ability to take up and transport water. Therefore, there is a possibility of vine tolerance to PD actually being a tolerance to water stress in the vine, though it was noted as being unlikely (Ruel and Walker 2006). It was found that there is potential for reducing the impact of PD through breeding and genetic engineering of resistant material and was noted that native grape species appear to be resistant in areas where PD is severe. PD vectors and neighboring vineyards that might be affected by the disease will have to be monitored and biological control methods implemented in the planted area of the vineyard lease in addition to vines being sought out which would provide the best quality in addition to disease resistance.

Ingels, et al. (2005) explored the positive and negative impacts of planting various cover crops in vineyards in Sacramento County. The research was done on Merlot vines that were nine years old. The findings were that planting cover crop had many potential benefits; enhanced water penetration in the soil, increased soil nitrogen, higher availability of other plant nutrients, increased presence and activity of microbes in the soil and the possibility of less gopher damage from feeding on the roots of cover crops as determined by soil structure at the site. The potential problems were; seed purchasing and distribution cost and the possibility of there being too much nitrogen, which can affect wine quality. These issues are easily fixed, leaving the positive far

outweighing the negative consequences. Other positives are erosion control, increased habitat for beneficial insects and aesthetic appeal, which help to make the case for cover crop planting.

Chapter 3

METHODOLOGY

Procedures for Data Collection

The data used in this study will be taken from benchmarks by Weber, Klonsky and DeMoura (2005 and 2009) of costs and revenues associated with vineyard site preparation and modified by Hyde Vineyards experience. Cost of labor, extent to which chemicals and fertilizer such as sulfur are to be applied are based on those from Hyde Vineyards and will be used to more accurately evaluate to what extent revenue from the sale of the grapes grown on the site will cover planting, farming, labor and maintenance costs. Specific materials costs including tillage, grape vine stakes, drip irrigation system and cost of chemicals and sanitation will be taken from the UC Cooperative Extension cost study. Revenues were estimated from grape prices taken from the Napa County Agricultural Commissioner's 2007 report and from prices from the previous year at the adjacent family run Hyde Vineyards. The prices used in the study range between $3,500 and $6,000 per ton. This price will be kept constant over a ten year analysis for initial setup.

Procedures for Data Analysis

The data analysis will consist of a series of tables outlining cost of vineyard establishment, cost of wine grape production, costs and returns, costs broken down by month, ranging analysis on cost and production and equipment costs. Profitability of the vineyard will then be determined to evaluate the economic feasibility of farming the land. To determine whether the operation is economically feasible, break even analysis will be used to find out if the operation is self-sustainable in the long term or profitable from year to year. The method for calculating profitability is an evaluation of marginal cost versus marginal revenue using the aforementioned data to project these figures for the farming of the site. The data will be organized in Microsoft Excel as a listing of costs of planting including equipment, labor, soil amendments, property tax and cultural practices. Grape revenues will also be outlined in Microsoft Excel on a basis of $4,000 per ton price. Both sets of data will be examined together with cost and revenue side by side in order to calculate the final profit from the operation.

Assumptions

Establishment Cultural Practices and Material Inputs

The following refer to table 1.

Environmental Preparation. The site is on less than 5% slope, meaning that it is not subject to planting restrictions from the Napa County Conservation, Development, and Planning

Department. Straw wattles will be distributed over the field prior to planting as a preventative measure for erosion.

Vineyard Conversion and Site Preparation. The vineyard is being planted on a vacant field. Rocks and other debris are cleared out by a hand crew, using a tractor and trailer, however this is not included in the study. The field is ripped three to four feet deep in three passes – line of planting, crossways, and diagonally. The land is then disked in two directions and landplaned by a custom operator. The CP crew conducts field layout, places marks and pounds pencil rods at the vine sites and lays out irrigation lines. A cover crop of Bell Bean, Oat and Vetch is planted in the row middles. The Trellis system end-posts and stakes are installed. Operations that prepare the site for planting begin in the fall of the year prior to planting but the costs are shown in the first year of planting.

Vines. Rootstalks are ordered from the local nursery. Choice of rootstalk will be 101-14 due to its relatively quick accumulation of phenolics (flavor and color compound) and its resistance to the dagger nematode (Xiphinema americanum), the soil dwelling root parasite which has been found in large populations in nearby soils. Cabernet Sauvignon buds will be field grafted onto the rootstalk. Vines will be trained to a bilateral cordon and spur pruned. Cordons are the horizontal branches laid down on the wires during the first years, and spurs are the bearing units on the cordon. The grapevines are assumed to begin yielding fruit in three years. They are expected to produce for an additional 20 years.

Planting/Grafting. The rootstalk will be planted in the spring. The dormant rootstalks will be planted into holes dug out to the appropriate depth and filled with soil. The rootstalks will grow

and establish their roots during the summer. Cabernet Sauvignon buds will be grafted onto the rootstalks the following September on 7X5-foot spacing at 1,245 vines per acre. The grafting will be done by hand in the field.

Trellis System. The trellis is a vertical shoot positioning system (VSP). The system will utilize 3-inchX8-foot notched steel line posts spaced 20-feet apart (every 4th vine), with three training stakes (1/2-inch rebar rod X 4-feet) at the vine locations in between. Two clips to fasten each rebar. End posts are 3-7/8 inch X 10-foot steel tube with a spade. Seven permanent wires are secured to the end posts – 16 gauge fruit wire, drip wire, 2 pairs of canopy wires at fruit level and a single canopy wire at the top. Gripples are put on all wires except the cordon wire and the drip wires. The trellis is considered as part of the vineyard since it will be removed when the vines are removed. Therefore it is included in establishment cost. The trellis system cost for materials and labor cost are shown in the first year and it is installed during the first 2 years as follows:

First Year. In the fall of the year prior to planting, end-posts and stakes are laid out by the grower and installed by a CP crew. Stakes and end-posts are laid out in the field using a tractor and trailer. Hauling the posts takes 2 men and 1 tractor driver approximately 0.81 hours per acre. The drip wire is installed after planting.

Second Year. Two pairs of canopy wires, a single canopy wire at the top and the fruit wire are installed.

Drip System/Irrigation. Mainlines are laid out in the fall prior to trellis installation. After planting the drip line is attached to the drip wire on the trellis system and emitters are punched.

Drip system labor is included in the irrigation cost. The system is considered part of the vineyard since it will be removed when the vines are removed, so it is considered part of the establishment costs.

Training/Pruning. In this study training includes pruning, tying, suckering, shoot positioning, and thinning. The prunings will be left between the vine rows to be later disked in and incorporated into the soil.

First Year. The vines grow freely as the strongest shoot is trained up the stake and the others removed. Establishment of a good root system is critical to support vine training for the second year.

Second Year. In February the vines are pruned back to two buds. In June, the vines are suckered to one shoot. Vines are trained by tying one shoot to the post to become the main trunk. Later in the season this shoot is topped at or slightly below the cordon wire. Two lateral shoots from the trunk are selected to be trained as the bilateral cordons. The remaining lower lateral shoots are removed. In July and August, two passes are made to top the vines, remove extra shoots (suckering) and tie the canes loosely on the wire.

Third Year. In February, cordons are pruned back and tied to the fruiting wire. The cordons are extended along the fruiting wire to fill out missing spots on the trellis. Spur positions (buds for new shoots) on the cordon are selected. Suckering is done in May and shoot positioning in June and July. Crop thinning occurs in June and in August to remove half the crop from the young vines. Slower vines have all their fruit removed and continue to be trained.

Though planting and training vines can continue at a rate of 2% per year and is covered in cultural costs. After the vines are trained, canopy management begins and includes trunk and cordon suckering, shoot positioning, and thinning.

Irrigation. Pumping costs from grower input approximated $16.50 per acre inch. During the first and second year, irrigation is from May to October, about 20 weeks (2 irrigations per week at 2.5 gallons per vine per irrigation). No assumption is made about effective rainfall. In the third year five gallons per week per vine at one irrigation per week is applied over a 20-week period (155,865 gallons per acre or 5.74 acre inches). Labor is calculated at 0.33 hours per acre irrigated.

Frost Protection. The cost of installing one propane powered wind machine would be at $2,500 per acre. The wind machine at Larry Hyde & Sons vineyard has already been installed and is on a neighboring property, so the cost of purchasing and installing the wind machine has been left out. This is a large saving as cost of wind machine is $20,000 (Weber, Klonsky, and De Moura 2009). The cost of gas and other maintenance and repairs done to the wind machine have been included.

Pest Management. In this study it is assumed that no insecticides are needed, since their populations will be below treatment threshold levels. To control fungus, the most important pathogen being powdery mildew (Uncinula necator), fungicide applications are made in the second year: Stylet Oil (paraffinic oil) in May, Rally (mycobutanil) in June, Pristine (pyraclostrobin/boscalid) in July and Flint (trifloxystrobin) in July. All are applied by ground with the grower's equipment. A fungicide application (fungicidal laytex-based paint) may be

made to pruning wounds in February to control Eutypa, but the cost is not included in this study. Weeds are controlled by an application of Glyphos (glyphosate) under the vine row before planting and pruning in January/February.

Cover Crop. After land preparation in the fall, the annual cover crop is seeded in the vine row middles, mowed in March/April of the following year, and then disked in May. In the fall of the first and second year, an annual cover crop (bell bean, oat, vetch) is planted in October and disked in May of the second year. In October of the third year after planting, permanent cover crop is planted and allowed to re-seed thereafter in the spring.

Fertilization. Beginning the first year, an NPK fertilizer, 8-8-8, is applied equally through the drip line in June, July and September. A total of five gallons or 51 pounds of material per acre is applied. In the third year, the fertilizer is applied in May and in October after harvest.

Harvesting. Harvesting begins the third year. Since harvest will take more care and a longer amount of time to finish due to the young vineyard having small and uneven crop levels, the cost is projected at $318 per acre.

Yield. Average yield in the third year is projected to be 2 tons per acre.

Production Cultural Practices and Material Inputs

Refers to tables 2-6

Pruning. Pruning occurs in February and prunings are placed I the middle of the rows to be disked into the soil. Pruning is paid by piecework.

Canopy Management. Canopy management begins with trunk and cordon suckering in April/May. Leaf and lateral removal, shoot thinning and wire lifting are done in June and July. Crop thinning occurs twice, a green (color) thinning in July and a crop thinning in August. In early June/July some basal leaves are removed to allow air flow and sunlight to penetrate the canopy and enhance quality and uniformity of ripening.

Irrigation. In this study 5.74 acre inches (155,866 gallons per acre) are applied and water is calculated to cost $16.50 per acre-inch. Once per week over 20 weeks, water at five gallons per vine is applied from late May to September/early October. Irrigation labor is calculated at 0.33 hours per acre per irrigation. There is no assumption made about effective rainfall.

Fertilization. An NPK fertilizer, 8-8-8, at 51 pounds per acre is applied through the irrigation system in equal amounts in May and in October after harvest.

Pest Management. The same strategies mentioned in the establishment cultural practices and materials costs pertain to the years following.

PCA (Water Monitoring). This cost is to represent ongoing analysis done on soils and water quality.

Permanent Cover Crop. October of the third year is when a permanent cover crop is planted and then allowed to re-seed in the spring. The crop is mowed in March and again in May after seed formation. The cover crop dried out by early summer.

Harvest. The crop is picked by hand by the CP crew. Harvest costs are around $240 per ton. Charges will vary with crop level and number of pickers. It is assumed that the pick will be done

at a rate of 1 ton per day per picker, paid $13 per hour and working 8 hour days. Grapes are hand-picked into bins, unloaded by hand off a three bin dump trailer with rollers by the tractor driver, and loaded onto the truck by the forklift driver who will tie down the load and make the deliveries to the winery. The truck holds four bins and takes an hour round-trip per delivery.

Yields. Yield maturity is reached by the fourth year. An assumed yield of 3.5 tons per acre is used to calculate returns in production years. Typical yield on the site is between 2.5 and 5 tons per acre. Varying returns based on yield are shown in table 5.

Returns. Price per ton is conservatively estimated between $3,500 and $6,000 per ton. Net returns vary by price as shown in table 5.

Pickup/ATV. The grower uses the pickup for business and personal uses. The assumed business use for the pickup is 10,000 miles per year. In addition to its use as a sprayer for weed control, the ATV is used to check on irrigation and the vineyard.

Labor, Equipment and Interest Costs

Labor. Labor rates of $20.00 for machine labor and $18 for general labor includes payroll overhead of 45%. The basic hourly wages are $15.00 for machine labor and $13 for general labor. These figures are based on benefits and worker's compensation insurance paid to the CP crew.

Equipment Operating Costs. Repairs are done at the shop in the adjacent family owned vineyard operation and costs are split based on percentage between the two operations. Fuel

costs are also based on the cost splitting between the two operations. Since the 10 acre site represents 25% of the 40 acre CP vineyard, the cost was assumed to be of the same proportion.

Interest on Operating Capital. The rate at which interest on operating capital is calculated is 5.75%. This is based on the typical market cost of borrowed funds. The interest has been purposefully high to represent what payment is for an investment three times the size, the amount paid per acre for the pre-existing CP operation.

Risks. Crop production risks are not taken into account by the study. The full extent of financial, agronomic and market risk cannot be represented in the figures but are covered in Chapters 1 and 2 of the study. As a preventative measure to risk of crop loss, federal crop insurance may be purchased to insure against catastrophic loss and specific natural hazards.

Ranging Analysis. Cost per acre at varying yield to produce wine grapes with yields ranging from 1 ton per acre to 5 tons per acre. Prices range from $3,500 to $6,000 per acre. Returns are weighed against operating costs, cash costs and total costs (see table 5).

Cash Overhead

These various costs are paid out during the year and assigned to the whole farm rather than a single operation in particular. Cash overhead includes property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs and management.

Property Taxes. The amount assumed in the study for property taxes is representative of the amount paid per acre in 2009 for the CP family vineyards adjacent to the 10 acre site.

Insurance. Insurance for farm investments is based on assets owned by the CP family vineyard operation and the current rates paid for the CP farming operations. Liability insurance covers accidents on the farm and costs $1,000 for the entire 10 acres.

Sanitation Services. Sanitation services provide portable toilets for the vineyard crew. The annual cost is $1,400 for this site. The cost includes one toilet unit with washbasin, soap and towels, delivery and pickup, and five months of weekly servicing.

Management/Supervisor Wages. No salary is included. The returns made above the costs are considered a return to the management.

Office Expense. Office and business expenses are estimated at $88.00 per acre. These expenses include a computer and office supplies. Bookkeeping and accounting are done by the manager.

Investment Repairs. Since equipment is shared, the value for investment repairs has been inflated to over 2% of purchase price on investments or capital recovery items to cover the entire forty acre operation.

Non-Cash Overhead

Calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital Recovery Cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required annually to recover the difference between the purchase price and the salvage value. The formula for the calculation of the annual

capital recovery costs is ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate).

Salvage Value. Salvage Value is an estimate of the remaining value of an investment at the end of its useful life. For the purposes of this study, an estimate of the value after a fully extended useful life is used. Land will appreciate, so no depreciation can be taken. Other fixtures including the irrigation systems and buildings have a useful life of zero.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. Amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 4% is used to calculate capital recovery cost in this study. The interest rate is representative of a moderate amount loaned at very low risk.

Establishment Costs. The costs to establish a vineyard are used to determine capital recovery expenses, depreciation and interest on investment for the production years. Establishment cost is shown on table 1.

Irrigation System. The assumption is that a well from the adjacent CP vineyard and the existing pump are hooked up to the irrigation system of the 10 acre site. The irrigation costs shown pertain only to the 10 acre site.

Building/Tools. The existing shop at the adjacent CP vineyard will house equipment used in vineyard operations. Tools already owned in the existing shop are used.

Land Costs. Today's land costs in Napa County range between $120,000 per acre and $200,000 per acre. With a 25 year loan at 7% the payments are over $8,000 dollars per acre, more than doubling the total cost of farming the vineyard. The prohibitively high cost of land in Napa County makes payment difficult, and it is assumed that the land had been previously owned.

Market and Demand

The current market for quality wine and wine grapes will either continue to improve as it has in the past few decades or remain the same in the future with no significant drops in demand or other economic factors impacting the sector of the wine market which demands premium high quality grapes (Shoefield 2008 pp. 1). With demand forecasted to rise and current grape buyers looking for Bordeaux varieties (particularly Cabernet Sauvignon), finding clients to purchase the grapes will not be a problem. With our economy currently in a recession, growers should have a relatively easy time selling to wineries with demand still growing and circumstances being favorable to the industry overall (Carson 2009). These are tidings of opportunity for expansion, and with limited immediate growth in planted acreage, now is a good time to plant grapes (Campbell 2009).

This study assumes that the demand for wine and wine grapes will remain strong long into the future. It is also assumed that climatic conditions will not change enough to affect wine grape cultivation in the area, and that wine grape cultivation will not be disrupted with the advent of new diseases or pests that have not yet been accounted for in the area. This includes access to water from a well and adjacent irrigation pond for the purpose of irrigating the vines. Irrigation will be conducted only when necessary (when vines show signs of stress) until the vines reach

full maturity and have established sufficient rooting depth. Annual inflation of 1.5% can be expected to occur for all materials costs and property taxes. Insurance costs can be expected to increase by 20% per year, fuel will increase by 10% per year and labor costs are projected to rise by 10% per year. To offset these increasing costs the grape price will increase by 5% every year and subject to review upon written notice given by either party a certain time after the harvest year as specified in the grape sale and purchase agreement. A final assumption is that during the first crucial years of vine growth the entity responsible for planting and setup will maintain capacity to finance the establishment of the vineyard.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

Chapter 4

DEVELOPMENT OF THE STUDY

Data Collection

Research on the grape market was obtained from various agriculture and wine business related publications. The actual figures used in this study were primarily derived from the UC Davis Cost Study (Weber, Klonsky, and De Moura 2009). The data obtained from the study was reviewed on an item by item basis in order to reconcile the costs of labor, machinery and equipment, chemical application and land cost with those that apply to the purpose of the vineyard. The vineyard establishment costs are listed and totaled at the bottom of Table 1. Costs per acre to produce grapes thereafter are listed and totaled in Table 2. In Table 3 the costs are weighed against revenues to assess profitability.

Analysis

The data shows that given the inputs, the Hypothesis is proven to be accurate, and the vineyard planting will cover costs and is profitable and can remain profitable in the long run (20 years later). Analysis of costs and revenues (Table 3) demonstrates a profit of $8,346 that nearly equals the total per acre cost of $9,153 can be generated from grape revenues.

Table 1. COSTS PER ACRE TO ESTABLISH A VINEYARD: Carneros - Napa County 2009

		Cost Per Acre		
	Year:	1st	2nd	3rd
	Tons Per Acre:			2
Land Preparation Costs:				
Site Prep: Rip 3X		800		
Site Prep: Disc 2X/Landplane 1X		400		
Site Prep: Straw Wattles for erosion control (purchase and layout)		1,000		
Site Prep: Mark, Layout, and Stake Vineyard		800		
Trellis: Purchase and Install Trellis		7,000		
Cover Crop: Plant		75		
TOTAL PRIOR YEAR LAND PREP COSTS		10,075		
Planting Costs:				
	Weed: Spray Strip(Glyfos)	29		
	Weed: Mow Middles	43		
	Vines: (1,245 per acre)	1,700	40	
	Planting Labor:	1,100	67	
	Irrigate:	1,000		
TOTAL PLANTING COSTS		3,872	107	
Cultural Costs:				
	Grafting ($1 per vine)	1,245		
	Head Cutting labor and Cartons		600	
	Weed: Disc Middles	61	91	122
	Irrigate: (water & labor)	328	328	328
	Miscellaneous Labor: (various hand operations)	283		
	Fertilize: Through drip (8-8-8)	18	18	18
	Weed: Spray Around Vines (Glyfos)	29		
	Cover Crop: Plant	75	63	109
	Weed: Spray Vine Row(Glyfos)		40	59
	Train: Prune to 2 buds		230	
	Weed: Mow Middles		43	43
	Disease: Mildew (Oil)		63	83
	Disease: Mildew(Rally)		54	63
	Train: Sucker/Tie/Train		920	389
	Disease: Mildew (Pristine)		70	
	Train: Sucker/Train/Wrap on wire 2X		1,061	
	Disease: Mildew (Sulfur)			87
	Disease: Mildew (Flint)			74
	Prune: Winter Prune			566
	Train: Shoot Position			142
	Prune: Thin Crop			142
	Pickup Truck Use	269	269	269
	ATV Use	26	26	26
TOTAL CULTURAL COSTS		2,334	3,876	2,520
Harvest Costs:				142
	Pick Fruit			250
	Bin Handling			240
	Haul To Crusher			4
TOTAL HARVEST COSTS				636
TOTAL OPERATING COSTS/ACRE		16,281	3,983	3,156

Table 1. continued

	Year:	Cost Per Acre 1st	2nd	3rd
	Tons Per Acre:			2
Cash Overhead Costs:				
Office Expense		$300	$300	$300
Sanitation Fees		$140	$140	$140
Property Taxes		$1,768	$1,781	$1,788
Liability Insurance		$35	$47	$52
Investment Repairs		$23	$73	$73
TOTAL CASH OVERHEAD		$2,266	$2,341	$2,353
TOTAL CASH COSTS/ACRE		$18,547	$6,324	$5,509
INCOME/ACRE FROM PRODUCTION				$4,000
NET CASH COSTS /ACRE FOR THE YEAR		$18,547	$6,324	$1,509
PROFIT/ACRE ABOVE CASH COSTS				
ACCUMULATED NET CASH COSTS/ACRE		$18,547	$24,871	$26,380
TOTAL COST/ACRE FOR THE YEAR		$18,547	$6,324	$1,509
INCOME/ACRE FROM PRODUCTION				$4,000
TOTAL NET COST/ACRE FOR THE YEAR		$18,547	$6,324	$0
NET PROFIT/ACRE ABOVE TOTAL COST				$2,491
TOTAL ACCUMULATED NET COST/ACRE		$18,547	$24,871	$22,380

The average production for these values is set at 3.5 tons per acre and price is set at $5,000 per ton, or $17,500 per acre. The Ranging Analysis (see Table 5) demonstrates ranging tonnage that could be produced on the site per acre and the respective per ton prices that might be paid for the grapes. The result is a table of returns above total costs that can be expected per acre. This table can be used to examine the range of profit at different prices and yields and observe the break even points. The break even diagram (see Figure 1) demonstrates how yield and price interact. At 2.5 tons per acre a price of $3,600 per ton is required to cover total cost and break even.

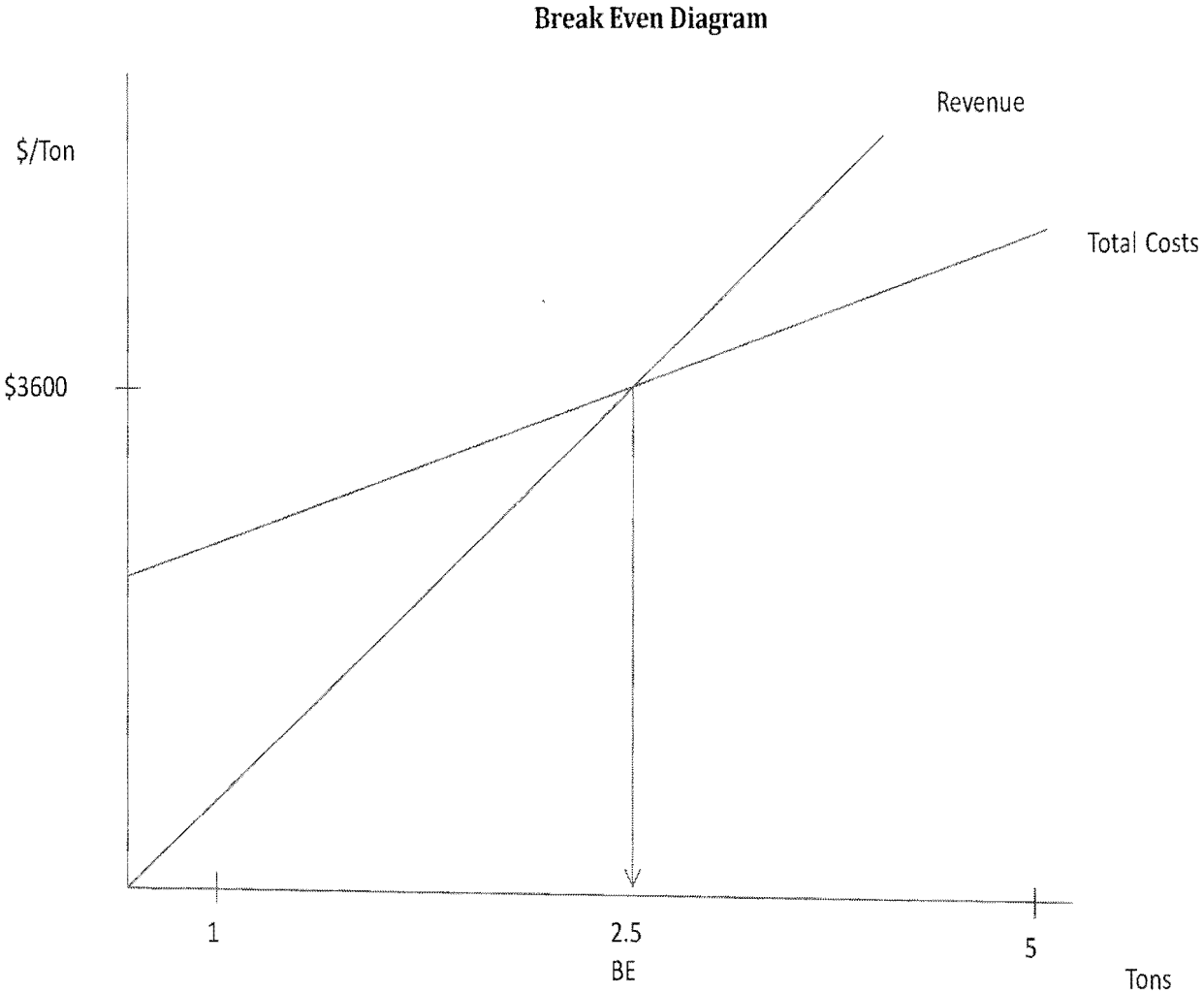

Figure 1. Break even analysis, Larry Hyde & Sons 10 acre parcel.

Table 2. COSTS PER ACRE to PRODUCE WINEGRAPES: Carneros, Napa County 2009

Operation	Operation Time (Hrs./A)	Cash and Labor Cost per acre: Labor Cost	Feul, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost
Cultural:						
Weed: Spray Vine Row (Glyfos)	2.00	$19.00	$4.00	$6.00		$29.00
Prune: (Cordon Spur Pruned)	27.00	$282.50				$282.50
Prune: Tie Canes	12.00	$100.00				$100.00
Weed: Mow Middles	2.00	$49.00	$38.00			$87.00
Disease: Mildew (Sulfur)	2.00	$25.00	$33.00	$25.00		$83.00
Frost Protection: Wind machines	5.01	$89.00		$216.00		$305.00
Canopy Management: Trunk/Cordon Sucker	15.00	$100.00		$0.00		$100.00
Irrigate: (water & labor)	3.30	$58.00		$96.00		$154.00
Fertilize: through drip (8-8-8)	0.00	$0.00		$18.00		$18.00
Disease: Mildew (Stylet Oil)	1.00	$24.00	$17.00	$42.00		$83.00
Canopy Management: Sucker/Shoot Thin/Shoot Position)	10.00	$177.00				$177.00
Disease: Mildew (Rally)	1.00	$24.00	$17.00	$22.00		$63.00
Canopy Management: Leaf/Lateral Removal & Wire Lift	40.00	$708.00				$708.00
Thin: Thin Crop (color thin)	10.00	$177.00				$177.00
Disease: Mildew (Flint)	1.00	$24.00	$17.00	$33.00		$74.00
Thin: Thin Crop (set thin)	18.00	$318.00				$318.00
Disease: Mildew (Pristine)	1.00	$24.00	$17.00	$38.00		$79.00
Pest Control/Water Management Adviser	0.00	$0.00			$100.00	$100.00
Pickup Use	6.06	$148.00	$122.00			$270.00
ATV	1.00	$22.00	$2.00			$24.00
TOTAL CULTURAL COSTS	157.37	$2,368.50	$267.00	$496.00	$100.00	$3,231.50
Harvest:						
Harvest-Hand Labor	0.00	$650.00	$0.00	$0.00	$0.00	$650.00
Harvest-Bin Handling	4.00	$76.00	$5.00	$0.00	$0.00	$81.00
Haul	0.31	$100.00	$5.00	$0.00	$0.00	$105.00
TOTAL HARVEST COSTS	4.31	$826.00	$10.00	$0.00	$0.00	$836.00
Interest on operating capital @ 5.75%						$97.00
TOTAL OPERATING COSTS/ACRE		$3,194.50	$277.00	$496.00	$100.00	$4,164.50
CASH OVERHEAD:						
Office Expense						$88.00
Liability Insurance						$100.00
Sanitation						$140.00
Property Taxes						$1,300.00
Property Insurance						$250.00
Investment Repairs						$300.00
TOTAL CASH OVERHEAD COSTS						$2,178.00
TOTAL CASH COSTS/ACRE						$6,342.50

NON-CASH OVERHEAD:	Per Producing Acre	Annual Capital Recovery Cost		
Wind Machines	$2,500.00	$181.00		$181.00
Vineyard Establishment	$22,380.00	$1,958.00		$1,958.00
Equipment	$5,767.50	$672.20		$672.20
TOTAL NON-CASH OVERHEAD COSTS	$30,647.50	$2,811.20		$2,811.20
TOTAL COSTS/ACRE				$9,153.70

Table 3. COSTS AND RETURNS PER ACRE to PRODUCE WINEGRAPES: Carneros, Napa County 2009

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
GROSS RETURNS				
Cabernet Sauvignon Winegrapes	3.5	ton	$5,000	$17,500
OPERATING COSTS				
Herbicide:				
Glyfos	1	pint	$6.17	$6.00
Fungicide:				
Dry Sulfur	20	lb	$0.75	$15.00
JMS Stylet Oil	4	gal	$20.77	$83.08
Rally 40 WSP	4	oz	$5.50	$22.00
Flint	2	oz	$16.50	$33.00
Pristine	5	oz	$3.77	$18.85
Frost Protection:				
Wind Machine (Propane @ $3.60 per gallon)	0.75	hr/ac	$4.32	$35.00
Water:				
Water Pumped (37,500 gallons)	1	ac-in	$16.50	$16.50
PCA (Water Monitoring)	1	ac	$100.00	$100.00
Fertilizer:				
8-8-8 (10.2 lbs per gallon)	51	lb	$0.36	$18.36
Harvest:				
Labor	3.5	ton	$185.50	$649.25
Delivery	3.5	ton	$30.00	$105.00
Machinery:				
Repairs	5	ton	$20.00	$100.00
Fuel- Diesel	29.48	gal	$3.70	$109.08
Lube				$7.72
Labor	20	hrs	$18.00	$360.00
Labor (non-machine)	118	hrs	$20.00	$2,360.00
Rent:				
Forklift	2	acwk	$14.33	$28.66
Interest on Operating Capital @ 5.75%				$97.00
TOTAL OPERATING COSTS PER ACRE				$4,164.50
NET RETURNS ABOVE OPERATING COSTS				$13,335.50
CASH OVERHEAD COSTS:				
Office Expense				$88.00
Liability Insurance				$100.00
Sanitation				$140.00
Property Taxes				$1,300.00
Property Insurance				$250.00
Investment Repairs				$300.00
TOTAL CASH OVERHEAD COSTS/ACRE				$2,178.00
TOTAL CASH COSTS/ACRE				$6,342.50
NON-CASH OVERHEAD COSTS (Capital Recovery):				
Wind Machine				181
Vineyard Establishment				$1,958.00
Equipment				$672.20
TOTAL NON-CASH OVERHEAD COSTS/ACRE				$2,811.20
TOTAL COSTS/ACRE				$9,153.70
NET RETURNS ABOVE TOTAL COSTS				$8,346.30

Table 4. MONTHLY PER ACRE CASH COSTS to PRODUCE WINEGRAPES: Carneros, Napa County 2009

Beginning JAN 09	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 09	`09	`09	`09	`09	`09	`09	`09	`09	`09	`09	`09	`09	
Cultural:													
Weed: Spray Vine Row (Glyfos)												$29.00	$29.00
Prune: (Cordon Spur Pruned)		$282.50											$282.50
Prune: (Tie Canes)			$100.00										$100.00
Weed: Mow Middles			$43.50		$43.50								$87.00
Disease: Mildew (Sulfur)			$83.00										$83.00
Frost Protection: Windmills			$94.50	$116.00	$94.50								$305.00
CM: Trunk/Cordon Sucker				$100.00									$100.00
Irrigate: (water & labor)					$15.00	$31.00	$31.00	$31.00	$31.00	$15.00			$154.00
Fertilize: through drip (8-8-8)					$9.00				$9.00				$18.00
Disease: Mildew (Stylet Oil)					$83.00								$83.00
CM: Sucker/Shoot Thin/Shoot Position					$177.00								$177.00
Disease: Mildew (Rally)						$63.00							$63.00
CM: Leaf/Lateral Removal& Wire Lift						$354.00	$354.00						$708.00
Thin: Thin Crop (color thin)							$177.00						$177.00
Disease: Mildew (flint)							$74.00						$74.00
Thin: Thin Crop (set thin)								$318.00					$318.00
Disease: Mildew(Pristine)								$79.00					$79.00
Pest Control/Water Management Advisor	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00			$100.00
Pickup truck use	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$22.50	$270.00
ATV	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$2.00	$24.00
TOTAL CULTURAL COSTS	$34.50	$317.00	$355.50	$250.50	$456.50	$482.50	$670.50	$462.50	$74.50	$49.50	$24.50	$53.50	$3,231.50
Harvest													
Harvest-Hand Labor									$650.00				$650.00
Harvest-Bin Handling									$81.00				$81.00
Hauling									$105.00				$105.00
TOTAL HARVEST COSTS									$836.00				$836.00
Interest on Operating Capital @ 5.75 %													$97.00
TOTAL OPERATING COSTS PER ACRE	$34.50	$317.00	$355.50	$250.50	$456.50	$482.50	$670.50	$462.50	$910.50	$49.50	$24.50	$53.50	$4,164.50
Cash Overhead:													
Office Expense	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$7.33	$87.96
Insurance		$350.00											$350.00
Sanitation	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00	$14.00			$140.00
Property Taxes	$650.00						$650.00						$1,300.00
Investment Repairs	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$25.00	$300.00
TOTAL CASH OVERHEAD COSTS	$696.33	$396.33	$46.33	$46.33	$46.33	$46.33	$696.33	$46.33	$46.33	$46.33	$32.33	$32.33	$2,177.96
TOTAL CASH COSTS/ACRE	$730.83	$713.33	$401.83	$296.83	$502.83	$528.83	$1,366.83	$508.83	$956.83	$95.83	$56.83	$85.83	$6,342.46

Table 5. RANGING ANALYSIS: Carneros, Napa County 2009

COSTS PER ACRE AT VARYING YIELD TO PRODUCE WINEGRAPES

	YIELD in Tons/Acre								
	1	1.5	2	2.5	3	3.5	4	4.5	5
OPERATING COSTS:									
Cultural Cost	$3,231.50	$3,231.50	$3,231.50	$3,231.50	$3,231.50	$3,231.50	$3,231.50	$3,231.50	$3,231.50
Harvest Cost	$586.00	$636.00	$686.00	$736.00	$786.00	$836.00	$886.00	$936.00	$986.00
Interest on Operating Capital	$95.00	$96.00	$96.00	$96.00	$96.00	$97.00	$97.00	$97.00	$98.00
TOTAL OPERATING COSTS/ACRE	$3,912.50	$3,963.50	$4,013.50	$4,063.50	$4,113.50	$4,164.50	$4,214.50	$4,264.50	$4,315.50
Total Operating Costs/Ton	$3,912.50	$2,642.33	$2,006.75	$1,625.40	$1,371.17	$1,189.86	$1,053.63	$947.67	$863.10
CASH OVERHEAD COSTS/ACRE	$2,178.00	$2,178.00	$2,178.00	$2,178.00	$2,178.00	$2,178.00	$2,178.00	$2,178.00	$2,178.00
TOTAL CASH COSTS/ACRE	$6,090.50	$6,141.50	$6,191.50	$6,241.50	$6,291.50	$6,342.50	$6,392.50	$6,442.50	$6,493.50
Total Cash Costs/Ton	$6,090.50	$4,094.33	$3,095.75	$2,496.60	$2,097.17	$1,812.14	$1,598.13	$1,431.67	$1,298.70
NON-CASH OVERHEAD COSTS /AC	$2,811.20	$2,811.20	$2,811.20	$2,811.20	$2,811.20	$2,811.20	$2,811.20	$2,811.20	$2,811.20
TOTAL COSTS/ACRE	$8,901.70	$8,952.70	$9,002.70	$9,052.70	$9,102.70	$9,153.70	$9,203.70	$9,253.70	$9,304.70
Total Costs/Ton	$8,901.70	$5,968.47	$4,501.35	$3,621.08	$3,034.23	$2,615.34	$2,300.93	$2,056.38	$1,860.94

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE	YIELD (ton/acre)								
$/ton	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
$3,500	(412.50)	1,286.50	2,986.50	4,686.50	6,386.50	8,085.50	9,785.50	11,485.50	13,184.50
$3,750	(162.50)	1,661.50	3,486.50	5,311.50	7,136.50	8,960.50	10,785.50	12,610.50	14,434.50
$4,000	87.50	2,036.50	3,986.50	5,936.50	7,886.50	9,835.50	11,785.50	13,735.50	15,684.50
$4,250	337.50	2,411.50	4,486.50	6,561.50	8,636.50	10,710.50	12,785.50	14,860.50	16,934.50
$4,500	587.50	2,786.50	4,986.50	7,186.50	9,386.50	11,585.50	13,785.50	15,985.50	18,184.50
$4,750	837.50	3,161.50	5,486.50	7,811.50	10,136.50	12,460.50	14,785.50	17,110.50	19,434.50
$5,000	1,087.50	3,536.50	5,986.50	8,436.50	10,886.50	13,335.50	15,785.50	18,235.50	20,684.50
$5,250	1,337.50	3,911.50	6,486.50	9,061.50	11,636.50	14,210.50	16,785.50	19,360.50	21,934.50
$5,500	1,587.50	4,286.50	6,986.50	9,686.50	12,386.50	15,085.50	17,785.50	20,485.50	23,184.50
$5,750	1,837.50	4,661.50	7,486.50	10,311.50	13,136.50	15,960.50	18,785.50	21,610.50	24,434.50
$6,000	2,087.50	5,036.50	7,986.50	10,936.50	13,886.50	16,835.50	19,785.50	22,735.50	25,684.50

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE	YIELD (ton/acre)								
$/ton	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
$3,500	(2,590.50)	(891.50)	808.50	2,508.50	4,208.50	5,907.50	7,607.50	9,307.50	11,006.50
$3,750	(2,340.50)	(516.50)	1,308.50	3,133.50	4,958.50	6,782.50	8,607.50	10,432.50	12,256.50
$4,000	(2,090.50)	(141.50)	1,808.50	3,758.50	5,708.50	7,657.50	9,607.50	11,557.50	13,506.50
$4,250	(1,840.50)	233.50	2,308.50	4,383.50	6,458.50	8,532.50	10,607.50	12,682.50	14,756.50
$4,500	(1,590.50)	608.50	2,808.50	5,008.50	7,208.50	9,407.50	11,607.50	13,807.50	16,006.50
$4,750	(1,340.50)	983.50	3,308.50	5,633.50	7,958.50	10,282.50	12,607.50	14,932.50	17,256.50
$5,000	(1,090.50)	1,358.50	3,808.50	6,258.50	8,708.50	11,157.50	13,607.50	16,057.50	18,506.50
$5,250	(840.50)	1,733.50	4,308.50	6,883.50	9,458.50	12,032.50	14,607.50	17,182.50	19,756.50
$5,500	(590.50)	2,108.50	4,808.50	7,508.50	10,208.50	12,907.50	15,607.50	18,307.50	21,006.50
$5,750	(340.50)	2,483.50	5,308.50	8,133.50	10,958.50	13,782.50	16,607.50	19,432.50	22,256.50
$6,000	(90.50)	2,858.50	5,808.50	8,758.50	11,708.50	14,657.50	17,607.50	20,557.50	23,506.50

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE	YIELD (ton/acre)								
$/ton	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
$3,500	(5,401.70)	(3,702.70)	(2,002.70)	(302.70)	1,397.30	3,096.30	4,796.30	6,496.30	8,195.30
$3,750	(5,151.70)	(3,327.70)	(1,502.70)	322.30	2,147.30	3,971.30	5,796.30	7,621.30	9,445.30
$4,000	(4,901.70)	(2,952.70)	(1,002.70)	947.30	2,897.30	4,846.30	6,796.30	8,746.30	10,695.30
$4,250	(4,651.70)	(2,577.70)	(502.70)	1,572.30	3,647.30	5,721.30	7,796.30	9,871.30	11,945.30
$4,500	(4,401.70)	(2,202.70)	(2.70)	2,197.30	4,397.30	6,596.30	8,796.30	10,996.30	13,195.30
$4,750	(4,151.70)	(1,827.70)	497.30	2,822.30	5,147.30	7,471.30	9,796.30	12,121.30	14,445.30
$5,000	(3,901.70)	(1,452.70)	997.30	3,447.30	5,897.30	8,346.30	10,796.30	13,246.30	15,695.30
$5,250	(3,651.70)	(1,077.70)	1,497.30	4,072.30	6,647.30	9,221.30	11,796.30	14,371.30	16,945.30
$5,500	(3,401.70)	(702.70)	1,997.30	4,697.30	7,397.30	10,096.30	12,796.30	15,496.30	18,195.30
$5,750	(3,151.70)	(327.70)	2,497.30	5,322.30	8,147.30	10,971.30	13,796.30	16,621.30	19,445.30
$6,000	(2,901.70)	47.30	2,997.30	5,947.30	8,897.30	11,846.30	14,796.30	17,746.30	20,695.30

Table 6. WHOLE FARM ANNUAL EQUIPMENT COSTS : NORTH COAST - Napa County 2009

	ANNUAL EQUIPMENT COSTS			*scrap metal price/lb			$50/Ton
				napa recycle scrap metal dpt			2.5 cents/lb.
					Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Total
09	50 HP 4WD Narrow Tractor	$45,000	15	$ 150.00	$ 4,053.30	$ 202.50	$ 225.00	$ 4,480.80
09	Air Blast Gil 3Pt 200 gal	$15,000	5	$ 50.00	$ 3,371.45	$ 67.50	$ 75.00	$3,514
09	ATV 4WD	$8,000	10	$ 30.00	$ 987.52	$ 36.00	$ 40.00	$1,064
09	Bin 1/2 Ton #1	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
09	Bin 1/2 Ton #2	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
09	Bin 1/2 Ton #3	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
09	Bin 1/2 Ton #4	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
09	Bin 1/2 Ton #5	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
09	Bin 1/2 Ton #6	$500	10	$ 88.00	$ 65.17	$ 2.25	$ 2.50	$ 69.92
	Bin Trailer 3Bns #1	$3,000	25	$ 75.00	$ 195.03	$ 13.50	$ 15.00	$ 223.53
	Bin Trailer 3Bns #2	$3,000	25	$ 75.00	$ 195.03	$ 13.50	$ 15.00	$ 223.53
09	Mower-Flail 5'	$8,000	15	$ 62.50	$ 722.02	$ 36.00	$ 40.00	$ 798.02
09	Pickup Truck 1/2 Ton	$10,000	7	$175	$ 1,673.10	$ 45.00	$ 50.00	$1,768
09	Sprayer ATV 20 gal	$350	10	$ 62.00	$ 45.63	$ 1.58	$ 1.75	$49
09	Truck Flatbed 20 ft 2 Ton	$20,000	15	$ 275.00	$ 1,809.80	$ 90.00	$ 100.00	$2,000
	TOTAL	$115,350		$1,483	$13,444	$519	$577	$14,540
	50% of New Cost*	$57,675		$741	$6,722	$260	$288	$7,270

*used to reflect a mix of used and new equipment

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

After an analysis of current data including local grape prices and costs associated with setup, the total revenues from grape sales were weighed against the accumulated costs associated with the vineyard establishment and operation. The result was a reasonably profitable operation. The 10 acre vineyard is capable of generating $8,346 per acre at 3.5 tons per acre of production. This is the average production at Hyde Vineyards, the adjacent family owned vineyard.

Conclusions

After an examination of the result of the research done for the project, that a vineyard planting, if established with the proper knowledge of grape clones and grape vine cultivation and provided with reasonably priced labor, can yield a profitable crop over two or more decades starting in the third year. As the vines age reaches the first ten years of production, the quality of the fruit can be expected to increase and a higher price can be charged for the grapes. This is enough time for the vines to pay for themselves. A greater return on investment can likely be realized by developing land into real estate or by selling to developers; however that is not an

option due to zoning ordinances protecting agricultural land in Napa County. There is a considerable amount of work to be done in order to maintain the vineyard year round, however it is for personal enjoyment and not only for profit that this will be undertaken.

Recommendations

The planting of wine grapes is an endeavor that requires patience. It is typically five years before the vines reach full maturity and full production levels. Also, when growing vines, it is important to understand that uniformity among them is critical to achieving expectations of winemakers, who purchase the grapes and provide revenue. This means that not only must the product (grapes) be marketed, but the vines must be individually cared for to ensure the health and proper growth of the vineyard as a whole. Due to the established market and reputation for wine grapes I the region, farming the grapes is likely the most profitable agricultural land use. Furthermore, planting vineyard is an option that provides not only the beauty of nature and the outdoors to its caretakers but the satisfaction of having contributed to the winemaking process. If the grapes are grown to the site's full potential and the wine is made well, it can provide great wine that the grower can be proud to drink and have contributed to.

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