A Comparison of Costs and Returns for Organic and Conventional Cabernet Sauvignon Grape Production in San Luis Obispo County

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ABSTRACT

This study examined the differences in costs and profitability for established conventional and organic cabernet sauvignon vineyards the Edna Valley region of San Luis Obispo County, California. The study used a partial budgeting approach to compare cost and profitability for established vineyards for 2009, and thus ignored transition costs. Data were obtained from UC Davis cost studies for organic and conventional grape production in other regions of California in previous years. Adjustments made to these costs to account for changes in input use, input costs and grape prices in San Luis Obispo County during the 2009 growing season.

The basic costs were found the conventional costs were slightly higher than the organic, however with the partial budget change it was deemed 'unfeasible'. The study found that the profitability of established vineyards would be equal with a price premium of 1.08%. There were many limitations and estimations when doing this study such as secondary information and use of price indexing; therefore the price premium may be more or less depending on the vineyard.

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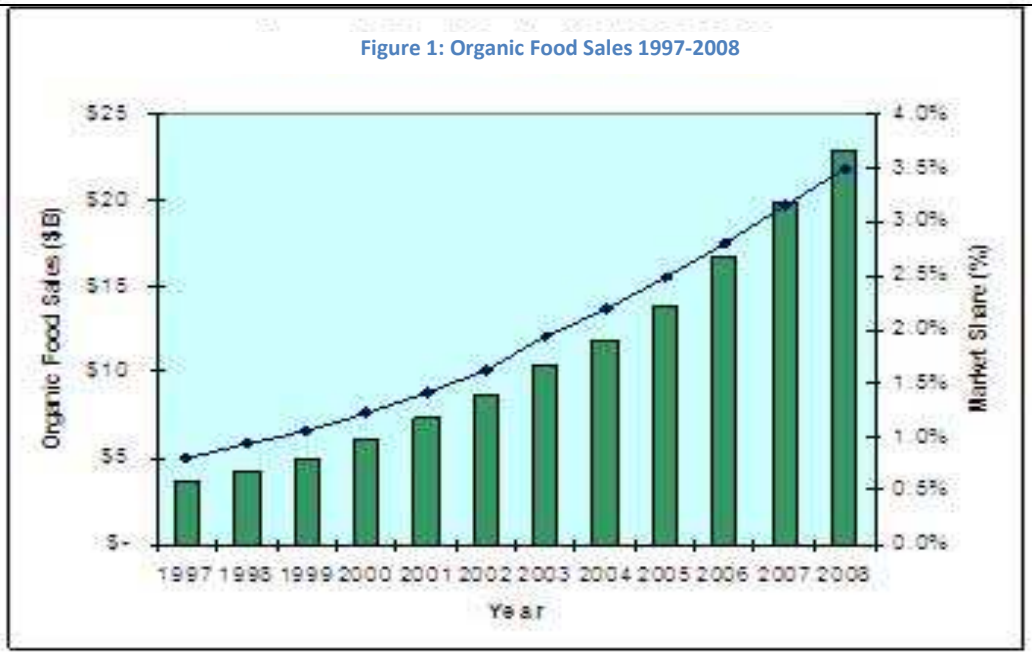
Chapter 1

INTRODUCTION

Organic products are becoming more available and could soon be mainstream staples. Though they are still considered "specialty" products, they are becoming popular enough that they may lose that designation. In the 1990's, organics were rare in conventional grocery stores, and could only be found in natural food stores like *Whole Foods*. With the success of *Whole Foods* and *Trader Joe's*, the organic trend has swept the nation. The market for organic goods has been steadily increasing during the last decade, and recently, interest for fully organic wine has increased also. Although wine that is made from organic grapes is popular, consumers are not necessarily willing to pay a higher price simply because they see an "organic" or "eco-friendly" label (Delmas and Grant, 2010).

The USDA's Economic Research Service (ERS) reported that organic sales in the U.S. increased from $3.6 billion in 1997 to $21.2 billion in 2008 (Dimitri and Oberholtzer, 2009). Over a longer time horizon, the growth in organic sales is even more impressive: from $178 million in 1980 to $10 billion in 2003, according to *BusinessWeek* (Cropper, 2004). *See Figure 1*. This growth is most likely because organic products are being found more in "big box" stores like Costco and Wal-Mart, making organics more affordable and available. Previously, organic products and private labels were found only in natural stores like *Whole Foods*, and were available at high prices. With many grocery stores bringing in private labels, such as Albertson's employing the *Wild Harvest Organic* label, the prices are nearing their conventional competitors' products and the variety of products are expanding. *Wild Harvest Organic* had 150 products in 2008 and planned to expand to 250 or 300 products total for Albertson's. According to the *Wild*

Figure 1: Organic Food Sales 1997-2008



Source: Ontario Ministry of Agriculture, Food and Rural Affairs

Harvest Organic website, grapes are one of the top 12 fruits and vegetables that should always be purchased organically because they tend to carry much higher levels of pesticides (*wildharvestorganic.com*, 2010). The USDA report also found that grapes are the most popular organic produce item purchased by consumers (Dimitri and Oberholtzer, 2009).

Overall, organic product sales are increasing, but an especially important area is the demand for organic wine. In the article "Sonoma County's Green Wine Summit 2010 Eyes Growing Demand for Organic wines" by Wanda Hennig, it was noted that the sales of organic wines were growing more rapidly in volume than the sales for conventional wines. Nielson reasearch found that organic wine sales had increased 13%, in comparison to 3% of conventional table wines during October and November 2009 (Hennig, 2009). Ultimately, with the demand for organic wine indicated by Nielson research, the acreage of organically grown grapes also is likely to increase. However, for a vineyard to be certified organic, it must go through a process to convert to organic practices. The farm can apply for organic certification only after it has completed the conversion process, which means it has complied with the organic procedures for three years.

In San Luis Obispo County, wine grape production is an important agricultural enterprise. As of 2009, estimates of the number of wineries ranged from 110 (*wineinstitute.org*, 2010; *sanluisobispoinfo.com*, 2010) to over 300 (based on other industry sources). According to the California Certified Organic Farmer's (CCOF) website, there were 11 organically certified vineyards in San Luis Obispo County as of March 4th, 2010 (ccof.org). With the demand for organic wines on the rise, the number of organic wineries throughout San Luis Obispo County is likely to increase. A key question, however, is the financial feasibility of this conversion.

The overall objective of this project is to assess the costs and returns of organic wine grape production after a conversion, in San Luis Obispo County compared to conventional wine grape production practices. For this purpose, costs and returns for a hypothetical organic vineyard were developed. The hypothetical vineyard being analyzed was assumed to be located in the Edna Valley appellation of San Luis Obispo County, California. It was already established as conventional vineyard on 35 acres of land. Thirty acres were planted with Cabernet Sauvignon grapes spaced 10' x 5' with 871 vines per acre. The other five acres contained irrigation machinery, equipment, roads, fencing and buildings. A five-year-old drip irrigation system was already established on the vineyard and had an additional 20-year lifespan. It was assumed that the vineyard was operated by the owner and that no money was due on the acreage. No operating loans were required for the conversion, the capital was assumed to come from the owner's retained earnings or other owner's equity.

Problem Statement

Based on growing interest by consumers in organic wines, opportunities may exist in San Luis Obispo County for increased organic wine grape plantings. Vineyard managers may be interested in converting from conventional to organic practices but are unsure of the costs and procedures required for an organic vineyard and of the profitability of organic grapes versus conventionally farmed grapes. This study will describe the necessary procedures and compare the profitability of organic wine grape production and conventional production practices.

Hypothesis

Conversion of the vineyard to organic wine grape production will be equally or more profitable than a conventionally-farmed vineyard.

Objectives

1. To find the costs associated with conventional grape production techniques and those associated with organic techniques for the hypothetical vineyard described above;
2. To compare the profitability of growing organic Cabernet Sauvignon wine grapes versus conventionally grown grapes for the hypothetical vineyard;
3. To determine the conditions under which organic grapes are more profitable than conventional grapes (such as price premiums for organic wine grapes).

Significance of the Study

In order for grape producers to keep up with the growing consumer demand for organics, more vineyards need to be established as organic or converted from conventionally farmed vineyards. It is often assumed that organic agriculture is a more expensive alternative to

conventional agriculture. This study was meant to satisfy in part farmers' concerns and consumers' curiosity about the economics of conventional verses organic viticulture. Through reading this report, consumers who are concerned about the price of organic products will understand the extra effort that price entails. Producers will have an improved understanding of financial and environmental advantages and disadvantages of organic farming, which may be slightly lower crop yields.

Because the vineyard was hypothetical, no individual vineyard will directly benefit from this study. Vintners in the Edna Valley also may derive useful information from this study. The information provided on organic certification could assist any producer interested in the process.

Chapter 2

LITERATURE REVIEW

Organics & Organic Certification

Organic agriculture is defined by the United States Department of Agriculture (USDA) as a farming production that promotes and improves biodiversity, biological cycles and soil biological activity (USDA, 2007). Organic producers should use products that improve the ecosystem, not work against it or pollute the soil, water or air. The USDA notes that organic producers must use non-polluting inputs that do not leave residue and that promote the health of the ecosystem and consumers of the product. Furthermore, organic livestock producers cannot administer antibiotics or growth hormones. Organic crop farmers cannot use traditional pesticides, synthetic fertilizers, sewage sludge (human waste), or procedures like irradiation or bioengineering (USDA, 2007).

Instead of conventional practices, organic producers use cover crops, animal manures, and composting for fertilizer and nutrients. To boost soil fertility and biological activity, farmers rotate crops; for livestock ranchers, grazing pastures are rotated. Integrated Pest Management (IPM), or biological control is sometimes used in place of pesticides to reduce crop pests. Biological control means natural predator insects are released to control the population of pests in the cropland. Each organic farm varies, but embraces many of the same principles: give back to the soil, maintain its fertility and ensure its renewability (USDA, 2007).

Table 1: Conventional vs. Organic Farming Techniques

Conventional farmers	Organic farmers
Apply [inorganic] fertilizers to promote plant growth.	Apply natural fertilizers, such as manure or compost, to feed soil and plants.
Spray insecticides to reduce pests and disease.	Use beneficial insects and birds, mating disruption or traps to reduce pests and disease.
Use chemical herbicides to manage weeds.	Rotate crops, till, hand weed or mulch to manage weeds.
Give animals antibiotics, growth hormones and medications to prevent disease and spur growth.	Give animals organic feed and allow them access to the outdoors. Use preventive measures — such as rotational grazing, a balanced diet and clean housing — to help minimize disease.

Source: Mayoclinic.com

All producers that wish to label their products as "organic" must be state certified by a USDA verified agency. California Certified Organic Farmers (CCOF), the state certifier that will be used in this study, is approved by the USDA in accordance with both the National Organic Program and international organic standards. The National Organic Program (NOP) is the organization that develops labeling for organics to ensure the producers meet the standards that are drawn up in the Organic Foods Production Act of 1990 (*Certification*, 2010).

The certification process, according to the CCOF website, involves four steps. Application for certification occurs only after the conversion has been made and is functioning as an organic entity. To begin, the farm or other production site must have proof that they have been following organic standards for the previous three years. To start the certification process, the processor, farmer, labeler, restaurant or whoever wants to become certified, contacts CCOF to obtain the application package. The application package contains the required forms and an

Organic Systems Plan (OSP). The OSP is completed once (then updated as needed) and is necessary for the producer to lay out what practices and procedures they followed to become, and remain organic. After forms are completed, a $275 non-refundable fee is due to CCOF. The next step is the inspection to ensure the entity is functioning under the NOP standards, and also any international standards they request verification for; this also has a fee that varies by size of the production. The final step is actually receiving certification, which takes six to ten weeks with CCOF (*Certification,* 2010). After certification, products may be labeled both USDA and CCOF Organic.

Vineyard Case Studies

Conversion from conventional viticulture to organic is a topic that is not yet widely researched and documented. Many farmers have made the switch, but few formal case studies of their experiences have been documented. The available case studies discuss the social and the financial aspects of the change. Some studies were conducted over short periods of time and did not allow generalizable conclusions. The studies read for this review analyzed changes over one year, five years, and 14 years. In addition, a working paper was collected that had reached no conclusions but was included in this review. No case studies were found that were based on California vineyards.

Conversions to organic viticulture and organic farming have been promoted and subsidized by a few countries. Therefore, many farms convert to organic because of their country's goals to become more environmentally friendly. This government-supported goal was noted by the one-year study done in the Vrendendal District located in South Africa (Hough and Nell, 2003). Other studies concentrate on the economic feasibility of converting their vineyards;

this was shown in the case studies of the working paper from Italy, the 14-year study in Australia and also the five-year study done in New York State (Vastola and Tanyeri-Abur, 2009; Wheeler and Crisp, 2010; White, 1995).

The economic studies compared the costs of growing grapes organically with the costs of conventionally growing grapes. Unfortunately, the studies did not include enterprise budgets and only listed certain findings. Overall, it was found that the input costs were higher, the most recent studies estimated 20-30% higher and this was primarily driven by labor costs (Vastola and Tanyeri-Abur, 2009; Wheeler and Crisp, 2010). The oldest study, from 1995 found the costs to be increased 69-91%, depending on variety (White, 1995). Averaged yields were between 5-35% lower White recorded the largest decrease in yields (Vastola and Tanyeri-Abur, 2009; Wheeler and Crisp, 2010; White, 1995). Given the higher costs and lower yields, most studies noted that for growing organic grapes to be economically viable, a price premium was needed. Hough and Neil found that price premium was normally 30% over conventional price points in South Africa. This was somewhat higher than the average organic price premiums compared to conventional of 20% for all U.S. produce (Biing-Hwang, et al; 2005). In practice, no price premiums were offered for organic produce from 1991 to 1995 as found by White (1995). However, White's results may no longer apply because the study is dated. In addition, the study assumed that a conventional vineyard was split down the middle and one side was farmed as "organic". The standards of the Organic Foods Production Act of 1990 were most likely not followed (it was not noted in the study), and it may not adequately represent current, most efficient production because of the very high costs found.

Vineyard Cost Studies

Previous cost studies of California wine grape production provide invaluable information for this study. Two vineyard cost studies done by UC Davis were used to create a basis and guide for constructing the theoretical vineyards figures regarding costs (Weber et al, 2005; Klonsky and De Moura, 2009). UC Davis releases studies for a variety of commodities, in multiple counties for different years, dating back to the 1930's. The two cost studies used in this study were chosen because they are similar in location, time frame, and varietal, which make them acceptable candidates to be the conventional "before" vineyard and the organic "after" vineyard.

The cost studies, *Sample Costs to Establish a Vineyard and Produce Wine Grapes*, and *Sample Costs to Produce Organic Wine Grapes* focused on the varietal Cabernet Sauvignon and its production in Napa County, California. The studies both describe "representative" rather than actual costs and outline the features of the vineyard, including the conditions of the vineyard site, specific vine spacing, trellis and training system, irrigation, pruning, pest and frost protection, cover cropping, fertilization, harvesting, yield, management, labor, cash and non-cash overhead expenses. Although representative, their detailed enterprise budgets, cash flow budgets, ranging analysis (for different yields), annual equipment, investment and overhead budgets and even hourly equipment costs provide useful information (Klonsky and De Moura, 2009; Weber, Klonskey and De Moura, 2005).

These costs are very specific and can be used by vineyard managers to estimate costs by adding their own input costs and units. The cost studies offer no hypothesis or conclusions. Rather, they report establishment and production costs.

Organic Demand Determinants

Economic determinants of demand are what drive a shift in the quantity demanded of a certain product. Generally, these determinants of demand are the following: consumers' income, population, prices of substitutes or compliments of the good and consumer tastes and preferences. Consumers' tastes and preferences, and ultimately their demand for a product can be influenced by media reports, advertising and promotion. For example, in 1991 Dr. Serge Renaud coined the term the "French Paradox" that attributed the healthy cardiovascular systems of the French people to red wine. After this report was aired in the United States on *60* Minutes, red wine consumption increased 44% from the previous year in the U.S. (Marin Institute, 2000).

Consumers considering organic can be swayed by studies and articles written about organic products and how they affect the outcomes consumers consider important. These reports can affect consumers' desire to eat healthier, do their part for the environment, or support small family organic operations. For example, a news report published in 2004 highlighted many health reasons consumers should choose organic products over conventionally farmed foods. Cropper encouraged pregnant women and children to eat organic, noting a study on fetal growth and pesticides. In the same article, she mentioned a study from the University of Washington that involved school children's diets and an additional study conducted by the Centers for Disease Control (CDC) (Cropper, 2004). Studies like this influence some consumers to change their tastes and preferences towards organic products, which shift the demand curve to the right (an increase). As consumers become more health conscience and environmentally friendly, the demand for organics continues to increase.

Enterprise Budgets and Partial Budgeting

Enterprise budgeting is a useful tool to assess the returns and costs of an enterprise per acre for an entire enterprise (e.g. a crop or herd). In contrast, partial budgeting can be used to find what the benefits and detriments of an alternative production practices or technologies would be, considering only changes in production practices.

Enterprise budgets are used on farms to estimate costs and potential revenues for a single enterprise. On a farm with multiple crops and livestock, each will have an enterprise budget; e.g., one for corn, one for dairy cows. In addition to creating different budgets for each commodity, they can also be made for different levels of production or technology. For crops, each item on the budget will be based on a per acre basis. An enterprise budget typically contains the estimated crop yields and estimated price, so the revenue per acre can be projected (Kay et al., 2008). It also contains each of the inputs for pre-harvest (variable) and post-harvest (variable). Inputs can include fertilizer, seed, labor, irrigation charges, and % of overhead. Each input will have a line on the enterprise budget that notes the unit of measure, the quantity required, price per unit and total price, on a per acre basis. Below the variable costs, the fixed costs are calculated; fixed costs can include machinery, taxes, land and management (Kay, Edwards and Duffy, 2008). After the estimated revenue and inputs for pre-harvest and post-harvest are calculated, the gross margin is determined (Total Revenue-Total Costs), along with break-even numbers. The break-even (B/E) for a crop can be calculated for the variable costs and the total costs: B/E price for variable costs is calculated as (Total Variable Costs) / (Yield per acre). The B/E for total costs is calculated the same way but with Total Costs in the numerator. A summary of the enterprise budget is also included; this calculates the returns over

variable costs, returns to land and management, net returns to land investment, the rate of return to land and the pure profit (Kay, Edwards and Duffy, 2008).

Partial budgeting is used on farms when changes are being made, such as converting from one enterprise to another, or analyzing several enterprises and their interchangeability. It can be used when considering increases in head of cattle, or to aid in the decision to lease or buy a piece of machinery or to plant more grapes instead of almonds. Kay et al. note that a partial budget compares benefits and costs of changing from one enterprise to another, or changes in practices for a given enterprise. The partial budget it set up like a 'T' account; on the left side, potential profits from the new enterprise or practice and the decreased cost of inputs from the enterprise or practice being replaced are considered benefits. On the right side, the amount of profit that will be lost from the enterprise being replaced is listed, and the increased cost of inputs from the new enterprise, are detriments. After both benefits and detriments are broken down, and each side is added up, they can be compared using two equations to determine the overall impact on the business (Kay, Edwards and Duffy, 2008).

Chapter 3

METHODOLOGY

Procedures for Data Collection

The objective of this project was to compare costs and returns for a conventionally farmed Cabernet Sauvignon wine grape vineyard and an organic one. The vineyard that was examined in this study was a "typical" vineyard, growing Cabernet Sauvignon wine grapes. Compared to other regions of California, there is a lack of information for organic vineyards in San Luis Obispo County, so this study will present the conversion from conventional to organic viticulture for that County. In addition to the possible environmental benefits of farming organically, this project will examine if there is the potential for increased profits from the production of organic wine grapes. There are many factors a vineyard needs to consider for an endeavor of this size. The data collected for this project can help managers comprehend these factors. These include the costs of the current operation's production, the costs of the current operation with organic input costs, determination of the profitability of growing organic grapes over conventional grapes, and the tools to conclude if converting is economically feasible. Ultimately, this study will determine whether organic net profits would equal or exceed conventional net profits.

Organic Certification

Farming organically can be a lifestyle choice, but in order to be able to sell product as organic, it must be certified by a USDA approved state organic certifier. The California state certification firm that was used in this study was California Certified Organic Farmers (CCOF), located in Santa Cruz, California. This company's website contained detailed information about the certification process to help producers through the change.

For interested producers, the CCOF website had Frequently Asked Questions about certification and the initial forms that had to be completed. While the organic standards documents could also be found on the USDA website, CCOF had a series of three manuals to guide producers. The first manual, *Manual One: CCOF Certification Process,* described responsibilities and rights of certified operators, the procedures of CCOF, costs of becoming certified, how CCOF certifies organic productions and how managers maintain organic certification. The second manual, *Manual Two: National Organic Standards, 7 CFR 205,* contained the USDA National Organic Program (NOP) Standards, which are the very detailed standards of how organic operations must be managed in order to achieve and maintain certification. This information was also found on the USDA website through the NOP section of the site. The detailed standards were located in the Organic Foods Production Act of 1995 (amended through public law 109-97, in 2005). This study will consider requirements to become USDA certified, but primarily will focus on the annual cost of certification.

Costs

The costs of certification were found on the CCOF website's certification section, but the costs for the actual conversion were not considered.

Because the vineyard was assumed to already be in production, the vineyard establishment costs had already been paid. The costs for the established vineyard were approximated from the 2009 study "Production and Sample Costs to Establish a Vineyard and Produce Wine Grapes-Cabernet Sauvignon" (Klonsky and De Moura, 2009). The new organic vineyard's costs were estimated from the 2005 study: "Sample Costs to Produce Organic Wine Grapes-Cabernet Sauvignon", and was also considered to already be established (Weber et al.,

2005). The data for the enterprise budgets was primarily collected from the UC Davis Cost studies. Although the values reported in this study are for Napa County, the majority of the inputs and quantity of those inputs were deemed an accurate estimate for San Luis Obispo County also. To assure that these numbers were appropriate accurate, experienced professionals were consulted (De Moura, 2010; Patterson, 2010; Welsh, 2010). Costs that changed in the organic vineyard were the costs for fertilizer, herbicides, fungicides and labor. The conventional inputs were eliminated and the costs for organic fertilizer, fungicides and weed control increased. These included costs for compost, organic fertilizer and fungicides, and the increased cost of machine labor required for weed control.

Table 2: Inputs Eliminated and Added

Conventional Inputs Eliminated	**Organic Inputs Added**
Chemical fertilizer	Organic fertilizer
Chemical Herbicides	Extra machine labor for weed control
Chemical Fungicides	Organic Fungicides

The additional cost of loss of yield during the 3-year conversion period when crops could not yet be labeled as "organic" was not considered in costs. Grapes could still be sold during the 3-year period, but because the vineyard was in the process of converting to organic, they were not able to use conventional pesticides, herbicides or fertilizer. Because of the losses to pests, weeds, and the lowered fertility, the yields may have been lower than their previous years under conventional farming.

Although these studies were done for the North Coast and Napa, the costs were considered a good estimate for vineyard costs, but were changed to reflect the needs and costs of San Luis Obispo County. This project used data from the available cost studies to estimate the costs of a conversion from one cost study to another. The existing cost studies were done on hypothetical vineyards, the organic vineyard for a one-year period, and the conventional over a slightly longer period because it included the costs of establishment. Only the production numbers costs and yields were used from the conventional cost study, which was the fifth year of the vineyard. The budgets were developed based on the same basic vineyard configuration before and after the conversion. The costs were changed to current San Luis Obispo County prices that could be located, and the differential needs of Napa were considered and changed, which only included the different frost protection. Costs and returns were considered for the 2010 season, as if the vineyard remained conventional and if the vineyard had made the conversion. Prices for the Organic study, done in 2005 were adjusted using the agricultural price index to reflect current prices. This was done by obtaining the 2009 Agricultural Prices document from the National Agricultural Statistics Service and using price indexing to update prices from 2005 to the most recent available prices, which were for 2008 (NASS, 2009).

Profitability

As in any financially successful operation, this vineyard is assumed to desire a higher profit. To determine 2010 Cabernet Sauvignon grapes price per ton, the previous three years of California's District 8 prices were averaged. The projected 2010 crop yields for the conventional vineyard were averaged from the previous five years crop yields in San Luis Obispo County (Department of Weights and Measures Crop Reports, 2005-2009). The organic vineyard's yield was reduced by 3% by recommendation from experienced professionals (Welsh, 2009). Because

of the possibility of no price premium, the budgets were given the same purchase price for their grapes. A necessary price premium was calculated as needed to make the profitability of the organic vineyard equal to that of the conventional vineyard.

Procedures for Data Analysis

Data Organization

The goal of this study was to examine if the profitability of converting to an organic vineyard would at least equal the profits earned from a conventional vineyard. The UC Davis cost studies' enterprise budgets were used as a template to create the enterprise budgets for the vineyard before, and after the conversion. Data specific to San Luis Obispo were incorporated into the budget and costs incurred only in Napa and the North Coast were eliminated. One cost that was eliminated was the wind machines used for frost protection. This cost was removed at the advice of experienced professionals because wind machines are not necessary for the Edna Valley wine region (Patterson, 2009). Additionally, the labor costs were changed to reflect those located on the Bureau of Labor Statistics website (Bureau of Labor Statistics, 2009). Finally, the costs for machine labor were increased 25% to reflect extra tractor work needed for weed control in the organic vineyard (Welsh, De Moura, 2009).

Microsoft Excel was used to organize the cost data into enterprise budgets. The cost data were expressed in dollars, the yield data were in tons and the inputs in their necessary measurement (e.g. hours, gallons, tons). The acreage and historical price data from the NASS website was available in Excel format and was imported for use in Microsoft Excel to assist in

estimating prices. The cost data regarding organic certification by CCOF was included in the enterprise budget by annual cost per acre.

Because current costs could not be located from other published sources, the prices for the enterprise budget were price indexed to the most current year available. In the *Agricultural Prices Summary* it has the recorded "Costs paid by farmers" from recent years (NASS, 2009). In order to update prices, the year from which the prices are from is located, along with the most current year (or whichever year that the prices are to be indexed to). In this case, the prices from the 2005 organic budget had to be updated to the 2008 prices. To do this, the cost of the 'current year' is divided by the cost of the 'base year' to get the 'price index'. Then, the cost-per-unit is multiplied by the 'price index' to equal the current cost of that product. This was done for each item on the enterprise budget, by farm category.

Analysis

Analysis of the budgets indicates the profitability of both vineyards. From the enterprise budget, break-even analysis was done, on the operating costs of both vineyards.

With the enterprise budgets completed, Excel was used to create a partial budget for substituting organic for conventional wine grapes in order to analyze the impact of the change. The benefits of the change were listed on the left side of the budget, and the detriments were listed on the right side. Benefits included the increased revenue from yields obtained from organic production (even if they were less than conventional production), and the decreased costs resulting from ceasing conventional production. The detriments included the lost revenue from conventional production, and the increased costs associated with farming organically. The two sides were summed (no negatives) and could then be compared using benefit to detriment

analysis and break-even analysis. The equations for Benefit-Detriment analysis used were: **B-D** and **B/D**: for the change to be beneficial, both equations should have been greater than 1 to indicate a positive change.

After analysis of the partial budget, price premium needed to equal a break-even change in production practices was calculated. Because it is possible that no price premium would be given, the analysis was initially done with the same price that the conventional grapes received.

Analysis of the certification costs entailed calculating the annual certification cost according to the Gross Organic Production Value (GOPV), which was calculated as all farm gate organic sales. This is simply the gross sales received from the grapes per acre. These costs were added to the organic budget.

The hypothesis may be proven or disproven through the analysis of the data collected. To be proven, the revenues of the organic vineyard, after conversion, must equal or exceed the expected revenues of the vineyard if it remained conventional. To reject the hypothesis, the costs associated with the conversion to organic will be found to exceed the revenues, and be less profitable than the previous vineyard and therefore not be worth the change.

Assumptions

One assumption for this study was that this vineyard was a “typical” or “representative” one, meaning there was not a specific vineyard this data was collected from, or for. It was assumed that the costs gathered and projected were accurate for San Luis Obispo County and were based on well-maintained vineyards. Also, it is assumed that the input prices and quantities were correct and current for the San Luis Obispo County setting and were the average amount used on a well-maintained vineyard in this area. Samples of these costs may not be typical to

every vineyard, though some sensitivity analysis was performed to reflect different market conditions. It was assumed that all projected crop yields modified for single year budgets were "typical": no extremely high yields or unexpectedly low yields, which are possible for either conventional or organic.

Limitations

As this was based on a theoretical vineyard and on industry averages, the study was limited in its availability to assist in actual conversion projects. The most accurate data for San Luis Obispo County was applied if available or when estimated was noted as such. The methods from this study could be applied to a specific vineyard's transition to organic viticulture, but prices should be changed to reflect current market prices and quantities to the necessary amounts required in that specific vineyard. To determine current costs, some were price-indexed, which may lead to inaccuracies. Additional information from a specific vineyard may replace or add to this project to make it more suitable for an actual vineyard. Any trade names, or firms mentioned in the data collection and analysis were in no way directly involved in this study, nor are they endorsed by this project. This project was limited by its use of secondary information. Also limiting this study was the short length of time available to gather, analyze and interpret data. Though it was assumed that projected yields were "typical", actual yields from year to year will vary and possibly have extremely low or high points.

Chapter 4

DEVELOPMENT OF THE STUDY

Data Collection Problems

This study would have benefitted from having access to more current, San Luis Obispo data. For example, an actual working budget obtained from a San Luis Obispo County vineyard would have eliminated any differences regarding the County. Additionally, Farm Supply was consulted for current agricultural prices, but was inadequate because they had only retail prices. Had these prices been available for producers, it would eliminate any errors in cost on the enterprise budget. Another section that would have made this study more comprehensive would be the actual costs of conversion from conventional to organic.

Analysis

The analysis shows operating costs for two vineyards are similar, with the organic budget being slightly lower. Therefore, these two types of production incur very similar costs. The partial budget favored the conventional vineyard over the organic vineyard with a negative benefit to detriment analysis. The price premium needed to favor the organic vineyard was also found.

To find current estimations of price and yield, production per acre from the previous five years was averaged. Additionally, a 3% loss was calculated from the estimated 2010 production to represent the organic vineyard's estimated production per acre. To calculate 2010 estimated price, the average of the last three years (2007-2009) was used. Because the 2006 price was so

low, and prices continued to increase from year to year, it was chosen to use only the last three years. These calculations can be found in table 3.

Table 3: Production and Price Estimates

Production Per Acre		**Estimated 2010 Production Per Acre**	
2009	3.993	No Loss	3% Loss
2008	2.408	3.913	3.79561
2007	3.752		
2006	4.067		
2005	5.345		
Price Per Ton		**Estimated 2010 Price Per Ton**	
2009	$ 1,031.66	$ 982.40	
2008	$ 1,003.82		
2007	$ 911.73	**1.08% Price Premium**	
		$ 993.14	

Conventional Vineyard Enterprise Budget

The conventional budget shows the 3.913 tons at $982.40 per ton, equaling gross sales at $3844.18 (Table 4). The operating costs of fertilizer, herbicide, fungicide, water, custom/contract, rent and assessment equal $3,206.05. The cost breakdown shows that the fertilizer, herbicide and fungicide account for around 5% of operating costs whereas labor is around 75% of operating costs. The water, which remains the same, is used for both irrigation and also through sprinklers for frost protection, as needed. The PCA contract work monitors the vineyard for pests, nutrition and water usage. Additionally, the rent of tractors and forklift apply to harvest time when extra machinery is needed.

The break-even yield for this budget is 3.263 tons, which is 0.649 tons LESS than this vineyard is expected to produce. The break-even price is $819.33, again less than expected return for this vineyard ($181.26/ton less). These break-evens show that the current vineyard would typically cover their operating costs.

Table 4: Conventional Enterprise Budget

2010 ENTERPRISE BUDGET

Cabernet Sauvignon Wine Grapes-Conventional

Cabernet Price per Ton =	$ 982.40			
Cabernet Yields per Acre =	3.913		Land Value =	$75,000
Revenues:	Quantity	Unit	Cost per unit	Value or Cost
Cabernet SALES	3.913	Acre	982.4	$3,844.13
Operating Costs				$/acre
Fertilizer:				
8-8-8 (10.2 lbs per gallon)	51.00	lb	$0.36	$18.36
Herbicide:				
Glyfos	1.00	pint	$6.17	$6.17
Fungicide:				
Wettable Sulfur 97	6.00	lb	$0.75	$4.50
JMS Stylet Oil	2.00	gal	$20.77	$41.54
Rally 40 WSP	4.00	oz	$5.50	$22.00
Flint	2.00	oz	$16.50	$33.00
Pristine	10.00	oz	$3.77	$37.70
Water: Irrigation & Frost Protection				
Water Pumped at (155,866 gallons)	5.73	acin	$16.50	$94.55
Custom/Contract:				
PCA (pest, nutrition, water monitering)	1.00	acre	$100.00	$100.00
Harvest labor	5.00	ton	$150.00	$750.00
Rent:				
Tractors (2)	4.00	acwk	$24.66	$98.64
Forklift (1)	2.00	acwk	$17.33	$34.66
Assessment:				
Labor (machine)	24.45	hrs $	11.77	$287.78
Labor (non-machine)	154.31	hrs $	9.03	$1,393.42
Fuel-Gas	28.77	gal	$3.36	$96.67
Fuel-Diesel	29.48	gal	$3.70	$109.08
Lube				$31.00
Machinery repair				$47.00
Total Operating Costs				$3,206.05
Gross Profit				$638.08
Break Even Yield (in tons)				3.263
Break Even Return				$819.33

Organic Vineyard Enterprise Budget

The organic vineyard enterprise budget shows the expected tonnage of 3.796 at $982.40 equaling $3728.81 gross return per acre (Table 5). The cost breakdown for the organic vineyard shows that a higher percentage, 6.5% accounts for fertilizer and fungicide; and the labor percentage was around 76%, only slightly higher than the conventional budget. For the organic vineyard, the fertilizer changed, no herbicides were used, fungicide changed, the organic certification was added as well as 25% added onto machine labor for weed control.

The break-even in tons is 3.201, which is 0.667 LESS than the expected yield. The break-even price is $154.91 LESS than the expected return. As with the conventional vineyard, the organic vineyard also would typically be able to cover their operating costs.

The Partial Budget Analysis

The Partial Budget analysis shows the detriments are more than the benefits of converting the vineyard (Table 6). This is shown by the negative $40.76 as well as the .994, which suggests that conventional production is more profitable. However, with a 1.08% price premium ($993.41 per ton), the organic vineyard would be equally as profitable as the conventional vineyard. Additionally, if the organic vineyard were to yield 3.84 tons, it would also be equally profitable. Both the yield and the price necessary for organic production to be as profitable as conventional production fall within the observed average annual values during the last five years.

Hypothesis

According to the analysis of the partial budget, the hypothesis “Conversion of the vineyard to organic wine grape production will be equally or more profitable than a

conventionally-farmed vineyard", must be rejected because the costs are greater than the benefits. However, the difference in net benefit is small enough that this result may not apply in every year or for an individual vineyard with somewhat different characteristics than the one analyzed here.

Table 5: Organic Enterprise Budget

2010 ENTERPRISE BUDGET

Cabernet Sauvignon Wine Grapes-Organic

Cabernet Price per Ton =	$ 982.40		
Cabernet Yields per Acre =	3.796	Land Value =	$75,000

Revenues:	Quantity	Unit	Cost per Unit	Value or Cost
Cabernet SALES	3.796	Acre	982.4	$3,728.81
Operating Costs				$/acre
Fertilizer:				
Potassium Sulfate Fines (0-0-50)	25.00	lb	$0.39	$9.72
Compost (includes haul & spread) 1/2 rate	2.00	ton	$73.17	$146.34
Fungicide:				
Thiolux Jet (micronized sulfur)	6.00	lb	$1.07	$6.44
Sulfur Dust (Wilbur Ellis)	60.00	lb	$0.20	$12.20
Serenade	4.00	lb	$7.45	$29.79
Water: Irrigation & Frost Protection				
Water Pumped	5.73	acin	$16.50	$94.55
Custom/Contract:				
Harvest: Hand	5.00	ton	$143.66	$718.28
Rent:				
Tractors (2)	4.00	acwk	$24.66	$98.64
Forklift (1)	2.00	acwk	$17.33	$34.66
Assessment:				
Organic Certification	1.00	acre	$60.00	$60.00
Labor (machine)	28.03	hrs	$ 11.77	$329.85
Labor (non-machine)	144.77	hrs	$ 9.03	$1,307.27
Fuel-Gas	11.80	gal	$3.36	$39.65
Fuel-Diesel	42.02	gal	$3.70	$155.47
Lube				$31.00
Machinery repair				$47.00
Total Operating Costs				$3,073.87
Gross Profit				$654.93
Break Even Yield (in tons)				3.129
Break Even Return				$809.85

Table 6: Partial Budget

Partial Budget Organic Wine Grapes for Conventional Wine Grapes

Benefits				Detriments			
Increased Yield:				**Decreased Yield:**			
Organic Grapes				Conventional Grapes			
3.796	tons at	$982.40	$3,728.81	3.913	tons at	$ 982.40	$3,844.13
Decreased Costs: Conventional Inputs				**Increased Costs:** Organic Inputs			
Fertilizer:				***Fertilizer:***			
				Potassium Sulfate Fines			
8-8-8 (10.2 lbs per gallon)			$18.36	(0-0-50)			$9.72
				Compost			$146.34
Herbicide:							
Glyfos			$6.17				
Fungicide:				**Fungicide:**			
Wettable Sulfur 97			$4.50	Thiolux Jet			$6.44
JMS Stylet Oil			$41.54	Sulfur Dust			$12.20
Rally 40 WSP			$22.00	Serenade			$29.79
Flint			$33.00				
Pristine			$37.70				
Custom/Contract		$	850.00	Custom/Contract		$	718.28
Labor:				***Labor:***			
Machine			$287.78	Machine			$329.85
Non-Machine			$1,393.42	Non-Machine			$1,307.27
				Organic Certification			$60.00
Total Benefit			$6,423.27	Total Detriment			$6,464.03

Benefit-Detriment=	($40.76)
Benefit/Detriment=	0.993694305

Break-even Quantity=	3.84
Break-even Price=	$993.14
Price Premium needed=	1.08%

Chapter 5

SUMMARY, CONCLUSIONS AND RECCOMENDATIONS

Summary

This project has presented the analysis of post-conversion costs and profitability for conventional and organic Cabernet Sauvignon vineyard. Sample budgets were collected for other regions and previous years, and modified to reflect current, San Luis Obispo County costs, prices, yields and needs. The two budgets were compared, analyzed and both types of production were found to both be profitable. However, organic production resulted in a small negative amount cost-to-benefit, which indicates that at a zero percent price premium, converting is not as profitable as conventional production.

Conclusions

Analysis of the two enterprise budgets, conventional and organic, indicates that both type of production are profitable. Both cover their operating costs and have additional funds to cover depreciation and other fixed costs. The partial budget analysis found that the conversion to organic would result in more costs (detriments) than benefits to the vineyard. Essentially, the hypothesis that conversion to the organic vineyard would produce equal or higher profits than the conventional vineyard after a conversion must be rejected. However, as stand-alone budgets, the organic vineyard actually has nearly $20 more gross profit than the conventional vineyard. It was found that with only a 1.08% price premium, the conversion would be an equal cost-benefit trade. As many of the costs were estimated, an each vineyard and cost structure is different; the 1.08% price premium may be possible for an organic vineyard to obtain. With different

practices, there may need to not need a price premium or a greater price premium may be needed.

Recommendations

For any producer deciding whether or not to convert their vineyard to organic, they should use their own budgets, or input their own prices into the enterprise budgets categories. Additionally, the cost of the actual conversion was not calculated and this is potentially quiet important. The costs needed to convert such as soil testing for carbons and residual non-organic chemicals; overall operating changes such as mechanized weed removal, as well as the revenues potentially lost due to lower yields during the three-year conversion must be taken into account. Also, the period required to pay off those costs would be important to a producer. In the larger scope, a market study for the San Luis Obispo area should be done to be confident that a market for their grapes would be available after converting to certified organic practices. If not, perhaps converting the vineyard to organic but not receiving the certification would be a desirable option.

Fellow researchers would benefit from having additional information and perhaps utilizing a physical site that has adequate budgets available. Though the UC Davis cost studies that were used was a good place to start, having actual numbers for a vineyard in the location for which the vineyard is located would be preferable. Use of current bulk/agricultural costs for inputs would be recommended, and would be more accurate than indexing aged costs. More time for this project to calculate the physical conversion and organic certification costs, estimate revenue lost, and organic certification costs is also recommended.

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