

Texas Vineyard Budgets

Cost of Production for Commercial Vineyards in Texas



Daniel K. Pate

Research Assistant, Department of Agricultural & Applied Economics
Research Assistant, Department of Plant & Soil Sciences
Texas Tech University

Dr. Edward Hellman

Professor of Viticulture and Extension Specialist
Texas AgriLife Extension and Texas Tech University

Dr. Jeff Johnson

Assistant Professor, Director of Farm Operations, CASNR
Associate Director, CASNR Water Institute
Texas Tech University



**College of Agricultural Sciences & Natural Resources
Technical Report T-1-602, Texas Tech University**

Table of Contents

Preface	4
Acknowledgements	5
Texas Industry Trends Through 2007	6
Methods	6
General Study-Wide Assumptions	6
Multiple Chemical Combination Applications	8
Allocating Costs for Multiyear Enterprises and Enterprise Budgeting	9
Annual Capital Recovery	10
Total Amortized Establishment Cost	10
Budget Table Relationship and Flow Chart	11
West Texas Region	12
North Texas Region	66
Texas Hill Country Region	124
Texas Gulf Coast Region	182

Table of Figures

Figure 1: Texas Viticulture Region Map.....	4
Figure 2: Flow Chart for Visual Understanding of Intra-Budget Relationships	11
Figure 3: West Texas Viticulture Region Map	16
Figure 4: Total Cost Proportions for Establishment Years 0-3	29
Figure 5: Total Cost Proportions for Full Production Years 5-25.....	36
Figure 6: Proportions of Major Annual Business Overhead Costs (Table 12.B).....	38
Figure 7: Bar Graph showing Monthly Cash Available for Production Years 5-25 from Table 16	42
Figure 8: North Texas Viticulture Region Map	70
Figure 9: Total Cost Proportions for Establishment Years 0-3	84
Figure 10: Total Cost Proportions for Full Production Years 5-25.....	92
Figure 11: Proportions of Major Annual Business Overhead Costs (Table 12.B)	94
Figure 12: Bar Graph showing Monthly Cash Available for Production Years 5-25 from Table 16	99
Figure 13: Hill Country Viticulture Region Map	128
Figure 14: Total Cost Proportions for Establishment Years 0-3	142
Figure 15: Total Cost Proportions for Full Production Years 5-25.....	151
Figure 16: Proportions of Major Annual Business Overhead Costs (Table 12.B)..	153
Figure 17: Bar Graph showing Monthly Cash Available for Production Years 5-25 from Table 16	157
Figure 18: Gulf Coast Viticulture Region Map	186
Figure 19: Total Cost Proportions for Establishment Years 0-3	201
Figure 20: Total Cost Proportions for Full Production Years 5-25.....	210
Figure 21: Proportions of Major Annual Business Overhead Costs (Table 12.B)..	212
Figure 22: Bar Graph showing Monthly Cash Available for Production Years 5-25 from Table 16	216

Preface

Sample costs to establish a vineyard and produce commercial wine grapes are presented in this study. The geographical areas set forth by the Texas Viticulture and Enology Extension is as follows: the West Texas Region, North Texas Region, Hill Country Region, and Gulf Coast Region. The information contained in and suggested by this study is intended as a guide only. The tables provided may be a useful tool to assist both current and prospective growers in making individual production decisions, projecting individual potential returns, and preparing individual enterprise budgets. Operations described are based on viticulture production practices considered typical for the crop and region, but will vary in individual scenarios. Costs presented for labor, materials, equipment and custom services are based on current figures. Two blank columns for “Your Revenues” and “Your Costs” are provided in Tables 1 through 6 and 8 to enter individual costs and revenues to adapt these budgets to your operation. The hypothetical farm operation, production practices, variable expenses, capital expenses and calculations are detailed in the general study-wide assumptions as well as in the chapters for each region. For additional information or an explanation of the calculations used in the study contact the Department of Agricultural & Applied Economics, Texas Tech University, (806) 742-2821 or contact your Texas AgriLife Viticulture Extension Specialist.

Texas Viticulture Regions

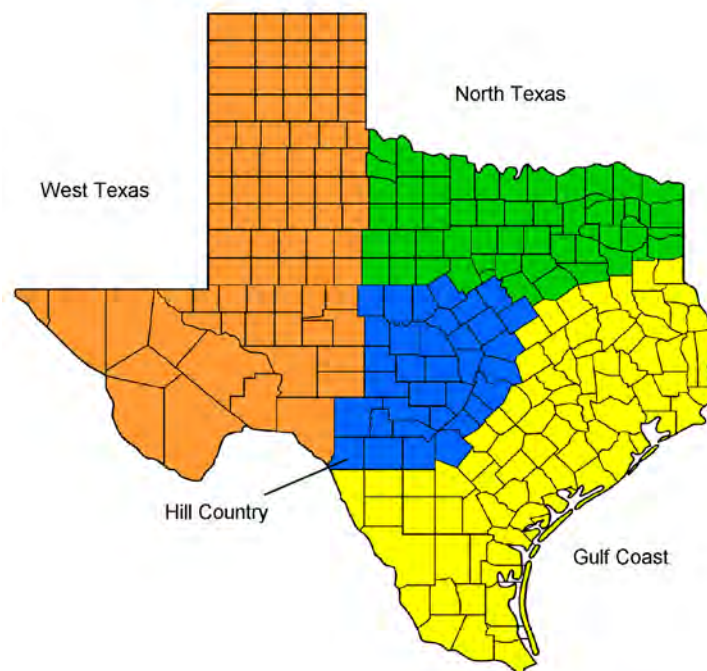


Figure 1: Texas Viticulture Region Map

Acknowledgements

First and foremost, we would like to thank the Texas wine grape growers consulted in this study. This study would not have been possible without their assistance and extensive generosity. Additionally, we would like to thank the Extension Viticulture Advisors, Teresa H. Burns, Fran Pontasch, Penny Adams, Fritz Westover, and Jim Kamas for providing the connection to growers as well as guidance in regional intricacies.

Texas Industry Trends Through 2007

Approximately 280 commercial growers with a combined acreage of 2,900 bearing acres were operating in Texas in 2007 (MKF Research LLC, 2007). The total economic impact, which accounts for the total sum of spending in these sectors, for wine and grapes in the state of Texas in 2007 was \$1.35 billion (MKF Research LLC, 2007). This number has been increasing rapidly in recent years and is quite remarkable for such a small industry.

Although vineyard acreage in Texas has been consistently hovering around 3,000 bearing acres since 2001, yield and crop value have varied remarkably. This was due primarily from unfavorable weather conditions such as late spring frost and mid season hail storms (MKF Research LLC, 2007). For example, when comparing 2005 to 2007, utilized production in tons and total crop value both fell by over 50%. In the same period, the number of wineries in Texas increased by over 40%. This data confirms the premise that the demand for wine grapes in Texas is outpacing the supply grown within the state. In 2007, approximately 72% of wine produced in Texas was derived from grapes from outside the state (MKF Research LLC, 2007).

One further factor of constraint on the wine industry is distribution accessibility. Most wineries in Texas are relatively small and typically cannot produce enough wine to meet a distributor's demands, thus they sell through their storefront or stock local stores themselves. This is supported by the statistic that approximately 97% of wine produced in Texas was consumed within its borders in 2007 (MKF Research LLC, 2007). With increased commercial wine grape acreage, Texas wineries will also benefit through expanded distribution options.

Methods

This study used a combination of three methods to construct cost estimates. First, a representative panel of growers was interviewed in each of the four regions. These growers provided input concerning common practices, labor requirements, labor rates, machinery, and costs of custom activities for a commercial vineyard. Second, operating costs, capital costs, and cost allocation of a multi-year enterprise were formulated using the Commodity Cost and Return Handbook (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998). This handbook was also used as a guideline for formatting reports. Third, equipment and machinery efficiencies were established using economic engineering recommendations (American Society of Agricultural Engineers, 2000).

Methods of calculating costs and returns comply with recommendations of the Commodity Costs and Returns Handbook. Prices of material inputs are representative of the 2008 period. Fuel cost has been updated to reflect price for the fall of 2008.

General Study-Wide Assumptions

This study created a representative vineyard scenario which is a composite of the practices used by the panel of growers surveyed for each region. This study is intended to be used as a general guide to the economics of vineyard establishment and production in the four Texas AgriLife Viticulture Extension Regions. An infinite number of variations may exist in vineyard site conditions, management decision criteria, input costs, market price, and returns to

management. It is recommended that prospective and current growers derive their individual economic analysis for use in their business management using the results of this study as a guide.

Several expansive assumptions were made to provide a common foundation for examination. The first assumption is that of establishing a new commercial vineyard in Texas. The land was assumed to be owned and paid for, rather than leased and the water well and pump were previously established for irrigation. The well and pump infrastructure cost was assumed to be included in the land value. Land values for each representative vineyard were derived from the Trends in Texas Rural Land Values for the year 2007 and inflated to more accurately reflect current values (American Society of Farm Managers and Rural Appraisers, 2008). All prices and costs are provided in year 2008 values. This study did include a land opportunity cost as a non-cash capital expense. Opportunity cost is, “The income that could be received by employing a resource in its most profitable alternative use.” (Kay, Edwards, & Duffy, 2004, p. 435) In this study, the resource was the land and the most profitable alternative use was considered the market price a landowner could charge for leasing this land (American Society of Farm Managers and Rural Appraisers, 2008). The capital recovery method was used to account for interest on the land owned. Custom costs were derived using 2004 Texas Custom Rate Statistics compiled by the National Agricultural Statistics Service Texas Field Office and inflated to more accurately estimate current rates (National Agricultural Statistics Service, 2004). All equipment, machinery, buildings, and equipment were used solely for wine grape production, so that sharing with other enterprises was not considered. Each of the four Texas AgriLife Extension Services Viticulture Regions had additional assumptions to better account for conditions in that respective region.

Second, this study broadly assumed a particular set and amount of chemicals were used in the representative vineyard. The authors understand that each individual situation may warrant a very different set and amount of chemicals and that a producer’s personal predisposition may dictate their chemical preferences as well. Readers should understand that the activities listed are representative only and should therefore be used as a model for structuring their own chemical plan.

The third assumption was that the vineyard is expected to be in the establishment phase for 3 years followed by 22 years of production. Establishment practices were detailed in Years 0 through 3 and production was detailed in Years 4 through 25. Tables 1 through 6 show costs and returns for the establishment phase, tables 7 through 9 show costs and returns for the production years, and tables 10-16 detail investment costs and other critical information. Land and site preparation was conducted in Year 0 and vine planting took place in Year 1. Many industry experts use the terms ‘first leaf’ and ‘year 1’ interchangeably and both refer to the age of the vines. Year 1 corresponded with the first leaf, Year 2 with the second leaf, Year 3 with the third leaf, and Year 4 with the fourth leaf, and so forth. Year 5 was considered the first year of full production. All tables provided are on a per acre basis. The operations, resources, and inputs were typical of similar vineyards which were surveyed in Texas. All labor was categorized as either unskilled or skilled. These categories were valued at \$10.00 and \$15.00 per labor hour respectively, which include wages per hour as well as payroll expenses. Several vineyards surveyed were operated solely by the owner and/or family, thus their values may also be used as the opportunity costs of labor performed by the vineyard grower. All labor was assumed to be hired as a cash expense. Machinery and equipment operation costs are based on agricultural

engineering estimates found in the Agricultural Engineers Yearbook (American Society of Agricultural Engineers, 2000). Purchase prices were obtained from Manufacturer Suggested Retail Price (MSRP) (Kayne, 2003). Hours of life, expected life, salvage value, repairs, lubricants, and fuel usage were estimated as suggested by the American Society of Agricultural Engineers (American Society of Agricultural Engineers, 2000). Capital recovery, insurance, taxes, and amortization were derived as recommended by the Commodity Cost & Returns Handbook (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998).

Fourth, this study assumed an operating interest rate of 7.56% annually and a long-term capital interest rate at a rate of 6.87% annually (Federal Reserve Bank of Dallas, 2008). The operating interest rate was considered opportunity cost of interest that farmers might receive for funds if an alternative investment had been selected. Operating interest was considered a capital cash expense and was charged on variable costs. This expense was included to reflect that money invested in wine grapes could be invested elsewhere and earn interest, which represents the opportunity cost of operating capital. For the vineyard to be considered a sound investment, it must provide at least as great a return on the next best alternative investment. The same logic applies to long-term capital. By associating the opportunity costs with the enterprise, an economic return was created as opposed to an accounting return. In many cases, a positive economic return leads to an accounting profit.

The fifth assumption in this study was that management opportunity cost was not included, which represents the value of the farm manager's skill assets and labor assuming the manager and owner are the same. Thus, returns were stated as "Residual Returns to *Management, Unpaid Labor, and Risk*", meaning that any returns stated should be expected to cover management and unpaid labor expenses not traditionally accounted for.

Using these five general assumptions, enterprise budgets were developed for each of the vineyard establishment years and a typical full production year. Other tables were included, which may prove useful tools for prospective and current wine grape producers alike. "The data in an enterprise budget can be used to perform several types of analyses. These include calculating cost of production and computing break-even prices and yields." (Kay, Edwards, & Duffy, 2004, p. 160)

Multiple Chemical Combination Applications

Producers often combine multiple pesticides into a single spray application. To account for this, this study reduced labor and equipment operation time for certain common chemical combination practices seen in each region. Due to the large number of combination possibilities, this approach reflected the reduction in operating expenses that a producer would achieve from combining chemicals. Typically, producers combine insecticide and fungicide applications. This topic is explained in greater detail later, and can be found under the assumptions for the given regions.

Allocating Costs for Multiyear Enterprises and Enterprise Budgeting

Vineyards are perennial crops, and therefore considered a multiyear enterprise in this study. A multiyear enterprise is an enterprise with more than one annual production period (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998). The costs presented were accounted for by estimating production costs and returns (CARs) of this multiyear enterprise. The pre-productive period, or establishment, “begins with the first expense associated with establishing the crop enterprise and ends in the crop year just before the crop yields a substantial percent of its expected mature yield, which is typically 70% to 80%” (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998, pp. 10-1). In this study, Year 3 was the end of establishment, Year 4 was expected to produce a yield which was 75% of full production, and Year 5 began full production with approximately 100% of anticipated harvest capacity. “In order for an enterprise to be profitable, these pre-productive costs, plus interest on the financial capital tied up in their production, must be recovered during the productive years of a multiyear enterprise. Therefore, the pre-productive costs of an enterprise, plus interest, must be allocated as a cost of doing business over the productive years of the enterprise.” (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998, pp. 10-2)

This study aggregated costs of specific activities to create an application cost for each activity. Each total activity charge, such as a chemical application, included the following costs; labor, variable equipment, fixed equipment, and materials. This allows individuals to capture the full costs associated with a given activity.

“An enterprise budget is a projection of costs and returns for some future period, such as the coming year.” (Boehlje & Eidman, 1984, p. 87). “An enterprise budget provides an estimate of the potential revenue, expenses, and profit for a single enterprise.” (Kay, Edwards, & Duffy, 2004, p. 150) Enterprise budgets were developed for each establishment year as well as a representative production year, which symbolizes expectations for the remainder of the enterprise life. Activities listed in this study were classified as either Pre-Growth or Post-Growth in Establishment Years 1 (Table 3) and 2 (Table 4) since there was no significant marketable harvest. For Establishment Years 3 (Table 5), Development Year 4 (Table 6), and Production Years 5 - 25 (Table 8), activities listed were classified under the following; Pre-Harvest, Harvest, or Post-Harvest. These categories generally describe when the activities take place in correspondence with the annual life cycle of the vine. All enterprise budgets provided were based on one calendar year.

Table 2 is a detailed summary of all investment costs per acre other than the vines and trellis system. These expenses at least include the drip irrigation system. Some regions also included deer fence and bird netting as standard investment expenses along with the drip irrigation system. Values presented in this table were derived from a panel of grower’s input and are considered typical in each respective region. The ‘Total Establishment Activity Costs Per Acre’ was then included in the ‘Total Amortized Establishment Cost Per Acre Beginning in Year 4 and Beyond’ given in Table 5.A. This amortized establishment cost was the expenses spread over the life of the productive period of the wine grape enterprise.

Annual Capital Recovery

This study used the cost recovery (annuity) method regarding allocation. The cost recovery method recovers combined charges for depreciation and interest over an asset's life. It "accrues annual pre-productive returns to a future value at the end of the pre-productive period, and then amortizes these costs over the productive life of the enterprise. The resulting annual amortization charge includes both interest and depreciation expenses" (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998, pp. 10-12).

Total Amortized Establishment Cost

Total amortized establishment cost is the annualized real pre-productive cost and was calculated as the periodic payment for an annuity (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998). This considered the interest rate for the loan, total number of payments for the loan, present value of principal, and cash future value after the last payment, and then determined the annual payment required to pay off the principal and interest of the loan. The annual amortized establishment cost was then included in Establishment Year 4 and beyond as a non-cash capital expense. This is considered the cost recovery approach for projected costs and returns (CAR) for multiyear crop enterprises. The AAEA Task Force on Commodity Costs and Returns recommends that, "the cost recovery approach is used in preparation of projected CAR for multiyear enterprises" (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998, pp. 10-25). The Task Force also goes on to explain that this method, "overcomes the shortcomings of the traditional budgeting method, and provides an intuitive approach for allocating establishment costs on an annualized basis..." which "is particularly well-suited for CAR estimates constructed for management purposes" (Agricultural & Applied Economics Association Task Force on Commodity Costs and Returns, 1998, pp. 10-25, 10-26). This study was specifically designed with management purposes and goals in mind and therefore makes the cost recovery approach ideal for these scenarios.

Budget Table Relationship and Flow Chart

This diagram can be referred to in the event that readers would like to see how each budget correlates with the model. Tables 10 through 13 are the foundation for all remaining tables. These four tables help to establish costs for all activities listed in this study. They also facilitate the calculation of capital expenses integral to the establishment and production years budgets.

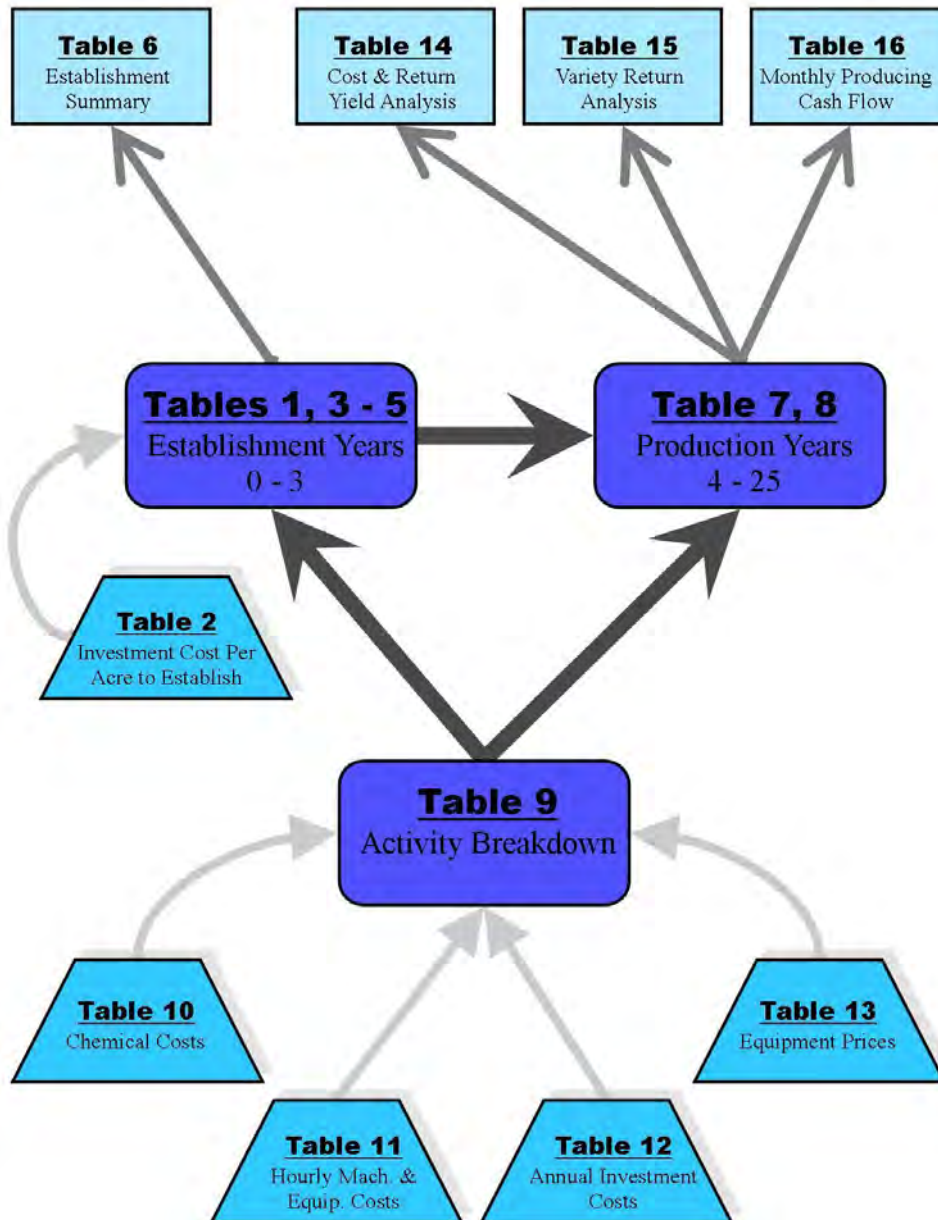


Figure 2: Flow Chart for Visual Understanding of Intra-Budget Relationships