1992

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS TO PRODUCE ORGANIC WINE GRAPES IN THE NORTH COAST

With Resident Vegetation

Prepared by:

Karen Klonsky	Extension Economist, U.C. Davis
Laura Tourte	Postgraduate Researcher, U.C. Davis
Chuck Ingels	Information Analyst, Sustainable Agriculture Research and Education Program, U.C. Davis

Contributing Authors:

Rachel Elkins	Farm Advisor, Lake County
Pete Livingston	Staff Research Associate, U.C. Davis
Glenn McGourty	Farm Advisor, Mendocino County
Rhonda Smith	Farm Advisor, Sonoma County
Ed Weber	Farm Advisor, Napa County

Cooperating Growers:

Ron Bartolucci	Fetzer Vineyards, Mendocino County
John Clendenen	Preston Vineyards, Sonoma County
Bob Ellis	Mark West Winery, Sonoma County
Mary Hall	Buena Vista Winery & Vineyards, Sonoma County
Clay Shannon	Sutter Home Vineyards and Winery, Lake County

Revised 12/21/93

1992 - U.C. COOPERATIVE EXTENSION

OVERVIEW OF ORGANIC WINE GRAPE PRODUCTION IN THE NORTH COAST

Introduction:

Recently, many wine grape growers in the North Coast region of California have shown an interest in organic agricultural production techniques. This interest may be influenced by concerns about long-term soil health and crop viability and such factors as a desire to decrease the use of pesticides and synthetic fertilizers. Growers may also view organic production as a marketing tool to appeal to environmentally conscious consumers.

This overview is meant to guide the reader through topics and issues that are integral to organic wine grape farming. Like conventional farming, there are numerous approaches to farming grapes organically, from vineyard spacing and trellis design to floor management and agricultural inputs. The following is a discussion of common practices and issues related to organic wine grape production.

The first section of this overview describes the seasonal flow of operations for the production of organic wine grapes. Next, the cover crop and pest management sections give greater details of these practices. Finally, the current status of regulations for organically grown grapes and organic wine are discussed.

Production Practices:

Cultural operations often begin each year after harvest with a postharvest irrigation. Soil amendments are then applied to vineyard soils where tissue and soil analysis, as well as grower experience, have shown it to be appropriate. Mined limestone is commonly applied once every third year in many North Coast vineyards. This practice helps neutralize soil acidity (where applicable), adds calcium to soils, improves drainage, soil tilth and the overall availability of nutrients for crop production. Alternatively, growers in some areas may apply gypsum to manage soil fertility and soil nutrient levels. Gypsum adds calcium and sulfur for crop production and can be used to improve soil tilth with soils high in sodium. Soils deficient in phosphorus may receive applications of rock phosphate and/or bone meal. Sulfate of potash may be banded under the vines each year to boost and maintain potassium levels. A compost of various materials (including manures and grape pomace) can be spread either in vine rows and centers or vine rows only depending upon the amount applied and the purpose of the application. For example, growers may spread compost in vine rows and centers to increase soil organic matter throughout the vineyard, stimulate soil microbial activity and increase overall nutrient levels. Alternatively, growers may choose to spread compost in vine rows only as a means of supplying nutrients specifically for crop production. The above operations are performed in September, October or November depending upon when harvest occurs. Seeded cover crops are planted and irrigated up directly after these operations. Alternatively, if resident vegetation is used as a cover crop, then no specific seeding operations or cover crop irrigation is performed.

Vineyard pruning takes place in December, January and February. Vine training wires are moved downward during pruning operations to prepare the trellis system for the new year's growth. This is included as an operational cost for pruning. The timing of pruning operations is critical; early pruning causes wounds to be more susceptible to Eutypa dieback (*Eutypa lata*) if rains should occur in December and also may expose spurs and canes to freeze damage following a mild fall, especially in the northern mountain areas. Prunings are thrown into the centers and shredded and chopped with a mower/chopper. This practice is performed either immediately after pruning or later in the season in conjunction with spring mowing, depending on vineyard floor management practices.

A dormant spray of lime sulfur may be applied in January in some vineyards. This practice can help decrease disease and insect pressures from powdery mildew (*Uncinula necator*), mite pests and overwintering insects within the vineyard. One trade-off, however, is that lime sulfur applications usually increase mortality rates for predaceous mites. The use of lime sulfur is therefore not a common practice among many organic growers, but might be used as an alternative pest control measure following years with severe pest pressure.

Powdery mildew is controlled by multiple applications of sulfur in the spring and summer months. In general, and depending on management technique, a wettable sulfur is applied with an air blast sprayer every 7 to 14 days beginning mid to late March when growth is between budbreak and two inches. Alternatively, some growers may choose to apply dusting sulfur with a duster during this time. Later in the season, however, most growers will apply dusting sulfur to vines every 7 to 14 days to speed operations, decrease costs and increase the material's effective coverage. Grower experience indicates that sulfur dust applications may also increase mortality rates for predaceous mites.

Frost protection can be accomplished by either overhead sprinklers or wind machines. When vines are irrigated with drip irrigation, frost protection by either method represents an additional investment. Substantial variation exists among the counties in the number of nights per year that frost protection is necessary. The following table lists the average frost protection requirements by overhead sprinklers among North Coast counties.

Average Frost Protection Requirements

County	Nights/Year	Hours/Night
Lake	12-18	8
Mendocino	10	6
Napa	6	6
Sonoma	6	5

Hand vine care, which takes place from April through July, includes a number of operations. Shoot thinning and suckering (removal of water sprouts), takes place in April and May. Vine training wires are moved three times (in April, May and June *or* May, June and July depending on the vineyard location) to support and accommodate vine and grape growth. Leaf removal is performed after bloom and fruit-set to help control bunch rot (*Botrytis cinerea*) and possibly decrease leafhopper populations.

The delivery method and the amount of water applied to vines may vary from county to county and vineyard to vineyard. Water is generally applied to vines from May through August. Most of the water is applied early to mid season, with less applied closer to harvest. Total applied water will be dependent on seasonal rains, rooting depth, the amount of moisture stored in the soil profile and how vineyard floor vegetation is managed. Also, soils with increased levels of organic matter may be better able to retain moisture and therefore decrease the amount of applied water.

Harvesting may be done by hand or by machine depending on the vineyard design. Generally, a custom operator manages the harvest. Depending on the county, grape variety and the yearly conditions, harvest can take place over the period of late August through mid November.

Yields of organically grown and conventionally produced wine grapes are similar, and can range from approximately three to nine tons per acre. Yields will vary depending on a number of factors including the vineyard design, grape variety, vineyard age, county of production and yearly growing conditions. Average yields for all grape production are shown for the various counties in the following table.

Average Yields for all Grape Production in the North Coast*****

County	Average Yields (tons/ac)	
	White	Red
Lake	5.90	4.50
Mendocino	5.07	4.09
Napa	4.81	4.44
Sonoma	5.54	4.42

*Source: Final Grape Crush Report 1991 Crop

Commodities that are produced organically can often be sold for a higher price than conventionally grown products. However, few pricing premiums for organic wine grapes currently exist. Therefore, grower returns for both organic and conventional wine grapes are usually the same, and can range from approximately $300 to $1,700 per ton depending on the grape variety and quality, county of production and current market conditions. Average returns for white and red varieties are shown for the various counties in the following table.

Average Value for all North Coast Wine Grapes*

County	Average Returns (tons/ac)	
	White	Red
Lake	773	783
Mendocino	839	707
Napa	1,199	1,257
Sonoma	1,034	990

*Source: Final Grape Crush Report 1991 Crop

Cover Crops:

Cover crops can be beneficial for the production of organic wine grapes in a number of ways. If leguminous cover crops are used, soil nitrogen may be increased through nitrogen fixation. Water penetration and infiltration may be improved by root growth of the cover crop and by returning organic matter to soils. Microbial activity, often stimulated by cover crop root exudates and organic matter additions to soils, has been shown to promote soil aggregate stability. Microbes also enhance the decomposition process by breaking down organic matter and releasing nutrients in a form that crops can more readily use. Increased organic matter can also improve the soil's ability to retain moisture. Hilly North Coast vineyards with substantial bare ground may benefit from planting cover crops to help control erosion. Cover crops increase the plant diversity of the vineyard and can provide nectar to attract and sustain beneficial arthropods (insects, spiders, and predatory mites). Cover crops can also reduce dust problems in vineyard systems which in turn can help reduce spider mite pests. Weed suppression may be another direct benefit of cover cropping depending on the species or mix selected. Lastly, farm machinery may be able to enter vineyards earlier and later in the season in situations where a cover crop's (especially perennial cover crops) mat of root and vegetative growth provides support on wet soil. This may also serve to reduce soil compaction.

There may also be some disadvantages with using cover crops in vineyards. Cover crops increase cash costs for seed and labor, and may require the rental or purchase of additional farm machinery. Competition between vines and cover crops may increase the need for additional inputs such as water and nutrients. This should be taken into consideration because water may be in short supply in some North Coast vineyards. Some growers, however, view the cost of planting and maintaining a cover crop as the cost of producing nitrogen and/or improving soil quality for the long-term. Vine row cover crops, which are sometimes used to suppress weeds in no-till systems, may provide a habitat for vertebrate pests which can damage vines. Cover crops may also attract arthropod pests to the vineyard. Another disadvantage of cover cropping may be that air and soil temperatures are lowered by substantial vegetative growth on the vineyard floor. This could increase the possibility of frost damage. Cover crops are often closely mowed or disced under during critical frost periods to overcome this problem. Reduced soil and air temperatures may also delay bud break.

Selection of a particular cover crop species should take into account the yearly production cycle of the vine crop as well as the climate, which dictates the planting time and winter cold tolerance of the cover crop. Also, growers should select cover crops for the specific needs of a vineyard. For example, if soil nitrogen is in short supply, then a leguminous cover crop may be preferred. If, however, increased soil organic matter is desired, then a cover crop that includes legumes, grasses and other species for biomass production may be the best alternative. In addition, the soil type and the irrigation system should be taken into consideration. Growers in some areas may find that certain cover crop species and mixes are not suitable for their soils and conditions. Often, the most suitable cover crop in each situation is determined by observation and experimentation over a period of years.

In this production region several different legumes, perennial grasses, and annual grasses are commonly planted as cover crops. Alternatively, resident vegetation is often managed as a cover crop. There are a number of options for managing annually sown cover crops. If sown in the fall, the cover crop is generally irrigated up with one to three inches of water depending on the planting date, the amount of moisture stored in the soil profile and seasonal rains. After this time, cover crop growth is often dependent on fall and winter rains. In years when sufficient soil moisture exists and/or early fall rains occur, no irrigation for cover crop germination may be necessary. Also, vineyards without overhead sprinkler systems generally rely on fall rains for cover crop germination.

In the spring months management practices for annually sown cover crops depend upon grower preference and the needs of the vineyard. For example, some growers will mow the cover crop and incorporate the residue by discing to reduce competition between the cover crop and vines for water and nutrients. This practice is also performed to speed decomposition of the vegetation and recycling of nutrients. As an alternative after the initial cover crop mowing, the residue may be left on the soil surface to decompose more slowly. This practice is often preferred by those growers whose goal is to minimize tillage operations and improve soil tilth and structure for the long-term. Growers may then disc or mow periodically during the summer to keep vineyard floors free of vegetative growth, or plant a summer annual cover crop to maintain a diverse habitat within the vineyard. Costs will vary accordingly.

Some growers may use yet another strategy for managing annually sown cover crops. In this case, only a portion of the rows of the cover crop are mowed initially to reduce some of the above ground biomass. The remaining cover crop rows will continue to provide sufficient habitat to sustain beneficial insect populations that are already present in the vineyard. Grower experience indicates that the number of insect pests that move to the vines may be reduced when a portion of the cover crop remains. With regrowth of the cover crop in the mowed rows, the remaining (unmowed) rows are then mowed and disced. Therefore, a portion of the cover crop will remain growing in the vineyard for a longer period of time as an insect attractant. The disced rows may be left bare or reseeded with a summer annual cover crop depending on the management practices and the availability of water. Later in the season or after germination and growth of the planted summer cover crop occur, the remainder of the winter sown cover crop will generally be mowed and disced under. Periodic discings may be performed in these rows during the summer months.

Fall irrigation is generally unnecessary when resident vegetation is managed as a cover crop. Growth of this cover crop is dependent on moisture in the soil profile from fall and winter rains. No tillage operations are generally performed in the spring to incorporate vegetative growth, however resident vegetation is mowed periodically in the spring and summer months to reduce the above ground biomass. In the warmer summer months resident vegetation dies back; little or no management is therefore required during this time. However, overall vineyard irrigation requirements are increased because of competition between the vegetation and the vine growth. Alternatively, resident vegetation may be handled similarly to a planted cover crop in that it is disced in the spring.

Pest Management:

Most pesticides that are currently used by producers of conventionally grown wine grapes are not approved for use by organic wine grape growers. Sulfur is a notable exception. In general, pest control products used by organic growers are not as effective for immediate or acute problems as are those products used by conventional growers. The cost for some organically acceptable pest control methods may also be prohibitive for some growers. Therefore, vineyard monitoring, pest identification and pest prevention are essential elements of successful organic wine grape production.

The incidence of certain diseases such as bunch rot and powdery mildew can be increased by moist, humid weather and spring and fall rains. Bunch rot can often be decreased by removing leaves around grape clusters after bloom and fruit-set to open the vine canopy to sunlight and increase air circulation. Vineyard leaf removal is generally performed one time only, however, in years with increased bunch rot incidence, a second leaf removal operation may be necessary. The incidence of powdery mildew is lessened with sulfur applications. In spite of the potentially greater disease incidence in organic vineyards, yields for organic wine grapes in the North Coast are generally equal to those in conventional culture**.**

Leafhopper and mite problems may be lessened with applications of insecticidal soap and pyrethrin. Insecticidal soaps are derived from plant oils or animal fats and are allowed for use by organic growers. Pyrethrin is considered a botanical pesticide, or a pesticide derived from a naturally occurring plant source. Therefore, it is an acceptable method of insect control in organic farming in California, *provided it does not contain the synergist piperonyl butoxide*. A soap/pyrethrin mix may be applied one time only in late spring or early summer when temperatures, and thus insect activity, increase. However, many organic growers use pyrethrin and/or soap on a limited basis or as an emergency pest control measure only. For one reason, grower experience indicates that pyrethrin use will decrease the number of predatory mites and beneficial insects in the vineyard. The exact application rate and the number of acres treated will depend on the vineyard location and the extensiveness of pest infestations. Leafhopper populations may also be lessened when leaf removal operations are performed, as some nymphs (young leafhoppers) will be removed at the same time. Also,

coverage by the pyrethrin and/or soap spray in the fruit zone will be greater when the vine canopy is opened. Growers should be certain that any materials used are in compliance with the rules and regulations of state and third party organic certification agencies. (Refer to the **Regulations of Organically Grown Commodities** section.)

Many beneficial arthropods, such as parasites and predators, occur naturally within organic vineyards. When the parasitic wasp, *Anagrus epos*, is present in vineyards, it can be helpful in controlling the grape leafhopper (*Erythroneura elegantula)*. However, *A. epos* requires an overwintering habitat with alternate hosts to survive in or near vineyards on a year-round basis. Research indicates that refuges, which can occur naturally (wild blackberries) or are planted (prune trees), harbor alternate host leafhoppers and may therefore attract and sustain this parasitic wasp during the winter. When these plants are growing in or near the vineyard, parasite activity will usually be higher earlier in the spring. It should be noted that blackberries and other plant species growing in neighboring riparian areas can also serve as a host to sharpshooter leafhoppers, which are vectors of Pierce's Disease. Predaceous arthropods such as spiders, lacewings, and lady beetles can also lessen overall insect pest damage within the vineyard and should therefore be encouraged to proliferate by providing an appropriate habitat (cover crops) and avoiding insect and dormant sprays whenever possible.

Vineyard weeds are most often controlled by discing or mowing centers and by cultivation with a French plow (or a comparable implement) in the vine rows. Hand weeding is often used in addition to mechanical cultivations as a means of vine row weed control. The number of mechanical cultivations, mowings and/or hand weedings may vary among growers. Therefore, production costs may also vary. Some growers are currently using or experimenting with flame weed control in the vine rows. Weeds are not actually burned back; the plant's cells burst upon exposure to the high temperatures a flame weeder produces. This practice essentially kills and eliminates the targeted plants. A few growers are also testing the "mow and move" approach, where cover crop clippings are deposited under the vine row to suppress weed growth.

Regulations of Organically Grown Commodities:

As of January 1, 1992 all growers of organic commodities must register on a yearly basis with the State of California under the California Organic Foods Act of 1990, AB 2012. Enforced under this act are the provisions of Article 4.5 (commencing with Section 26569.20) of Chapter 5 of Division 21 of the California Health and Safety Code. These provisions contain rules and regulations which must be adhered to by all producers and handlers of organic commodities. State law requires that growers follow the necessary guidelines for at least 12 months prior to becoming organic. State registration fees are levied based on the previous year's gross sales. Fees are payable before any sales of the commodity occur.

In addition to state registration, some growers may choose to be certified by a third party certification agency. Third party agencies were formed to set forth and monitor standards for organic production. Before state laws began to govern organic commodities, third party agencies were often the only means to verify that products were, in fact, organically grown. Third party organizations must adhere to all state laws regulating organic commodities, and in addition may enforce standards and procedures specific to their own agencies. Differences between organizations may also occur in the certification process and the associated costs. Farm advisors in your area of interest may be able to provide additional information or assistance.

California Certified Organic Farmers (CCOF) is one of a number of third party organizations in the United States which can certify organic growers within the State of California. CCOF adheres to the standards of the California Organic Foods Act of 1990 as well as its own procedures and standards. Certification by CCOF is voluntary. CCOF currently requires a three year transition period when converting from conventional production practices to organically acceptable methods.

On October 1, 1993, the federal Organic Foods Production Act of 1990 was to become effective. However, due to budget constraints, implementation of the law will be delayed for at least one year. When implemented, the act will regulate all organic commodities on the national level and will preempt state law where state law is less stringent than federal law. The Secretary of Agriculture has appointed a National Organic Standards Board (NOSB) to make recommendations for implementing the law, including the compilation of a national materials list. This list will indicate which agricultural materials are permissible and which are prohibited in organic agriculture on the national level. The original directive of the Organic Foods Production Act stated that organic growers did not need to register on the federal level. Growers were, however, to be certified by a third party certification agency or a state agency. This requirement was to be different from, and

in addition to, California state registration. Because of budget cuts and implementation changes, organic grower's registration requirements may be different than the original directive when the law is finally enacted. Therefore, organic growers and other interested parties should use this information as a guideline only. To comply with the federal law in its current form, growers making the change from conventional to organic must complete a three year transitional period. This means that growers within California must already be in transition to be certified organic on the federal level by the law's anticipated implementation in 1994.

Organic Production Versus Organic Processing:

California has seen a substantial increase in acreage dedicated to the production of organic wine grapes in the last two years. In 1990 CCOF reported that wine grape acreage certified organic or pending certification totaled 5,816 acres. By 1991 this figure had increased to 10,120. Because this figure does not necessarily include all state registered growers, it may represent only a portion of the total organic acreage. However, it is the only data currently available.

California currently follows the standards and guidelines of the Organic Foods Act of 1990 to regulate processed organic products, including organic wine. At issue in the winemaking process is the matter of naturally occurring versus added sulfites. Sulfites are naturally produced at extremely low levels during the wine fermentation process (generally 10 parts per millions (ppm) or less). Also, sulfites are normally added during wine processing to decrease the risk of oxidation and microbial spoilage. Under the California Organic Foods Act of 1990, sulfite additives are prohibited. Therefore, wines with added sulfites may not be labeled organic by California state law regardless of whether or not the wine grapes used in processing were organically grown. However, these wines may claim to be processed from organically grown wine grapes. When no sulfites are added, but do occur naturally, wines may be labeled organic under California state law provided all regulations governing organic commodities are adhered to and that 100% organically grown wine grapes are used. Organic wines currently represent only a very small segment of the market.

In addition to state rules and regulations, the United States Bureau of Alcohol, Tobacco, and Firearms (BATF) mandates that any wine that contains greater than 10 ppm sulfites be labeled as a product that contains sulfites. The maximum level of sulfites currently allowed in any wine by the BATF is 350 ppm.

An organization of wine grape growers, winemakers, distributors, and wholesalers, the Organic Grapes Into Wine Alliance, is currently addressing the issue of organic wine standards on the federal level with the NOSB. The alliance would like to develop a standard definition of organic wine, and to develop minimum standards by which organic wines can be processed, including the limitation and regulation of sulfites. Federal standards for processed organic foods and wines are targeted for enactment in late 1994. It is not yet clear how this will ultimately affect California legislation governing organic wines. However, the alliance hopes that eventually standards will be initiated on both state and federal levels which are in alignment with international regulations, thus enabling trade throughout the United States and the world.

1992 - U.C. COOPERATIVE EXTENSION

ORGANIC WINE GRAPE COST AND RETURNS STUDY
General Information

The practices described for the hypothetical organic vineyard used in this report are considered common for wine grapes in the North Coast. Sample costs given for labor, materials, equipment and contract services are based on 1992 prices. The use of trade names is not an endorsement or a recommendation. A blank **Your Cost** column is provided to enter your actual costs on **Table 1 Costs Per Acre to Produce Organic Wine Grapes - Operations** and **Table 2 Detail of Costs Per Acre To Produce Organic Wine Grapes - Inputs**. Some costs and practices detailed in this study may not be applicable to your situation. This study is only intended as a guide and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

This report consists of the set of **Assumptions For Producing Organic Wine Grapes** and six tables.

Table **1.** **Costs Per Acre To Produce Organic Wine Grapes - Operations**
Table **2.** **Detail of Costs Per Acre To Produce Organic Wine Grapes - Inputs**
Table **3.** **Monthly Cash Costs Per Acre To Produce Organic Wine Grapes**
Table **4.** **Annual Equipment, Investment And Business Overhead Costs For Organic Wine Grape Production**
Table **5.** **Hourly Equipment Costs For Organic Wine Grape Production**
Table **6**. **Ranging Analysis**

For an explanation of calculations used for the study refer to the attached assumptions, call the Department of Agricultural and Resource Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3563 or call the farm advisor in the county of interest.

A second cost study entitled "*Sample Costs To Produce Organic Wine Grapes In The North Coast With An Annually Sown Cover Crop"* is also available in conjunction with, or as an alternative to, this report.

A companion study entitled "*Sample Costs To Establish A Vineyard And Produce Wine Grapes In Sonoma County - 1992*" is availabl**e** for those interested in vineyard establishment costs and for production costs of conventionally grown wine grapes.

The above studies can be requested through the Department of Agricultural and Resource Economics, U.C. Davis, or from selected county Cooperative Extension offices.

University of California and the United States Department of Agriculture cooperating.

Assumptions For Producing Organic Wine Grapes
In The North Coast
With Resident Vegetation

This study reflects the practices and costs associated with a production system for organically grown wine grapes in the North Coast region of California. While every effort is made to model a production system based on real world practices, this report cannot fully represent the costs and practices that are specific to each vineyard, or the variations that exist between the four counties which comprise this region. Therefore, this study should be interpreted as a representative operation and not as a statistical average.

The vineyard in this report is assumed to have been established as a conventional vineyard for wine grape production. It is considered to have completed the transition period and is registered and certified as organic. Changing a farming system from conventional to organic practices requires a transition period. State and third party certification agency rules and regulations which are specific to organic commodities must be adhered to during this time period. Crops grown in transition years may not be sold or labeled as organic. Commodities that are produced organically can often be sold for a higher price than conventionally grown products. However, few pricing premiums for organic wine grapes currently exist.

The following is a description of general assumptions pertaining to sample costs for organic wine grape production with resident vegetation in the North Coast region. The costs are based on common practices used by local growers and may not be applicable to all situations. Production practices and vineyard management techniques are generally individualized to meet the specific needs of each grower. These costs are represented on an annual per acre basis.

1. LAND:

The total vineyard size is 37 acres. Land is owned by the grower and is valued at $13,000 per acre. This figure is within the low and high ranges of values for undeveloped land with vineyard potential for the four counties that comprise this region. Land costs per acre will vary within the region and within each county. Land is not depreciated. Land is assumed to be level, with well drained soils of moderate depth and fertility. The following table shows the range of values for land suitable for vineyards in each county.

Range of Vineyard Land Values in the North Coast Counties*

County	Land Value Ranges ($/ac)
Lake	4,000 - 5,500
Mendocino	6,000 - 7,000
Napa	17,000 - 30,000
Sonoma	10,000 - 25,000

*Source: Thomas Jordan, Associated Service Appraisal Partners, Napa, Ca.

2. VINEYARD ESTABLISHMENT:

The establishment cost is the sum of the costs for the land preparation, trellis system, planting, vines, cash overhead and production expenses for growing the vines through the first year that grapes are harvested (year three). The vineyard establishment cost is used to determine the non-cash overhead expenses, depreciation and interest on investment during the production years. (For more detailed information on this cost refer to the companion study ***Sample Costs To Establish A Vineyard And Produce Wine Grapes In Sonoma County - 1992***).

3. VINES:

Grape variety is not specified in this study. Vines are planted on a 7' x 11' spacing with 566 vines per acre. Vines are cordon trained and spur pruned. The vineyard life is assumed to be 22 years beyond three establishment years.

4. TRELLIS SYSTEM:

A vertical shoot positioned trellis is utilized with a five wire design; a lower, or fruiting wire, and two pair of movable wires above. Wires are attached to lodgepoles which are placed at every fourth vine. The drip irrigation line is attached to the permanent (lower) wire. The movable wires are adjusted three times (May, June and July) during the growing season to accommodate vine and grape growth.

5. DRIP IRRIGATION:

Water for the drip irrigation system is pumped from a depth of 150 feet in a 200 foot well using a 10 horsepower (hp) pump. Pressure at the discharge head is 35 pounds per square inch (psi) and produces a flow of 125 gallons per minute (gpm). The cost for the drip irrigation system includes the 10 hp pump, the filtration system, all drip lines, emitters and labor charges for installation. In addition, 100% of the cost to refurbish the well is included in the cost of the drip irrigation system. The irrigation system has a 25 year lifespan, is an improvement to the property, and is therefore included in **Table 4** as an investment.

The amount of drip irrigation water applied for crop growth is assumed to be 400 gallons per vine per year or approximately two-thirds of an acre-foot per acre. The amount of water applied through the drip system to irrigate the vines relates to the vineyard floor management practices. Resident vegetation will complete with vines for soil moisture. Therefore, additional water must be applied to vines. (See the **cover crop** section below). The pumping cost for irrigation water is estimated at $23.40 per acre-foot. This vineyard is irrigated with the drip system between May and August.

6. OVERHEAD SPRINKLERS/FROST PROTECTION:

In this study, an overhead sprinkler system is used for frost protection and for postharvest irrigation. The entire system consists of a 20 acre-foot reservoir, a 1500 gpm pump powered by a diesel engine, a permanent underground pipeline, and solid set sprinklers. Water for the indicated operation is pumped from the well into the reservoir and stored there until needed. This system has an expected 25 year life, is considered an improvement to the property, and is therefore included as an investment in **Table 4.**

Three inches of water per acre is applied for the postharvest irrigation. Frost protection is assumed to be necessary 12 nights per year at six hours per night. Each frost protection application is equal to approximately one-half inch of water per night per acre. Frost protection takes place over the period from March through May. Annual water application through this system on all 37 acres is 19.70 acre-feet total for the postharvest irrigation and for frost protection. The cost of the water for overhead sprinkler operations is $34.80 per acre-foot. The cost difference between water for drip irrigation and for sprinklers is due to the extra pumping required to move the water from the reservoir through the overhead sprinklers. These figures are within a range of use and costs for the North Coast and will vary among the counties.

7. YIELD & RETURN RANGES FOR ORGANIC WINE GRAPES:

For the hypothetical vineyard in this study no pricing premium is assumed. Net returns above total costs are positive at a price for grapes of $1,000 per ton when yields reach 4.75 tons per acre. For prices at or below $500 per ton and for yields at or below 9 tons per acre, it is not profitable to produce organic wine grapes. At a high price of $1,700 per ton, the breakeven yield is 2.4 tons per acre. A ranging analysis for varying yields and prices is shown in **Table 6**.

8. PRODUCTION PRACTICES:

Production practices in this study are listed in **Table 1**. This table shows the order in which the operations are performed, as well as the hours per acre required for each operation. Labor and custom rates, material and fuel and repair costs are also included in this table. In addition, **Table 3** shows the monthly cash costs and sequence of operations.

To increase soil tilth, fertility, and nutrient availability, some soil amendments are applied to the organic vineyard analyzed in this study, as shown in the following table. Soil amendments are added if warranted by appropriate tissue and soil sampling.

Soil Amendment Materials

Material	Number of Applications/Year	Application Rate/Acre	Month Performed
Mined Limestone	1/3 (one in three years)	3 tons[1]	October
Sulfate of Potash	1	250 lbs	October
Compost	1	1-2 tons	October

[1] Divided by three = annual rate per acre included in this study

9. COVER CROPS:

In this study, resident vegetation is managed as the cover crop. No yearly planting or irrigation to germinate the cover crop is required. Resident vegetation is often dominated by grasses, mustards and malva, but can include other broadleaf plants. The cover crop is mowed three times yearly in April, May and June to control flushes of weed growth. Because resident vegetation dies back in the warm summer months, little or no management is needed during this time.

10. PEST MANAGEMENT:

The incidence of disease, as well as invertebrate and vertebrate pest damage is assumed to be low. However, some treatments are commonly used to minimize pest damage. The following table indicates the pest management techniques used in this study.

Pest Management Materials

Material	Number of Applications	Application Rate/Acre	Month Performed
Wettable Sulfur	3	3.5 lbs	March, April
Dusting Sulfur	6	10 lbs	May, June, July
Insecticidal Soap	1/3 (of acreage)	2 gals[1]	June
Pyrethrin[2]	1/3 (of acreage)	2 pints[1]	June

[1] Divided by three = annual rate per acre included in this study.
[2] May be omitted by some growers.

Because many beneficial arthropods occur naturally within organic vineyards, costs for release or augmentation of parasites and predators are not considered in this study. Weeds in the vineyard centers are controlled by discing. A French plow is used to cultivate vine row weeds. Hand weeding is used in the vine rows in addition to mechanical cultivations. No other means of weed control are used in this report.

11. HARVEST:

Harvest operations are performed by a custom operator at a cost of $120 per ton. This rate reflects the cost for hand harvesting. This study assumes that harvest takes place in the month of September.

For more information on custom harvesting contact the farm advisor or companies contracting for grapes in the area of interest. If growers choose to do their own harvesting, equipment for the required operations should be inventoried and labor, fuel, repairs, depreciation and interest on investment should be added as a cost of production to **Tables 1** and **3**. Custom charges, then, would not be included.

12. LABOR:

Basic hourly wages for workers are $8.00 and $6.00 per hour for machine operators and field workers, respectively. Adding 34% for SDI, FICA, insurance and other benefits increases the labor rates shown to $10.72 per hour for machine labor and $8.04 per hour for non-machine labor. The labor hours for operations involving machinery are 20% higher than operation time to account for extra labor involved in equipment set-up, moving, maintenance and repair. Wages for managers are not included as a cash cost. Any returns above total costs are considered returns to management and risk.

13. INVESTMENT:

The investments shown in **Table 4** are those that are allocated to the entire vineyard. The totals in **Table 4** are used for the costs in **Tables 2**, **4** and **6.** Annual investments shown in **Table 1** represent depreciation and opportunity cost for each investment on an annual per acre basis.

14. BUSINESS OVERHEAD:

County taxes are calculated as 1% of the average value of equipment, buildings and improvements. Property insurance is charged at 0.5% of the average value of all assets over their useful life. Liability insurance covers accidents on the farm and costs $300 per year. Office and business costs are estimated at $250 per acre for the farm. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road preparation and maintenance. Leaf and soil analyses are included at $4 per acre.

15. ASSESSMENTS:

In this study, a stepped scale organic grower's registration fee of $300 is assessed by the State of California on the gross sales amount of $175,750. The fee is calculated by multiplying the yield (4.75 tons per acre) by the price received ($1,000 per ton) and the number of acres (37). This is only an estimate of potential fees and will vary depending on yields and returns. Contact the County Agricultural Commissioner in your area for further details.

The grower is assumed to be certified by California Certified Organic Farmers (CCOF). CCOF adheres to the standards of the California Organic Foods Act of 1990 as well as its own specific procedures and standards. Certification by CCOF is voluntary. Before January 1, 1992, CCOF required a one year transition period when converting from conventional production practices to organically acceptable methods. The requirement is now three years. Annual membership fees are $125. Inspection fees are $115. An assessment fee of 0.5% of gross sales, or $879, is included as a cost of production. These fees are specific to this study. Fees are based on the number of acres and parcels contained in an operation as well as whether or not the farm is totally organic. Therefore, individual situations may vary.

16. INTEREST:

Interest on operating capital is based on a short term interest rate charged against cash costs and is calculated monthly until harvest at a nominal interest rate of 9% per year. Interest is also charged on investment at a real interest rate of 4% per year to account for income foregone that could be received from an alternative investment (opportunity cost) and is calculated using a long term interest rate charged on the average value of the land, improvements to the property and equipment. A real interest rate indicates the return for the use of capital and does not include any adjustment for inflation. A nominal interest rate would include an inflation factor.

17. EQUIPMENT COSTS:

In allocating the equipment costs per acre, the following calculations were made and shown in **Table 5**: (a) **Original Cost** of equipment is the cost of the new equipment plus sales tax. (b) **Depreciation** is straight line with a 10% salvage value. (c) **Interest** on investment is calculated as the average value per acre of the equipment during its useful life multiplied by a real interest rate of 4%. Average value per acre equals new cost plus salvage value divided by 2 then divided by the number of acres. (d) The **Total Investment Costs** are calculated as 60% of the depreciation and the interest costs for all new equipment to reflect a mix of the new and used equipment. These values are also used in **Table 1**, **4**, and **6**. All of this equipment is used on the entire 37 acre vineyard.

18. FUEL & REPAIR:

The fuel and repair cost per acre for each operation in **Table 1** is determined by multiplying the total hourly operating cost for each piece of equipment in **Table 5** by the number of hours per acre for that operation. Prices for on-farm delivery of gasoline and diesel are $0.98 and $0.71 per gallon, respectively.

19. ACKNOWLEDGMENT:

Several organic wine grape producers assisted in furnishing information for this study. Appreciation is expressed to those growers and other individuals who provided assistance.

This study was funded by the University of California's Sustainable Agriculture Research and Education Program (SAREP) and Giannini Foundation.

REFERENCES

1. California Agricultural Statistics Service. 1992. *Final GrapeCrush Report 1991 Crop.* Sacramento, California.

2. California Certified Organic Farmers, Inc. (CCOF). 1992. *California Certified Organic Farmers 1992 Handbook.* agAccess. Davis, California.

3. Debach, P. and D. Rosen. 1991. *Biological control by natural enemies.* Cambridge University Press. Cambridge, U.K.

4. Finch, Clarence U. and W. Curtis Sharp. 1976. *Cover Crops in California Orchards & Vineyards.* USDA Soil Conservation Service.

5. Flint, Mary Louise. 1990. *Pests of the Garden and Small Farm. A Grower's Guide to Using Less Pesticide.* University of California, Statewide Integrated Pest Management Project, Division of Agriculture and Natural Resources. Publication 3332.

6. Integrated Pest Management Education and Publications. 1991. *U.C. IPM Pest Management Guidelines.* University of California, Statewide Integrated Pest Management Project, Division of Agriculture and Natural Resources. Publication 3339.

7. Miller, P.R., et al. 1989. *Covercrops for California Agriculture.* University of California, Division of Agriculture and Natural Resources. Leaflet 21471.

8. Vaupel, Suzanne. 1992. *What a Farmer Needs to Know. A Summary of California & Federal Organic Production Laws.* Suzanne Vaupel, Vaupel Associates. Sacramento, California.

U.C. COOPERATIVE EXTENSION

Table 1. COSTS PER ACRE TO PRODUCE ORGANIC WINE GRAPES - 1992 - OPERATIONS WITH RESIDENT VEGETATION

Labor Rate: $10.72/hr. machine labor
$8.04/hr. non-machine labor
Interest Rate: 9.00%
Yield per Acre: 4.75 ton

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Postharvest Irrigation	0.40	3.22	0.00	8.70	0.00	11.92	
Lime Application - 1 of 3 years	0.00	0.00	0.00	36.47	10.00	46.47	
Potassium Application	1.00	36.98	4.29	48.75	0.00	90.03	
Compost Application	0.00	0.00	0.00	75.08	10.00	85.08	
Pruning	19.99	160.72	0.00	0.00	0.00	160.72	
Chop Brush/Mow Centers	0.65	8.36	3.82	0.00	0.00	12.18	
Frost Protection	1.92	15.44	0.00	17.40	0.00	32.84	
Sulfur Application - 9X	1.95	25.08	11.92	12.51	0.00	49.51	
Thin Shoots/Sucker*	40.00	321.60	0.00	0.00	0.00	321.60	
Mow - 3X	1.50	19.30	8.82	0.00	0.00	28.11	
Under Vine Weeds - Cultivate	1.00	12.86	5.34	0.00	0.00	18.21	
Move Wires	9.00	72.36	0.00	0.00	0.00	72.36	
Under Vine Weeds - Hand Hoe 2X**	8.00	64.32	0.00	0.00	0.00	64.32	
Irrigation	5.28	42.45	0.00	15.60	0.00	58.05	
Leaf Removal***	27.00	217.08	0.00	0.00	0.00	217.08	
Soap/Pyrethrin Application 1/3 of Acreage	0.08	1.03	0.53	16.92	0.00	18.48	
Pickup Use	7.75	99.70	35.06	0.00	0.00	134.76	
TOTAL CULTURAL COSTS	125.52	1100.50	69.78	231.43	20.00	1421.72	
Harvest:							
Harvest - Contract	0.00	0.00	0.00	0.00	570.00	570.00	
TOTAL HARVEST COSTS	0.00	0.00	0.00	0.00	570.00	570.00	
Assessments:							
Ca. State Organic Registration Fees	0.00	0.00	0.00	8.11	0.00	8.11	
CCOF Inspection Fees	0.00	0.00	0.00	3.11	0.00	3.11	
CCOF Membership Fees	0.00	0.00	0.00	3.38	0.00	3.38	
CCOF .5% of Gross Sales	0.00	0.00	0.00	23.75	0.00	23.75	
TOTAL ASSESSMENT COSTS	0.00	0.00	0.00	38.35	0.00	38.35	
Interest on operating capital @ 9.00%						69.55	
TOTAL OPERATING COSTS/ACRE		1100.50	69.78	269.78	590.00	2099.62	
TOTAL OPERATING COSTS/TON						442.02	

* Costs for Thin Shoots/Sucker can range from $150-350 per acre
** Costs for Hand Hoeing can range from $50-100 per acre
*** Costs for Leaf Removal can range from $60-225 per acre

U.C. COOPERATIVE EXTENSION
ORGANIC WINE GRAPES - 1992 - WITH RESIDENT VEGETATION
Table 1. continued

				Total Cost	Your Cost
CASH OVERHEAD:					
Office Expense				250.00	
Leaf & Soil Analyses				4.00	
Liability Insurance				8.11	
Property Taxes				218.23	
Property Insurance				109.11	
Investment Repairs				20.95	
TOTAL CASH OVERHEAD COSTS				610.39	
TOTAL CASH COSTS/ACRE				2710.01	
TOTAL CASH COSTS/TON				570.53	
NON-CASH OVERHEAD:					
Investment	Per producing Acre	Annual Cost Depreciation	Annual Cost Interest @ 4.00%		
Buildings	425.68	14.16	8.53	22.69	
Shop tools	270.27	16.22	5.95	22.16	
Land	13000.00		520.00	520.00	
Drip Irrigation System	1474.59	53.09	32.44	85.53	
Frost Protection System	1289.73	46.43	28.37	74.80	
Vineyard Establishment	11039.00	501.77	220.78	722.55	
Pruning Equipment	32.43	2.92	0.71	3.63	
ATV - 4WD	175.68	31.62	3.86	35.49	
Reservoir - 20 acft	1351.35	40.54	29.73	70.27	
Equipment	1023.97	86.16	22.53	108.68	
TOTAL NON-CASH OVERHEAD COSTS	30082.70	792.90	872.91	1665.81	
TOTAL COSTS/ACRE				4375.82	
TOTAL COSTS/TON				921.23	

U.C. COOPERATIVE EXTENSION

Table 2. DETAIL OF COSTS PER ACRE TO PRODUCE ORGANIC WINE GRAPES - 1992 - INPUTS WITH RESIDENT VEGETATION

Labor Rate: $10.72/hr. machine labor
$8.04/hr. non-machine labor

Interest Rate: 9.00%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Water:					
Sprinkler	9.00	acin	2.90	26.10	
Drip	8.00	acin	1.95	15.60	
Soil Amendments:					
Mined Limestone	1.00	ton	36.47	36.47	
Sulfate of Potash	0.13	ton	375.00	48.75	
Compost	2.00	ton	37.54	75.08	
Custom:					
Spread Lime	1.00	acre	10.00	10.00	
Spread Compost	1.00	acre	10.00	10.00	
Fungicide:					
Wettable Sulfur	10.50	lb	0.22	2.31	
Dusting Sulfur	60.00	lb	0.17	10.20	
Soap:					
Insecticidal Soap	0.67	gal	13.26	8.88	
Botanical:					
Pyrethrin	0.67	pint	12.00	8.04	
Contract:					
Harvest	4.75	acre	120.00	570.00	
Assessments:					
Ca. St. Org. Reg. Fees	1.00	acre	8.11	8.11	
CCOF Inspection Fees	1.00	acre	3.11	3.11	
CCOF Membership Fees	1.00	acre	3.38	3.38	
CCOF .5% of Gross Sales	1.00	acre	23.75	23.75	
Labor (machine)	7.42	hrs	10.72	179.20	
Labor (non-machine)	114.59	hrs	8.04	921.30	
Fuel - Diesel	34.53	gal	0.71	24.52	
Lube				3.68	
Machinery repair				41.54	
Interest on operating capital @ 9.00%				69.55	
TOTAL OPERATING COSTS/ACRE				2099.62	
TOTAL OPERATING COSTS/TON				442.02	

U.C. COOPERATIVE EXTENSION
ORGANIC WINE GRAPES - 1992 - WITH RESIDENT VEGETATION
Table 2. continued

	Cost/ Acre	Your Cost
CASH OVERHEAD COSTS:		
Office Expense	250.00	
Leaf & Soil Analyses	4.00	
Liability Insurance	8.11	
Property Taxes	218.23	
Property Insurance	109.11	
Investment Repairs	20.95	
TOTAL CASH OVERHEAD COSTS/ACRE	610.39	
TOTAL CASH COSTS/ACRE	2710.01	
TOTAL CASH COSTS/TON	570.53	
NON-CASH OVERHEAD COSTS (DEPRECIATION & INTEREST):		
Buildings	22.69	
Shop tools	22.16	
Land	520.00	
Drip Irrigation System	85.53	
Frost Protection System	74.80	
Vineyard Establishment	722.55	
Pruning Equipment	3.63	
ATV - 4WD	35.49	
Reservoir - 20 acft	70.27	
Equipment	108.68	
TOTAL NON-CASH OVERHEAD COSTS/ACRE	1665.81	
TOTAL COSTS/ACRE	4375.82	
TOTAL COSTS/TON	921.23	

U.C. COOPERATIVE EXTENSION

Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE ORGANIC WINE GRAPES - 1992
WITH RESIDENT VEGETATION

Begining OCT 91 Ending SEP 92	OCT 91	NOV 91	DEC 91	JAN 92	FEB 92	MAR 92	APR 92	MAY 92	JUN 92	JUL 92	AUG 92	SEP 92	TOTAL
Cultural:													
Postharvest Irrigation	11.92												11.92
Lime Application-1 of 3 yr.	46.47												46.47
Potassium Application	90.03												90.03
Compost Application	85.08												85.08
Pruning			53.55	53.55	53.63								160.72
Chop Brush/Mow Centers						12.18							12.18
Frost Protection						10.95	10.95	10.95					32.84
Sulfur Application - 9X						5.63	11.26	10.87	10.87	10.87			49.51
Thin Shoots/Sucker							160.80	160.80					321.60
Mow - 3X							9.37	9.37	9.37				28.11
Under Vine Weeds-Cultivate							18.21						18.21
Move Wires								24.12	24.12	24.12			72.36
Under Vine Weeds-Hand Hoe 2X								32.16	32.16				64.32
Irrigation								19.36	19.36	9.67	9.67		58.05
Leaf Removal									217.08				217.08
Soap/Pyrethrin App 1/3 of Ac									18.48				18.48
Pickup Use												134.76	134.76
TOTAL CULTURAL COSTS	233.49		53.55	53.55	53.63	28.76	210.59	267.63	331.44	44.66	9.67	134.76	1421.72
Harvest:													
Harvest - Contract												570.00	570.00
TOTAL HARVEST COSTS												570.00	570.00
Assessments:													
Ca. St. Org. Reg. Fees												8.11	8.11
CCOF Inspection Fees												3.11	3.11
CCOF Membership Fees												3.38	3.38
CCOF .5% of Gross Sales												23.75	23.75
TOTAL ASSESSMENT COSTS												38.35	38.35
Interest on oper. capital	1.75	1.75	2.15	2.55	2.96	3.17	4.75	6.76	9.24	9.58	9.65	15.23	69.55
TOTAL OPERATING COSTS/ACRE	235.25	1.75	55.70	56.10	56.58	31.93	215.34	274.39	340.69	54.24	19.32	758.33	2099.62
TOTAL OPERATING COSTS/TON	49.53	0.37	11.73	11.81	11.91	6.72	45.33	57.77	71.72	11.42	4.07	159.65	442.02
CASH OVERHEAD:													
Office Expense	20.83	20.83	20.83	20.83	20.83	20.83	20.83	20.83	20.83	20.83	20.83	20.83	250.00
Leaf & Soil Analyses									4.00				4.00
Liability Insurance				8.11									8.11
Property Taxes			109.11				109.11						218.23
Property Insurance				109.11									109.11
Investment Repairs	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	20.95
TOTAL CASH OVERHEAD COSTS	22.58	22.58	131.69	139.80	22.58	22.58	131.69	22.58	26.58	22.58	22.58	22.58	610.39
TOTAL CASH COSTS/ACRE	257.82	24.33	187.39	195.90	79.16	54.51	347.03	296.96	367.26	76.82	41.90	780.91	2710.01
TOTAL CASH COSTS/TON	54.28	5.12	39.45	41.24	16.67	11.48	73.06	62.52	77.32	16.17	8.82	164.40	570.53

U.C. COOPERATIVE EXTENSION

Table 4. ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS FOR ORGANIC WINE GRAPE PRODUCTION - 1992
WITH RESIDENT VEGETATION

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	- Cash Overhead - Insur-ance	Taxes	Total
92	60 HP 4WD Tractor	29900	15	1794.00	657.80	82.23	164.45	2698.48
92	Air Blast Sprayer	4560	10	410.40	100.32	12.54	25.08	548.34
92	Duster	3035	10	273.20	66.76	8.35	16.69	365.00
92	French Plow	3650	15	219.00	80.30	10.04	20.07	329.41
92	Mower/Chopper 8'	5500	10	495.00	121.00	15.13	30.25	661.38
92	Pick up - 1/2 ton	16500	7	2121.43	363.00	45.37	90.75	2620.55
TOTAL		63145		5313.03	1389.18	173.66	347.29	7223.16
60% of New Cost *		37887		3187.82	833.51	104.20	208.37	4333.90

· Used to reflect a mix of new and used equipment.

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	------ Cash Overhead ------ Insur-ance	Taxes	Repairs	Total
INVESTMENT								
ATV - 4WD	6500	5	1170.00	143.00	17.88	35.75	50.00	1416.63
Buildings	15750	30	524.00	315.60	39.45	78.90	100.00	1057.95
Drip Irrigation System	54560	25	1964.16	1200.32	150.04	300.08	300.00	3914.60
Vineyard Establishment	408443	22	18565.50	8168.86	1021.11	2042.22	0.00	29797.69
Frost Protection System	47720	25	1717.92	1049.84	131.23	262.46	200.00	3361.45
Land	481000			19240.00	2405.00	4810.00	0.00	26455.00
Pruning Equipment	1200	10	108.00	26.40	3.30	6.60	25.00	169.30
Reservoir - 20 acft	50000	30	1500.00	1100.00	137.50	275.00	0.00	3012.50
Shop tools	10000	15	600.00	220.00	27.50	55.00	100.00	1002.50
TOTAL INVESTMENT	1075173		26149.58	31464.02	3933.01	7866.01	775.00	70187.62

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Leaf & Soil Analyses	37.00	acre	4.00	148.00
Liability Insurance	1.00	year	300.00	300.00
Office Expense	37.00	acre	250.00	9250.00

U.C. COOPERATIVE EXTENSION

Table 5. HOURLY EQUIPMENT COSTS FOR ORGANIC WINE GRAPE PRODUCTION - 1992
WITH RESIDENT VEGETATION

Yr	Description	Actual Hours Used	COSTS PER HOUR: Non-Cash Over. - Depre-ciation	Interest	Cash Overhead - Insur-ance	Taxes	Operating - Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
92	60 HP 4WD Tractor	251.5	4.28	1.57	0.20	0.39	1.49	2.41	3.90	10.34
92	Air Blast Sprayer	30.7	8.02	1.96	0.25	0.49	2.29	0.00	2.29	13.00
92	Duster	44.4	3.69	0.90	0.11	0.23	1.52	0.00	1.52	6.46
92	French Plow	37.0	3.55	1.30	0.16	0.33	1.05	0.00	1.05	6.39
92	Mower/Chopper 8'	79.6	3.73	0.91	0.11	0.23	1.58	0.00	1.58	6.57
92	Pick up - 1/2 ton	286.8	4.44	0.76	0.09	0.19	2.99	1.53	4.52	10.01

Table 6. RANGING ANALYSIS
ORGANIC WINE GRAPES - 1992 - WITH RESIDENT VEGETATION

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ORGANIC WINE GRAPES

	YIELD (TON/ACRE)						
	3.00	3.50	4.25	4.75	6.25	7.75	9.00
OPERATING COSTS/ACRE:							
Cultural Cost	1422	1422	1422	1422	1422	1422	1422
Harvest Cost	360	420	510	570	750	930	1080
Assessment Cost	38	38	38	38	38	38	38
Interest on operating capital	68	68	69	70	71	72	73
TOTAL OPERATING COSTS/ACRE	1888	1948	2039	2100	2281	2462	2613
TOTAL OPERATING COSTS/TON	629.35	556.71	479.80	442.02	364.95	317.72	290.38
CASH OVERHEAD COSTS/ACRE	610	610	610	610	610	610	610
TOTAL CASH COSTS/ACRE	2498	2559	2650	2710	2891	3073	3224
TOTAL CASH COSTS/TON	832.81	731.11	623.43	570.53	462.62	396.48	358.20
NON-CASH OVERHEAD COSTS/ACRE	1666	1666	1666	1666	1666	1666	1666
TOTAL COSTS/ACRE	4164	4225	4315	4376	4557	4739	4890
TOTAL COSTS/TON	1388.08	1207.06	1015.38	921.23	729.15	611.42	543.29

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ORGANIC WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	3.00	3.50	4.25	4.75	6.25	7.75	9.00
300.00	-988	-898	-764	-675	-406	-137	87
500.00	-388	-198	86	275	844	1413	1887
750.00	362	677	1148	1463	2407	3350	4137
1000.00	1112	1552	2211	2650	3969	5288	6387
1250.00	1862	2427	3273	3838	5532	7225	8637
1500.00	2612	3302	4336	5025	7094	9163	10887
1700.00	3212	4002	5186	5975	8344	10713	12687

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ORGANIC WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	3.00	3.50	4.25	4.75	6.25	7.75	9.00
300.00	-1598	-1509	-1375	-1285	-1016	-748	-524
500.00	-998	-809	-525	-335	234	802	1276
750.00	-248	66	538	852	1796	2740	3526
1000.00	502	941	1600	2040	3359	4677	5776
1250.00	1252	1816	2663	3227	4921	6615	8026
1500.00	2002	2691	3725	4415	6484	8552	10276
1700.00	2602	3391	4575	5365	7734	10102	12076

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR ORGANIC WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	3.00	3.50	4.25	4.75	6.25	7.75	9.00
300.00	-3264	-3175	-3040	-2951	-2682	-2414	-2190
500.00	-2664	-2475	-2190	-2001	-1432	-864	-390
750.00	-1914	-1600	-1128	-813	130	1074	1860
1000.00	-1164	-725	-65	374	1693	3011	4110
1250.00	-414	150	997	1562	3255	4949	6360
1500.00	336	1025	2060	2749	4818	6886	8610
1700.00	936	1725	2910	3699	6068	8436	10410