

A Business Plan for a Norton Vineyard
To be Established in Virginia

To meet the research requirements for obtaining an
On-Line Masters in Agriculture & Life Sciences.

David R. Sheldon

June 27, 2016

INTRODUCTION

Passion and purpose. Perseverance and determination. These are the attributes often necessary to start a vineyard and stay with it until it's first fruits can be harvested several years after its planting. However, none of these emotions and "life's purposes" are likely to be maintained without the thorough knowledge of its costs and potential revenues. Many a dream has been tarnished once a new viticulturist realizes that the rewards (discounting getting one's hands soiled and breathing in fresh air) are years further away than anticipated or non-existent under the initial plan.

This paper is a summary of a research project that deals with the sometimes ignored and often forgotten subject, the Business Plan. Specifically, the research is to review the set-up costs for establishing a vineyard primarily made up of the Norton grape (also known as Cynthiana, a hybrid of *Vitis aestivalis*), carry it through to the point of positive cash flow, and then formulate a Business Plan around this data. It brings out into the open the day-to day requirements of setting up and farming a vineyard, and compares these costs for both labor, plantings, and equipment to the potential income the venture will produce.

A Business Plan is ordinarily thought of as a document to show lenders of the investment strategy of a potential business idea. It not only takes into account the expense side of the income statement, but also lays out the predicted income that will be generated over a pre-determined period of time. It includes a review of the risks that could possibly ensue, and how the new business owner will address these to ease the concerns of lending institutions. The Plan lays out the basic foundation of the proposed

business alongside the assumed preparation of the new owners to help insure their knowledge and success.

All of this makes perfect sense from a borrower's perspective except for one thing: the likelihood of a traditional investor in the Commonwealth of Virginia to loan money to start a vineyard in this State, even with a large demand and need because of a growing winery industry, is near zero. This is due to many things, including (a) pricing for wine grapes has a commodity-driven pricing structure, so regardless of quality, upper limit pricing is already established in the market place, (b) vineyards are not like row crop farmers who buffer inherent risks by rotating crops; they are restricted using a single type of fruit that is counter to this type of low risk methodology, (c) fruitful crops within a vineyard can take 3, 4, or even 5 years before income is recognized, and a lot can happen during this period to negatively influence this plan, and (d) the complete business failure of Kluge Winery where an overzealous business plan without the business expertise of its owner caught Bank of America, Farm Credit, and Southern National Bancorp of Virginia off guard, creating losses of \$34 million, \$40 million, and \$8.5 million respectively^{[7][8]}, hence assigning any venture associated with a new winery considered to be very high risk in the eyes of most potential investors.

Now this doesn't mean that there is less of a need to write a Business Plan for a new winery or a new vineyard. In fact, it actually points to just the opposite, i.e. there is a more important reason to produce a Business Plan. Even if the new viticulturist is the writer, and the only reader of the Plan, it forces him/her to perform some significant self-analysis of their own abilities in tackling a project of this magnitude, to perform a fair amount of homework requiring looking at time tables, costs of plants, labor and

machinery, annual expenditures of hands-on labor, and expected revenues based on forecasted output, all on a year-to-year basis. The Business Plan, whether it be modeled after other vineyards or is purely a compilation of data interpreted by the writer, provides a benchmark to measure the progress of the vineyard as it slowly matures to reach its full harvest potential.

More often than not an individual is not able to fully capitalize on meeting the needs of the theoretically perfect vineyard. Slightly sloping, southerly-facing, well drained fertile soils may be the ideal vineyard setting. These requirements however need to be reconsidered and one needs to be more realistic when looking at real estate land that is priced reasonably and available when the viticulturist is ready to start planting. It is likely that one will wait until they are blue in the face before they find the perfect location to plant thousands of grapevines. More often than not, a compromise needs to be made of the key attributes that contribute to the perfect farm setting. The future vineyard owner may decide to take a corner of an already established farm and begin a vineyard there. With all this being said, buying a piece of land or deciding to convert an already owned parcel really should follow after having answered the question: “How much land do I need in order to start a vineyard and, after a certain period of time, have it be able to show some kind of viable positive return?”

A PRELIMINARY REVIEW USING ROUGH NUMBERS

Business itself is not hard to understand, but there are levels of financial understanding that will allow a practitioner to better administrate the business and do much better as a result of implementing a more detailed approach to operating a business.

Simply put, there are three basic levels of business formulas that one needs in order to make quick judgement decisions regarding a business entity, or have a thorough grasp of the workings of a business in order to have it achieve maximum potential.

- **Simple Equation:** $\text{Revenue} - \text{Expenses} = \text{Operating Income}$

Obviously this is about as simple as it gets. It however excludes many of the necessities for understanding the details of the business. What is good about this simple 2-category row formula is that if this first calculation doesn't make sense, one need go no further. For example, if someone wants to open a sandwich shop, with rent, utilities, staffing, and supplies costing \$5000 per month, can they sell 1000 sandwiches a month (33 a day, every day) at \$5 each? If they can't, they either have to reduce costs or increase sales by upselling.

- **Mid-Level Equation:**

$$\text{Revenue} - (\text{Cost of Goods Sold} + \text{Admin. Exp.}) = \text{Operating Income}$$

Now this starts to categorize types of expenses, both variable and fixed, that contribute to the very important part of the formula. It recognizes that some portion of the formula varies with each additional unit produced, and that another part will stay relatively constant (or change less dramatically) as output grows. Depreciation as an accounting entry becomes part of this formula, which brings forward the need to grasp cash flow to meet monthly expenses. An example here would be purchasing a tractor, where from a depreciation angle you are allowed to expense a portion of the purchase price, but in actuality a monthly premium is paid that may not correspond. Certain expenses are ignored for the time being, such as cost of selling, while entries that are non-repeating such as

sale of obsolete equipment or one-time write-offs are delegated to the more complex income statement formula seen below.

- **Upper-level Equations:**

$$\text{Revenue} - \text{Cost of Goods Sold} = \text{Gross Profit}$$

$$\text{Gross Profit} - (\text{Selling} + \text{Admin. Exp.}) = \text{Operating Income}$$

$$\text{Operating Income} - \text{Interest} - \text{Taxes} +/- \text{Other} = \text{Net Income}$$

What we are seeing here is a consideration of all accounting entries and how borrowed money is handled as an interest cost. It becomes an income statement method for rating a return on investment. It does not however show the benefits seen in a Balance Sheet or focus on cash flow requirements which must pay out monthly premiums involving principal payment obligations. As is so often the case, this kind of analysis leads to other questions, such as what type of legal definition one wants to create for the business, and what method the owner wants to invoke in order to take out income. Initial reviews do not necessarily require absoluteness in this type of detail, but in a Business Plan it is prudent to have an idea how these will be addressed.

DETERMINING THE MINIMUM SIZE FOR A VIABLE VINEYARD

Putting together a Business Plan is a long, tedious task. To do it right, there are no short cuts. With that being said, it is best to determine what the likely size of a vineyard is to produce enough grapes to establish a revenue stream that meets all the conditions of the owner. If one wants to just keep busy or produce enough grapes for personal use, then making money is secondary. The assumption made when devising a Business Plan is that it will provide ample income to live a successful and comfortable life. Recognizing this, we should look at the detailed parts of our simple and mid-level equations and roughly fill in the blanks. Because a vineyard is not able to produce a significant harvest until 4 or so years after initial planting, we will focus on when we can see a significant revenue bump which occurs in about the sixth year. Years prior to this are considered unproductive or low output years, and should be looked at as start-up costs or lull time when vine training is conducted.

Revenue in the vineyard business is measured by taking dollars per ton of grapes, multiplying by tons per acre harvested, and then multiplying by total acres.

$$(\$ / \text{ton}) \times (\text{tons} / \text{acre}) \times \# \text{ of acres} = \text{Revenue}$$

Though the study involves a better collection of data to shore up these numbers, the layman can first refer to the Virginia Commercial Grape Report for 2014, published by the Virginia Wine Board. It says that for the calendar year 2014, the average harvest for Norton grapes yielded 2.1 tons per acre at a value of \$1620 per ton. Extended, this provides revenue of **\$3403. per acre**. It is important to understand that there are some severe limitations with the accuracy of these numbers as we apply them here.

First, the yields shown include both fully mature as well as some vines that have not reached their full output potential, therefore it is likely that when considering only fully mature Nortons the yield would be greater. Secondly, when reviewing the average price of all the grapes on a per ton basis, it is easily seen that some prices were paid above true market value. This is due to the over-lapping financial structures of wineries that also have vineyards, and a shell game that occurs when there becomes a balancing act between grape costs for the winery and grape revenues for the vineyard.

Looking at the Mid-Level Equation, we need to come up with expenses, primarily those associated with cost of goods sold (in the wine industry, these are referred to as *Cost of Revenues*) and Administrative expenses. Without doing a complete Upper-level equation, with all the research that is required to pin point certain detail, one of the ways to find these expenses is to look at industry members and see what their expense ratios are relative to revenues. The wine industry is notoriously secretive, primarily because many wineries are held privately and there is little public record exposing their financials. There are some Micro-Caps however that are publicly traded, and from those we can derive some numbers we can use.

Truett-Hurst Inc. (THST) and Willamette Valley Vineyards (WVVI) are both listed on NASDAQ. For this exercise I have opted to ignore Large and Mid-Cap Wineries because they have economies of scale that skew some of their numbers, and they are more likely to have unusual expenses and restructuring charges that affect Net Income.

Cost of Revenue was 66.67% and 40.93% of revenue, respectively for THST and WVVI. Total Operating Expenses for these two were much closer, coming in at 37.03%

and 41.4%, again respectively for THST and WVVI. It is important to note here that THST had a negative operating income for their last year reported.*

Lastly, since we are trying to determine a vineyard size that will provide a lifestyle for the new owner-manager of the vineyard, we need to set a value on this based on the conditions and needs of the new owner. If we were to look at the Median income level in Virginia for guidance (according to the US Census Bureau – 2013 American Community Survey) the Middle Class has a median income level of \$62,666.

Now let's plug in the numbers and see how many acres it would take to support this level of income.

$$A = \# \text{ of acres} \quad R = \text{Revenue per acre} = \$3403.00$$

$$\text{Cost of Revenue} = (66.67 + 40.93) / 2 = 53.8\% \times RA$$

$$\text{Administrative Expenses} = (37.03 + 41.4) / 2 = 39.22\% \times RA$$

$$(RA) - (.538 RA + .3922 RA) = \$62,666$$

$$(3403)A - (.9302)(3403)A = \$62,666$$

$$3403A - 3165A = \$62,666$$

$$238A = \$62,666$$

$$A = 263 \text{ acres} \text{!!!!!!}$$

If this number doesn't persuade someone to find another line of work, nothing will. The good news however is that there are some major flaws in using this type of rapid review. The owner is likely to contribute significantly to the labor within the operation, probably as much as a third or more. So there is in effect a "double dipping" occurring that should be accounted for. Secondly, for an operation that is primarily agriculture, as opposed to wine manufacturing, the administrative and selling costs are only a fraction of what might incur should they be a full service vineyard and winery.

*Published data (Scottrade Research) for fiscal years ending 6/30/15 for THST and 12/31/16 for WVVI; both NASDAQ stocks.

So if we reduce the Cost of Revenue so it is slightly less than that of WVVI, from say from 40.93% to 30% to account for ownership labor, and change the Administrative and selling charges to a flat \$2500, our revised formula becomes:

$$\begin{aligned}(RA) - (.30 RA) - 2500 &= 62,666 \\ .7 RA &= 65,166 \\ .7 (3403) A &= 65,166 \\ A &= 27.36 \text{ acres}\end{aligned}$$

Now I want to throw the caution flag up here. This revised number indicating the required acres of vineyard to make a viable business is based on unsubstantiated and rapid fire assumptions. But its value will be in assigning costs, recognizing that one person can't do it all, and to establish a starting point for creating a Business Plan. It creates a mind set for the owner that had only seen the "romantic" side of having a vineyard (and maybe ultimately a winery). It is in no way a substitute for putting the work and effort in producing a Business Plan, which must take in to account not only these recurring income statement entries once vines are established, but also the initial start-up costs that must be seriously considered.

WRITING THE BUSINESS PLAN

Up to this point we have been trying to define the target with only a scant review of the numbers. The target here is an operable income producing vineyard; what someone would hope to actually see 5 or 6 years after the vineyard was started. It is this "big picture" that one needs in order to stay focused and achieve the final goal. All decisions are made with this target in mind. The Business Plan answers the Who, What, Where, When, and How questions that not only provide the guidance towards reaching this

goal, but also addresses the shortfalls in thinking and planning, and sells the idea presenting its path to success that lenders require if they review the Plan.

Though there are varying techniques in arranging the key elements of a Business Plan, most will include the following in about this order:

- Executive Summary
- General Business Information
- Strategic Plan
- Legal & Institutional Plan
- Management Plan
- Staff Estimates
- Marketing Plan
- Cash Flow Tables
- Forecasted Income Statements
- Risk Analysis
- Various Appendices

Two final notes: The Business Plan that immediately follows lays out the approach specifically tied to setting up a vineyard comprised entirely of Norton grapes. The numbers shown reflect those compiled when researching known Norton vineyards in the Commonwealth of Virginia, along with written sources. Additionally, the writer owns a vineyard himself comprised of both American and French cultivars, and has nearly nine years of compiled data to lean back on when interpreting survey results. It is this data and its derived conclusions that a future owner-operator will continue to refer

to as the plan is executed. But it should be understood that the other parts of the plan are equally important, for they are the selling tools one needs if the Business Plan is reviewed by outsiders. This is the major reason why a Business Plan should be written in easy to understand language that is telling the story of the borrower. It makes the convincing argument that the future viticulturist has thought through the entire process and not underestimated the trials and tribulations of building something from scratch. It not only provides assurance for this owner-operator, but exudes confidence in the entire project that lenders require when loaning money to an unknown borrower.

Secondly, there are sections of the Business Plan that provide more prose than analytical specifics. They are part of the story that one needs to visualize as one walks through the steps to success. Where a section is devoted to items of more personal nature, such as citing one's education and training, a general description will be made of what should be written here and what the lenders are looking for. A "make-believe" author for the Business Plan will not be described, in as much as there can be numerous combinations of writers that bring to the project different levels of experience and strengths; there is no perfect cookie cutter background and approach for an individual that will guarantee a positive outcome above all others.

A “Virginia Norton” VINEYARD

BUSINESS PLAN

Table of Contents

Executive Summary	15
General Business and Industry Information	17
Strategic Plan	20
Legal & Institutional Plan	22
Management Plan	28
Operations Staff Estimates	30
Sales Plan	32
References	33
Table 1: Year One Cash Costs For Virginia Norton Vineyard	34
Table 2: Year Two Cash Costs For Virginia Norton Vineyard	35
Table 3: Year Three Cash Costs For Virginia Norton Vineyard	36
Table 4: Year Four Cash Costs For Virginia Norton Vineyard	37
Table 5: Year Five Cash Costs For Virginia Norton Vineyard	38
Table 6: Year Six Cash Costs For Virginia Norton Vineyard	39
Table 7: Income Statement Comparisons for Year 1 – 6	40
An Analysis of the Cash Statements and the Income Statement	41
Conclusions and Recommendations	44
Appendix A: “Norton” Vineyards/Wineries in Virginia	46
Appendix B: Farmland Available in Virginia in February 2016	48
Appendix C: Norton Vineyard Research Project Questionnaire	50
Appendix D: Survey Summary from Vineyard Tours	52
Appendix E: Capital Equipment for a Virginia Norton Vineyard	53
Appendix F: Pesticide Program and Costs for a 30 Acre Vineyard	54
Appendix G: Material Cost Detail for a Virginia Norton Vineyard	55

Executive Summary

The Virginia Norton Vineyard is being established first and foremost to address an urgent need for State-grown Norton grapes required in the local wine industry. Since 2007, when there were 119 wineries in the state, the industry has grown to greater than 254 in 2016. The corresponding increase in grape demand has not been met by an increase in the number of vineyards or by the expansion of existing vineyards [1, 2].

	2007	2014	% Increase
# of Wineries	119	254	114%
Bearing Acres – all types	2400	3144	31%
For Nortons only	91	120	31.9%
Tons Produced – all types	5600	8039	44%
For Nortons only	178	252	41.6%

Dealing in generalities, if one assumes that it takes one ton of grapes to produce 50 cases of wine, then the 8039 tons of grapes produced in 2014 can convert to 401,950 cases of wine. When compared to the 515,000 cases produced by Virginia wineries in 2014 [5], this makes for a 113,050 case shortfall. This means that in order to satisfy local demand, wineries in Virginia had to go outside the state to purchase 2261 tons of grapes (or juice equivalent).

Numbers specific to the Norton grape are very similar to the all-inclusive statistics cited above, with bearing acres up 31.9% and tonnage produced up 41.6% during the same period.

Norton grapes are a Native American variety that appears to do well in Virginia. Though it has stiff competition with European vinifera in the dry table wine category, there have been some strides made in using it in port-style wines. The advantage of the latter is that these are sold at higher prices per liter, which tends to complement well with the often times lower yields and its high acid and anthocyanin concentrations. [3]

Establishing a vineyard is no small task. There are advantages and disadvantages with either setting it up all at once or staggering the planting over several years. A single surge at the beginning requires a significant cash outlay providing some economies of scale but in four or six years' time creates a sustainable burst of revenue from that point on. A staggered approach spreads out the workload and may delay positive cash flow because of the needed up-front capital expense regardless. This plan has opted to use the "all in" approach, because it puts on the table all the costs required involved in the set up.

There are many factors to be considered when establishing a vineyard. Understand that there are wine grapes being grown in all 50 states; it is only a matter of determining what techniques would work best in a particular region. The approaches to these are tried and true, though there may be some minor variations required based on findings as one proceeds step by step in the planning and actual initiation of the project. These will be explained in greater detail in the Strategic Plan section.

GENERAL BUSINESS & INDUSTRY INFORMATION

PRIMARY PERSONNEL: A vineyard with an anticipated size of 30 acres requires two significantly different levels of knowledge. The first obviously requires some experience in agriculture, though initially this may be rudimentary to get started. As each successive year evolves, this knowledge must be built on to cover the more detailed aspects of growing grapes.

The second area of understanding is on the business side. Knowing income statements and a thorough grasp of cash flow are critical, especially in a business that doesn't generate income for the first few years. It is very easy to get in the spending mood, and that could easily lead to someone running out of capital too early to see positive results. Even though some funding may be acquired, there is a cost to this borrowing that must be accounted for over the long haul.

Resumés that describe the education and experiences of the future owner-operator should show solid expertise in these fields, or a path that would convince a lender that the required knowledge will be gained when the time requires it. The writer should do a fair amount of self-analysis and be able to explain clearly how past experience or future training will meet the needs of these important areas.

REAL ESTATE: Selecting a vineyard is probably the number one decision a potential grower will make. The decisions made here will either help or haunt the new grower for the duration of the vineyard. Though one may hear that a southerly exposed, slightly sloping terrain has the ideal traits of a vineyard, there are three conditions to consider that really take these into account. These are: (1) minimum winter temperature, (2) air

movement, and (3) soil drainage. While cold, harsh winters can result in severe cold injury as can early frosts in the fall or late frosts in the spring, hot and humid conditions can increase disease pressure. [4] Norton grapes tend to have an early bud break, but they are also more resistant to late-summer diseases.

One important note here: wineries are located throughout the state. Specific location to market may be more a consideration if a winery is apt to be a natural transition for the vineyard. If a vineyard is the only plan however, proximity to the buyer may be important in as much as when harvest time comes, one would want the winery to be in the “crush mood” and be ready to accept and process the grapes in an orderly fashion. Closeness to the buyer is an advantage when transporting grapes to the crush pad at the winery. Ordinarily Norton grapes need to hang longer on the vine to achieve the sugar levels required for harvest. If the vineyard location is in the Tidewater region, a harvest here may actually coincide with the later harvest seasons for wineries in the higher elevation parts of the state.

EQUIPMENT: Relative to the larger row farm demands, equipment for a vineyard tends to be downsized, primarily because it needs to fit between the rows. There are two things that need to be looked at when choosing a farm tractor, where all other accessories are attached. A small tractor (30 to 35 hp) will meet the minimum requirements of a vineyard at the lowest entry level price. With any size tractor there are bush hogs, spray equipment, post drivers, etc. that are sized to fit. Larger tractors (50 hp+) can still fit between the rows and can be real workhorses without overheating. They can also carry larger loads associated with bigger spray tanks, and drag larger mowers that can cut taller grass. These larger tractors are double in cost, but can also

save significant time by reducing sprayer refills and increasing speeds. They also provide other options around the farm that may include earth removal, disking, or tilling. Thirty acres is a sizeable vineyard, and efficient time utilization and greater flexibility for future needs is important. There is also a myriad of small equipment needed, from weed-wackers to spinning jennys, and seeders.

Nearly all of these capital expenditures are required up front. Shortly after when the vineyard location is identified and work has begun to prep the site, all of the machinery and equipment is needed.

VIRGINIA WINE INDUSTRY: In 1984 the Virginia Wine Board was created by the Virginia General Assembly as part of Virginia's Department of Agriculture & Consumer Services. Though it was assigned many tasks, its primary mission included promoting both education and appreciation for Virginia wines, and to encourage the growing of grapes and increasing wine production. Traditional row crops, especially tobacco, were being hammered in the commodity market, and subsidies were on the decline affecting the bottom line of many farmers. Producing wine grapes, however, offered an opportunity to produce a high value crop and, through direct marketing, allowed the small, dedicated farmer to be profitable yet still maintain the rural, agricultural lifestyle that Virginia is known for.

Today there are over 275 wineries in Virginia, being fifth in the United States in the number of wineries per state*. Contrary to popular belief, *competition* in this business is good. Wineries located near each other attract more tourists who can tour and taste

*Source: Wine Vines Analytics (Winesandvines.com / January 2016)

the varying varieties and vintages of the adjacent wineries. Though there is always the challenge to produce a wine better than the guy next door, customers tend to buy almost any wine they like, even if they visit several wineries in a weekend. Though most of the wineries in Virginia are in the Route 29 corridor, every part of the state is a home to up and coming wineries.

From 2005 till 2015, wine sales through Virginia wineries increased 320,000 cases to 524,000 cases, a 63% increase over ten years. In-state sales of Virginia wine increased 6.3%. According to the Governor's office, this indicates an increase in the solid growth of visitors and tourists to Virginia's wineries and to Virginia wine events. For 2015, Bloomberg News named Virginia as one of the next big wine regions. According to the Virginia Tourism Cooperation, 1.6 million tourists visited Virginia wineries in 2014.

[5][6]

STRATEGIC PLAN

BUSINESS MISSION: We see a significant gap in the amount of Norton grapes that the Virginia wine industry needs to meet consumer demand, and the amount of Norton grapes being harvested in the Commonwealth of Virginia. Our vineyard is directed at this need, conservatively producing on average 2 1/2 tons per acre for a total production anticipated of 75 tons from a 30 acre vineyard. Unlike French cultivars, which comprise the majority of the bearing acres in Virginia, and are easily purchased on the commodity market from out-of-state vineyards, Nortons are an American variety that begs for attention and greater output. Additionally, it is the belief of the writer that with the limited sourcing that exists for this grape, and its growing potential as a fortified wine

with its higher pricing structure, Norton sales can escape from the industry commodity pricing charts and establish a more valid price per ton value.

GOALS: SHORT TERM – YEAR 1

- 1) Locate a piece of property that meets the growing criteria for the Norton grape
- 2) Test and prepare the land for following year planting, including: soil samples and analysis, land prep with lime / nutrients, cover crop seeding, vineyard layout, end post & line post installation
- 3) Set up irrigation main line system

SHORT TERM – YEAR 2

- 1) Till rows
- 2) Plant vines, stake & tie
- 3) Install base line wire and drip line for irrigation*
- 4) Continued weed and disease control

INTERMEDIATE TERM – YEARS 3 - 5

- 1) Prune for height and cordon training; sucker control
- 2) Install T's and upper wires
- 3) Continued weed and disease control
- 4) Contact potential buyers; possible small harvest in years 3 & 4
- 5) Install end post anchors
- 6) Continued training and pruning

- 7) Shoot positioning and leaf pulling
- 8) Continued weed and disease control
- 9) First significant harvest in year 5

LONG TERM – YEARS 6 and BEYOND

- 1) Winter pruning
- 2) Preemergence weed control
- 3) Initial shoot positioning
- 4) Continued weed and disease control
- 5) Shoot positioning and leaf pulling
- 6) Harvest

*Irrigation to be used to supplement water needs in first few years. Thereafter, it can be tied in with an injector system to apply plant directed nutrients if required.

LEGAL and INSTITUTIONAL PLAN

Legal Organization: A vineyard is a farm. With that it requires a large capital expense for equipment and relies heavily on hand labor to do a majority of its tasks. Farming is consistently ranked in the top 10 of the most dangerous professions, primarily because farms use large and heavy equipment in the performance of its duties. Vineyard equipment tends to be much smaller than the large combines used in row farming, but accessories such as mowers, post drivers, trimmers, and sprayers all require a certain amount of care to prevent accidents.

An LLC structure has been determined to be the best option among the several ways to define the business. It provides some liability protections to the owner, yet is sized to provide an uncomplicated structure recognizing that the owner-operator is a major contributor to the day to day operations within the vineyard. It also creates a form that adapts well to stepping up the operation to a more formal approach, which may include payroll, insurances, guarantor positions, and organizational responsibilities.

Licenses, Taxes, and Fees:

- (a) State incorporation is required and must be renewed annually.
- (b) State Employment Commission dictates certain procedures and applications if employees and payroll are necessary.
- (c) Counties require a business license where a tax is levied after gross receipts of \$1000. Because all sales are of an agricultural product being sold to a value-added convertor, there is no sales tax.
- (d) County excise taxes on farm equipment may be exempt; individual county laws may apply.
- (e) Land Use & Zoning: Lands used in farming are generally zoned as Agricultural-Residential, or variations of this. Real estate taxes may be based on going appraised rates or may fall under a "Land Use" qualification (these rates may be lower).
- (f) For virgin land not previously used in farming, a land disturbance application may be required with supporting documentation specifically addressing erosion and water run-off.

(g) Building codes: structures deemed “agricultural” for use in storage and protecting equipment may be exempt from meeting building codes.

(h) Most applicable pesticides do not need certification by the applicator to use.

However, should restricted pesticides be considered, a registration and licensing, with annual classes is required.

General Vineyard Risks: All businesses have their risks, and where the risks cannot be subjugated with purchasing insurance, the risks are reduced or eliminated by ambiguity, cross-training, and additional sources. These are as follows:

- Manpower risks involve potential for manpower shortage or injury. Personnel who obtain payment less than \$600 per annum may be treated as contract employees, where wage deductions and liabilities are the responsibility of the individual (assuming signed contracts are consistently and diligently adhered to). This method is more used in single-requirement applications, such as during harvest, than it is for meeting the daily labor requirements of a vineyard. In these cases, where wages are likely to exceed this threshold, an employee must be handled like a full-time employee with wage deductions and benefits that the vineyard owner decides to offer.

Vineyard labor tends to be seasonal in nature, with the greatest demands being from the end of April until mid-October. Also, there is a balancing act between the specific work that needs to be done and the weather that is suited for best efforts and productivity. In the deep of the summer, farm assignments are best handled by starting early and ending early; five hour days are common when the heat index rises. What this coincidentally provides is a manpower demand of 25 to 30 hours a week which tends to be attractive to teens, interns, students, and

perpetual part-timers. With a crew made up of 2 or 3 individuals plus management, this offers the flexibility to add hours or replace hours should there be a bottleneck need or absenteeism. With the possible exception of pruning, most assignments can be readily made with very little training.

Full-time employees may require workman's compensation (or equivalent) insurance to be assigned. State laws may cite a minimum employee quantity or hours before it becomes mandatory. Long term disability insurance should be considered though not necessarily announced as an employee benefit, primarily because it is a blanket of protection in the event an employee gets seriously injured on the job.

- Planting & agricultural risks. All crop plantings have the potential for partial or complete loss. That is the nature of farming. These include:
 - (a) Acquiring diseased stock. Remedy: purchase grapevines only from providers with solid reputations in the field and can offer disease free certification.
 - (b) Planting in poor soils. Remedy: soil analysis at the start with soil prep as required, including liming and nutrient applications. Review organic matter and supplement as needed. Match rootstock (if used) with soil type.
 - (c) Drought. Remedy: ready an irrigation system to supplement rains for the first few years while root systems develop.
 - (d) Heavy rains. Remedy: when contouring the land, allow for natural drainage. Install tiles every so many rows to remove excess water if needed. Plant a cover crop to reduce soil erosion.

- (e) Heavy winds. Norton grapes, with their Geneva Double Curtain trellis system, are notorious for having trellis damage in severe winds, primarily because of their curtain of vegetative growth. Steel posts should be avoided, and end posts should be sized to match the row length (and hence the fruit load) with solid anchors in place.
- (f) Fungicide diseases. Set up a spray program based on most common plant diseases in the area. Maintain a program for constant observation to identify diseases beyond those already being focused on. Augment spray program to mitigate any new diseases.
- (g) Bird or animal pests. Use protective measures such as Bird-Gard or netting to repel birds. Trap or create a kill program for herbivores. These types of problems are apt to appear in Year 3 with the first small fruit production.
- (h) Insect pests. During the early formative years, identify not only the pests but the timing of these insects within the growing season. Obtain the help of local extension agents to set up traps to collect and identify potential pests, or to provide recent research data for pests likely to be expanding into the area.
- (i) Complete crop loss or significant partial loss. Obtaining crop insurance may be possible after the vineyard is established and a historical value is a matter of record.
- (j) Equipment failure. Most equipment failure tends to be of limited duration, with assignments being postponed for a few days without undue circumstances. Purchase equipment from a reputable dealer who is located close by, with its corresponding warranties.

- **Marketing Risk.** This involves the sale of the product to the winery, where value-added (i.e. the processing) makes a viable product for sale to the consumer.

Without splitting the types of customers (wineries) into too many categories, the extremes involve either the micro-winery that derive most or all of their sales at their winery, by direct selling to the consumer, or the mega-winery that has a solid distribution base that composes the greater part of its sales. A point should be made here, and that is that both of these are beholden to the wines that the consumer is attracted to.

Seventy-five tons of grapes are a lot of grapes. It is in the vineyards best interest to have a good solid blend of winery customers to mitigate any potential problems any one individual winery might have, whether it is changes in demand or managerial issues. It is easy to sell to just one operation, but that presents a high level of vulnerability, and reduces the amount of control one has over their pricing structure. The split allegiance also allows the grapes to be used in a greater array of products, whether it is a straight varietal, used in blends, or made into a dessert style wine (see Appendix A).

- **Financial Risk.** This can be divided into three categories: (1) moneys to tackle the initial capital expenses and start-up of the vineyard, (2) moneys for day-to-day operations during the first few years, and (3) moneys required for handling debt. Up front capital expenses may be handled via equipment financing through the manufacturer (in the case of tractors) with many of the key accessories attached.

Minor capital expense items must be handled via a direct cash infusion by the principal. These items will likely be treated as an expense item or via Section 179 for tax purposes.

Day to day operations must be paid by cash on hand at the start of the venture, and should have an allowance for unforeseen financial demands.

It is imperative that throughout the process that credit records be untarnished in order for traditional lenders to even consider future loans. It is recognized that traditional lenders are highly unlikely to provide funds for a venture that has no history of positive cash flow, or without a significant outlay by the principals where both sweat and equity are recognizable and with assigned value.

Understanding that traditional lenders may not want to be involved until positive cash flow is achieved, the purpose of their later involvement may be in financing equipment that will provide greater efficiencies such as larger tractors or mechanized harvesting equipment, further expansion, or working capital between harvest seasons.

MANAGEMENT PLAN

Owner – Operator (Chief Operating Officer)

- Oversees entire operation to make sure it meets plan in an efficient and timely manner
- Directs general farming staff to see that seasonal requirements are met

- Monitors cash flow of vineyard to meet critical needs
- Determines initial implementation and future expansion plans for the vineyard; designs and purchases vineyard materials as required and assigns
- Is predominant in day-to-day operations of the vineyard; particular emphasis on chemical applications, maintenance & repairs, accounting
- Takes primary role in contract negotiations and purchase agreements
- Directs and trains all personnel assigned to the vineyard, including mowing, pruning, weed control, and harvesting.

Certified Public Accountant to provide quarterly reports and year- end summaries and fulfill mandatory tax requirements. Must be versed in accounting particular to farming, as well as understand the lengthy process and various depreciable items associated with a vineyard.

Legal Counsel to provide input regarding organization of corporation and fulfill annual requirements of County and State.

Insurance Agent to monitor risks and liabilities relative to growth. Makes suggestions regarding coverage required by law as well as to reduce potential risks.

Operations Staff estimates.

Labor needs to be defined as to the work required for 1st and 2nd year set up, ramping up in years 3 and 4, and then from year 5 onward. Most labor, with the exception of the tractor driver (**Experienced**), can be entry level (**EL**). An itemized split of responsibilities is as follows:

Year One

- (1) Land prep – tilling and fertilizing land as soil testing suggests. This uses large scale equipment and will be sub-contracted out. Owner monitoring only.
- (2) Laying out the vineyard: 2 days with 2 men for every four acres. Allow 15 days.
- (3) Installation of posts: 1 week for 2 men (1@E) for every 4 acres. Allow 7 1/2 weeks.
- (4) Cover crop seeding: 2 days for 1 man (E)
- (5) Set up irrigation system: Depending on water source, Owner plus 2 men (1 @E) for 3 days

Summary: Timing, assuming October 1st cover crop seed planting, back up 9 1/2 weeks for a start date of about mid-July. Labor, allow 2 men for the entire period, with one experienced and one at entry level.

Year Two

- (1) Tilling in-row requires one tractor operator (E) for 5+ days.
- (2) Planting using a 10' row x 6' planting provides a requirement for approximately 635 vines per acre. At a planting rate of 500 vines per day using 3 people, to plant all 30 acres in 3+ weeks would require 2 crews.
- (3) Installing base wire and the drip tubes would require 3 people for 5 days but if there is no indication of immediate need, one man can perform this task over 3 weeks.
- (4) Weed , disease, and insect control can be handled by the owner and one experienced operator.

Summary: Planting is to be started on or around April 1st, as long as the potential for a late season frost is over. Manpower for Year 2 is primarily a key experienced man, with a bottle-neck requirement for 5 additional to handle planting for a period of slightly less than a month during April.

Years Three and Forward

- (1) Pruning and weed control now requires 2 full-time laborers. During “slack” times, T's need to be added to the posts (part of a GDC trellis system) along with support wires. Shoot positioning and leaf pulling may be required.
- (2) Picking labor at harvest is proportional to anticipated yield. Allow about one man-day for each ¾ ton of grapes. Mechanized harvesting should be seriously considered once yields get above 800 – 1000 pounds per acre due to a labor vs. timing scenario.

(3) End post anchors should be done before the second harvest, in as much as weight loads will require them at this point. Installation can be done off season before the ground hardens.

(4) Dormant pruning to occur off-season.

Summary: Manpower for Years 3 and going forward will require 2 – 3 people full time during the season, and 2 people off season to handle odd jobs and dormant pruning. The owner, plus one other, should have full capability to run all equipment and be able to self-manage.

SALES PLAN

Sales from a vineyard is a straight-forward cold-calling exercise. There are 275 wineries in Virginia, and even more in neighboring Maryland and North Carolina. Going to their websites is a tedious, but time efficient method to determine what wineries already use Norton grapes, and from this a phone call will determine interest and need. This can be done before anything else is done, but to obtain commitments four or five years before grape delivery is not likely. However, with this type of homework, trends can be determined and possibly other options can be explored before one goes down an irreversible road. Other avenues are available to locate potential grape buyers, including visiting the VVA (Virginia Vineyard Association) exchange site, contacting the Virginia Wine Board Marketing Office, and checking in with similar groups in adjacent states such as the North Carolina Wine & Grape Council.

REFERENCES

[1] 2007 Commercial Grape Report; Virginia Department of Agriculture and Consumer Services

[2] Virginia 2014 Commercial Grape Report, Virginia Wine Board Marketing Office, information @virginiawine.org.

[3] Commercial Grape Varieties in Virginia; Wolf,T., Dami,Zoecklein,B.,Warren,M.K.; Virginia Cooperative Extension, Publication 463-019 (1999)

[4]”Starting a Commercial Wine Grape Vineyard”; Bordelon, B.; Pursue Extension Agriculture and Natural Resources; 2/2/09.

[5] “Governor McAuliffe Announces Virginia Wine Sales Reach New Record High in FY 2015”, press release September 29, 2015 (<http://www.virginia.gov/>)

[6] Virginia Wine Industry Doubles in Five Years”, Cattell,Hudson; Wines & Vines; 2/8/2012.

[7] “The Rise and Fall of Patricia Kluge”, Brennan,Morgan; Forbes.com, 3/10/11.

[8] “Kluge Loses Estate to Bank of America Foreclosure”; Carmiel,Oshrat; Bloomberg.com, 2/17/11.

TABLE 1: YEAR ONE CASH COSTS FOR VIRGINIA NORTON VINEYARD										
Detail Description	Unit	Unit Cost Service	Unit Cost Labor	Unit Cost Materials	Frequency per season*	Seasonal cost for 30 acres				
VARIABLE EXPENSES:										
Soil Fertility Testing	1 lab sample per 3 acres	\$8			1x	\$80				
Land cultivation	per pass	\$500			1x	\$500				
Addition of lime	per acre	\$48			1x	\$1,440				
Vineyard layout - labor*	(4E + 4EL) / acre		\$100		1x	\$3,000				
Vineyard layout - materials	per acre			\$232.25	1x	\$6,968				
Post installation - labor	(10 E + 10 EL) / acre		\$250		1x	\$7,500	Depre. over 7 years			
Post installation - materials	per acre			\$1,434.43	1x	\$43,033	Depre. over 7 years			
Cover crop seeding - labor	16 hrs.E / application		\$240		1x	\$240				
Cover crop seeding - material	per acre			\$75	1x	\$2,250				
Irrigation system - labor	(12 E + 12 EL) / installation		\$300.00		1x	\$300	Depre. Over 15 years			
Irrigation system - materials	per installation			\$8,531.00	1x	\$8,531	Depre. Over 15 years			
						Σ	\$73,842			
FIXED EXPENSES										
General administrative & selling						\$2,000				
Equipment expensed - year one						\$3,182				
Equipment-depreciable - yr.one						\$11,231	For full cost refer to Cap.Equip.			
Vineyard & irrigation depreciation reqmts.						\$7,808	Includes depre.items above			
Real Estate - principal						\$3,171				
Real Estate - interest						\$7,040				
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.										
Labor costs do not include employer contribution.										
- No management costs considered in any calculation										
- For Real Estate, assumes total cost of \$118,773, with a 20-year fixed loan at 6%; amount shown										
is the single year expense including both principal & interest.										
-Assumes season goes from April 1st to September 30th (26 weeks)										

TABLE 2: YEAR TWO CASH COSTS FOR VIRGINIA NORTON VINEYARD

Detail Description	Unit	Unit Cost Labor	Unit Cost Materials	Frequency per season*	Seasonal cost for 30 acres	
VARIABLE EXPENSES:						
In-row tilling - labor	(1.5 hrs. x E) / acre	\$22.50		1x	\$675	
Planting grapevines - labor	(3 menx8 hrs.xEL)/acre	\$240.00		1x	\$7,200	Depre.over 10 yrs.
Planting grapevines - vines	per acre		\$2,381	1x	\$71,438	Depre.over 10 yrs.
Install base wire & drip tubes - labor	(4.25 hrs. x EL) / acre	\$42.50		1x	\$1,275	Depre.over 15 years
Install base wire & drip tubes - material	per acre		\$1,205	1x	\$36,136	Depre.over 15 years
Weed control - labor	(.75 hr. x E) / acre	\$11.25		6x	\$2,025	
Weed control - chemicals	per acre		\$3.03	6x	\$545	
Insect Control (only) - Labor	(.5 hr. x E) / acre	\$7.50		5x	\$1,125	
Insect Control (only) - Chemicals	Insecticide @ 1.5 qts/acre		\$15.75	5x	\$2,363	
Strip mowing - labor	(.625 hr. x E) / acre	\$9.38		18x	\$5,065	
Fuel	per acre		\$1.45	30x	\$1,305	
Perishable tooling / maintenance	as required		variable		\$4,000	
					Σ	\$133,152
FIXED EXPENSES						
General administrative & selling					\$2,000	
Insurance - truck					\$400	
Property & liability insurance					\$603	
Property taxes - truck	\$4.00 / 100				\$1,535	
Property taxes - real estate	\$.73 / 100				\$867	
Equipment expensed (year 2 only)					\$1,461	
Equipment depreciable(incl.yrs. 1 & 2)					\$12,815.00	For full cost, refer to Cap.Equip.
Vineyard + irrigation depreciation reqmts.					\$18,166.00	Includes both depre.items above
Real Estate - principal					\$3,366	Not on Inc.State.
Real Estate - Interest					\$6,845	
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.						
Labor costs do not include employer contribution.						
- No management costs considered in any calculation						
- Assumes season goes from April 1st to September 30th (26 weeks)						

TABLE 3: YEAR THREE CASH COSTS FOR VIRGINIA NORTON VINEYARD						
Detail Description	Unit	Unit Cost Labor	Unit Cost Materials	Frequency per season*	Seasonal cost for 30 acres	
VARIABLE EXPENSES:						
Fertilizer application - labor	(3.5 hrs. x EL) / acre	\$35.00		1x	\$1,050	
Fertilizer application - chemicals	per acre		\$103	1x	\$3,090	
Weed control - labor	(.75 hr. x E) / acre	\$11.25		6x	\$2,025	
Weed control - chemicals	per acre		\$3.03	6x	\$545	
Disease & Insect Control - Labor	(.5 hr. x E) / acre	\$7.50		4x	\$1,800	
Disease & Insect Control - Chemicals	see itemized breakdown		variable	4x	\$5,801	
Vine training - labor	(18 hrs. x EL)/acre	\$180.00		1x	\$5,400	
Strip mowing - labor	(.625 hr. x E) / acre	\$9.38		18x	\$5,065	
Assemble T's on trellis posts - labor	(28 hrs. x EL) / acre	\$280.00		1x	\$8,400	Depre. over 7 yrs.
Assemble T's on trellis posts - material	per acre		\$676.30	1x	\$20,289	Depre. over 7 yrs.
Install support and top wires - labor	(6.75 hrs. x EL) / acre	\$67.50		1x	\$2,025	Depre. over 7 yrs.
Install support and top wires - 3 wires	per acre		\$413.50	1x	\$12,405	Depre. over 7 yrs.
Install end post anchors - labor	(3E + 3EL) / acre	\$75.00		1x	\$2,250	Depre. over 7 yrs.
Install end post anchors - materials	per acre		\$244.05	1x	\$7,322	Depre. over 7 yrs.
Fuel	per acre		\$1.45	28x	\$1,218	
Perishable tooling / maintenance	as required		variable		\$4,000	
Petiole sampling	per 5 acres		\$26.20	1x	\$157	
Harvest labor at 1/4 ton per acre	(12 x EL)/ton	\$120.00		1x	\$900	
					Σ \$83,742	
FIXED EXPENSES						
General administrative, selling, and training					\$2,500	
Insurance - truck					\$400	
Property & liability insurance					\$603	
Property taxes - truck	\$4.00 / 100				\$1,415	
Property taxes - real estate	\$.73 / 100				\$867	
Equipment expensed (year 3 only)					\$5,488	
Equipment depreciable (yrs. 1 & 2)					\$12,815.00	For full cost refer to Cap. Equip.
Vineyard & irrigation depreciation reqmts.					\$25,693.00	Incl. all items above
Real Estate - principal					\$3,564	Not on Inc. State.
Real Estate - Interest					\$6,647	
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.						
Labor costs do not include employer contribution.						
- No management costs considered in any calculation						
- Assumes season goes from April 1st to September 30th (26 weeks)						

TABLE 4: YEAR FOUR CASH COSTS FOR VIRGINIA NORTON VINEYARD						
Detail Description	Unit	Unit Cost	Unit Cost	Frequency	Seasonal cost	
		Labor	Materials	per season*	for 30 acres	
VARIABLE EXPENSES:						
Pre-emergent herbicide appl.-labor	(.75 hr. x E) / acre	\$11.25		1x		\$338
Pre-emergent herbicide appl.-chemicals	per acre		\$10.65	1x		\$319
Fertilizer application - labor	(3.5 hrs. x EL) / acre	\$35.00		1x		\$1,050
Fertilizer application - chemicals	per acre		\$103	1x		\$3,090
Weed control - labor	(.75 hr. x E) / acre	\$11.25		6x		\$2,025
Weed control - chemicals	per acre		\$3.03	6x		\$545
Disease & Insect Control - Labor	(.5 hr. x E) / acre	\$7.50		4x		\$1,800
Disease & Insect Control - Chemicals	see itemized breakdown		variable	4x		\$8,062
Vine training - labor	(28 hrs. x EL) / acre	\$280.00		3x		\$25,200
Strip mowing - labor	(.625 hr. x E) / acre	\$9.38		18x		\$5,065
Fuel	per acre		\$1.45	29x		\$1,262
Perishable tooling / maintenance	as required		variable			\$4,000
Petiole sampling	per 5 acres		\$26.20	1x		\$157
Harvest labor at 1/2 ton per acre	(12 x EL)/ton	\$120.00		1x		\$1,800
					Σ	\$54,714
FIXED EXPENSES						
General administrative, selling, and training						\$2,500
Insurance - truck						\$400
Property & liability insurance						\$603
Property taxes - truck	\$4.00 / 100					\$1,295
Property taxes - real estate	\$.73 / 100					\$867
Equipment expensed						\$0
Equipment depreciable (yrs. 1 & 2)						\$12,815.00
Vineyard & irrigation depreciation reqmts.						\$25,693.00
Real Estate - principal						\$3,794
Real Estate - Interest						\$6,417
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.						
Labor costs do not include employer contribution.						
- No management costs considered in any calculation						
- Assumes season goes from April 1st to September 30th (26 weeks)						

TABLE 5: YEAR FIVE CASH COSTS FOR VIRGINIA NORTON VINEYARD						
Detail Description	Unit	Unit Cost	Unit Cost	Frequency	Seasonal cost	
		Labor	Materials			
VARIABLE EXPENSES:						
Pre-emergent herbicide appl.-labor	(.75 hr. x E) / acre	\$11.25		1x	\$338	
Pre-emergent herbicide appl.-chemicals	per acre		\$10.65	1x	\$319	
Fertilizer application - labor	(3.5 hrs. x EL) / acre	\$35.00		1x	\$1,050	
Fertilizer application - chemicals	per acre		\$103	1x	\$3,090	
Weed control - labor	(.75 hr. x E) / acre	\$11.25		6x	\$2,025	
Weed control - chemicals	per acre		\$3.03	6x	\$545	
Disease & Insect Control - Labor	(.5 hr. x E) / acre	\$7.50		4x	\$1,800	
Disease & Insect Control - Chemicals	see itemized breakdown		variable	4x	\$8,062	
Vine training - labor	(28 hrs. x EL) / acre	\$280.00		3x	\$25,200	
Strip mowing - labor	(.625 hr. x E) / acre	\$9.38		18x	\$5,065	
Fuel	per acre		\$1.45	29x	\$1,262	
Perishable tooling / maintenance	as required		variable		\$4,000	
Petiole sampling	per 5 acres		\$26.20	1x	\$157	
Harvest labor at 1 1/2 tons per acre	(12 x EL)/ton	\$120.00		1x	\$5,400	
					Σ	\$58,314
FIXED EXPENSES						
General administrative, selling, and training					\$2,500	
Insurance - truck					\$350	
Property & liability insurance					\$603	
Property taxes - truck	\$4.00 / 100				\$1,175	
Property taxes - real estate	\$.73 / 100				\$867	
Equipment expensed					\$0	
Equipment depreciable (yrs. 1 & 2)					\$12,815.00	For full cost refer to Cap.Equip.
Vineyard & irrigation depreciation reqmts.					\$25,693.00	
Real Estate - principal					\$4,029	Not on Inc.State.
Real Estate - Interest					\$6,182	
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.						
Labor costs do not include employer contribution						
- No management costs considered in any calculation						
- Assumes season goes from April 1st to September 30th (26 weeks)						

TABLE 6: YEAR SIX CASH COSTS FOR VIRGINIA NORTON VINEYARD						
Detail Description	Unit	Unit Cost		Frequency per season*	Seasonal cost for 30 acres	
		Labor	Materials			
VARIABLE EXPENSES:						
Pre-emergent herbicide appl.-labor	(.75 hr. x E) / acre	\$11.25		1x		\$338
Pre-emergent herbicide appl.-chemicals	per acre		\$10.65	1x		\$319
Fertilizer application - labor	(3.5 hrs. x EL) / acre	\$35.00		1x		\$1,050
Fertilizer application - chemicals	per acre		\$103	1x		\$3,090
Weed control - labor	(.75 hr. x E) / acre	\$11.25		6x		\$2,025
Weed control - chemicals	per acre		\$3.03	6x		\$545
Disease & Insect Control - Labor	(.5 hr. x E) / acre	\$7.50		4x		\$1,800
Disease & Insect Control - Chemicals	see itemized breakdown		variable	4x		\$8,062
Vine training - labor	(28 hrs. x EL) / acre	\$280.00		3x		\$25,200
Strip mowing - labor	(.625 hr. x E) / acre	\$9.38		18x		\$5,065
Fuel	per acre		\$1.45	29x		\$1,262
Perishable tooling / maintenance	as required		variable			\$4,000
Petiole sampling	per 5 acres		\$26.20	1x		\$157
Harvest labor at 2 1/2 tons per acre	(12 x EL) / ton	\$120.00		1x		\$9,000
					Σ	\$61,914
FIXED EXPENSES						
General administrative, selling, and training						\$2,500
Insurance - truck						\$325
Property & liability insurance						\$603
Property taxes - truck	\$4.00 / 100					\$1,055
Property taxes - real estate	\$.73 / 100					\$867
Equipment expensed						\$0
Equipment depreciable (yrs. 1 & 2)						\$12,815.00
Vineyard & irrigation depreciation reqmts.						\$25,693.00
Real Estate - principal						\$4,269
Real Estate - Interest						\$5,942
NOTE - Labor charges are: Experienced (E) @ \$15 / hr.; Entry Level (EL) @ \$10 / hr.						
Labor costs do not include employer contribution.						
- No management costs considered in any calculation						
- Assumes season goes from April 1st to September 30th (26 weeks)						

TABLE 7: INCOME STATEMENT COMPARISONS FOR YEAR 1 THROUGH YEAR 6 FOR A 30 ACRE VIRGINIA NORTON VINEYARD							
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
INCOME							
Revenue from grape sales	0	0	\$12,150	\$24,300	\$72,900	\$121,500	
Minus Cost of Goods Sold:							
Soil/petiole testing	\$80	0	\$157	\$157	\$157	\$157	
Land cultivation	\$500	0	0	0	0	0	
Cover crop seeding	\$2,250	0	0	0	0	0	
Vineyard labor (not harvest)	\$3,240	\$8,890	\$16,240	\$36,378	\$36,378	\$36,378	
Vineyard labor (harvest)	\$0	0	\$900	\$1,800	\$5,400	\$9,000	
Fertilizers	\$1,440	0	\$3,090	\$3,090	\$3,090	\$3,090	
Chemicals	\$0	\$2,908	\$6,346	\$8,926	\$8,926	\$8,926	
Fuel	\$0	\$1,305	\$1,218	\$1,262	\$1,262	\$1,262	
GROSS MARGIN	(\$7,510)	(\$13,103)	(\$15,801)	(\$27,313)	\$17,687	\$62,687	
EXPENSES							
General admin. & selling	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	
Perishable tooling & maint.	\$6,968	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	
Expensed capital equipment	\$3,182	\$1,461	\$5,488	0	0	0	
Insurances	\$0	\$1,003	\$1,003	\$1,003	\$953	\$928	
Taxes - property & real estate	\$0	\$2,402	\$2,282	\$2,162	\$2,042	\$1,922	
Depreciable capital expenses	\$11,231.00	\$12,815	\$12,815	\$12,815	\$12,815	\$12,815	
Depreciable vineyard estab.	\$7,808.00	\$18,166	\$25,693	\$25,693	\$25,693	\$25,693	
Real estate - interest only	\$7,040	\$6,845.00	\$6,647	\$6,417	\$6,182	\$5,942	
Total expenses:	\$38,729	\$49,192	\$60,428	\$54,590	\$54,185	\$53,800	
EARNINGS BEFORE TAXES:	(\$46,239)	(\$62,295)	(\$76,229)	(\$81,903)	(\$36,498)	\$8,887	

AN ANALYSIS of the CASH STATEMENTS and the INCOME STATEMENT

When the project was initially laid out, certain assumptions were made in order to focus on a particular sized vineyard that had a good chance of providing an income level of \$60,000. Using data from industry surveys, as well as some practical experience in this specific type of vineyard, the author was able to create a series of spreadsheets that described in detail the anticipated costs of setting up and running a 30 acre vineyard that was solely devoted to the Norton grape. There are three major items to understand when dissecting the numbers and trying to draw a conclusion based on an Income Statement that is amass in red ink.

Firstly, from a cash perspective, it was assumed that absolutely no assets that were previously owned could be applied towards this endeavor. No land, no tractors or vehicles were able to be tapped for possible use in setting up the vineyard. If any of these were available, they would likely reduce the out of pocket need for these working assets yet still possibly provide a means via depreciation to reduce taxes.

Secondly, with the possible exception of the land, a tractor, and a truck, financing in all likelihood would be impossible to obtain. Therefore, it is up to the owner-operator to have deep pockets to initiate this venture and be able to hold on until positive cash flow can occur. For this exercise, none of the depreciable items were considered to be able to be purchased using conventional financing. Items such as the truck and tractor, if purchased via financing, would only show a strain on monthly cash requirements of less than a thousand dollars, therefore these were considered to be purchased with up front funds. A review of the required cash contribution will follow.

And thirdly, it was noted on the Year One Cash Costs that no management labor was considered. Again, if someone wants to make a go in operating a vineyard, they are probably an individual that wants to be integrally involved and hands on. With that being the case, outside labor costs can be reviewed to see how their costs can be reduced. Looking at just Year Six, there are 1620 man hours scheduled to perform chemical applications, mowing, and vine training. Using 22 man-days per month, with 8 hour days over the six month growing season, this provides 1056 hours that the owner can opt in on with regards to performing field work. If all the work noted as “E” work is done, this offers 675 hours that was budgeted in at \$15 / hour, or \$10,125. Add just another 400 hours at the rate of \$10 / hour, this now reduces total out of pocket cost by \$14,125.

Working backwards, if one were to focus on the Income Statement beginning in Year Six to identify where available cash can come from to achieve the target amount of \$60,000, it can easily be identified by:

Earnings before taxes	\$ 8887.
Labor Savings	\$ 14125.
Depreciable items	\$38508.
Land interest	<u>\$ 5942.</u>
Total	\$67462.

Accepting these as the primary means of creating enough cash for meeting our target goal, then the cash requirements to enter into this venture can be itemized as follows:

Year 1: Land	\$118,773
Capital equipment	\$ 68060
Vineyard set up	\$ 59364
Working capital*	\$ 16478
Year 2: Capital equipment	\$ 12552
Vineyard set up	\$ 116049
Working capital*	\$ 22508
Year 3: Capital equipment	\$ 5488
Vineyard set up	\$ 52691
Working capital*	\$ 29110
Year 4: Working capital*	<u>\$ 42388</u>
Total:	\$543461

NOTE:* these amounts are not reduced to compensate for owner's contribution.

Recognizing that the owner cannot reduce the labor costs in any particular year that has labor costs less than his potential (i.e. \$14,125 / year), and that some job requirements need two people, if we allow half of the labor costs in years 1 through 3 and a full allotment in year 4, we then can show a reduction in working capital need by \$28,310.

CONCLUSIONS and RECOMMENDATIONS

One should not conclude that if they wanted to put in a half million dollars to set up and operate a vineyard, that they would have a greater than even chance at having a successful enterprise. The point is, that even if one met the plan line item by line item, there are so many potential opportunities for catastrophe that even an in-depth analysis of risks won't absolutely prevent them from happening.

One should expect that a major crop loss will occur once every 10 years, whether it be by severe frost, hurricanes, pestilence, or whatever. Secondly, consumer preferences do change. Merlot lost favor and was rapidly replaced by Pinot Noir, in part because in the movie *Sideways*, Paul Giamatti refused to drink Merlot. Farms adjacent may put down some 2-4D at exactly the wrong time and decimate your grape crop. Years of litigation will bankrupt the vineyard owner and line the pockets of the attorney's.

Farming, and for that matter, entrepreneurship, is not for the weak at heart (or weak back). The point is, no bank, venture capitalist, or mildly insane angel investor is going to invest in a vineyard before it reaches a positive cash flow. Many of these individuals, especially those affiliated with banks, don't understand start-ups, let alone vineyards, which have an extraordinarily long period to ramp up. Only a long range thinker can stay with it and focus on the end result that may be five years after the first vine is planted.

There is no easy answer to recognizing this "weakness" in the banking industry relative to understanding this particular type of farming. The IRS has put together "Wealth Squads" that are designed to understand the many valid business reasons that a high wealth individual uses when designing sophisticated financial business and

investment arrangements composed of complicated legal structures that lead to certain tax advantages. These arrangements are completely above board and the Wealth Squads are trained to unravel these intricacies of a well-designed business plan and understand the entire economic picture of the business. Those financial institutions that deal with wineries and vineyards should treat their financials with similar and distinct scrutiny.

There are things the future vineyard owner can do to aid in profitability and reduce risk even further, though it requires a slightly different mindset than the original Business Plan. These include:

- Diversify by raising other varietals. Most French varietals obtain greater yields and have a higher market value than Nortons. Additionally, most French vines use a vertical shoot positioning trellis, which is less expensive, and allows for tighter row spacing. Having a variety of grape types will also buffer the effects of consumer shifts in preference.

There are ample studies one can find on-line, as well as printed sources, that review the costs associated with setting up a vinifera vineyard. Referring to just one : Wine Grape Production Guide for Eastern North America^{*}, it calls for \$73,500 in capital equipment as compared to \$81,351 of comparable items in Appendix E. The *Guide* also shows costs to set up the vineyard; looking at only its variable costs amounts to \$8028 per acre. Removing land, capital equipment, and other depreciable costs such as irrigation from the Norton vineyard

^{*} Wine Grape Production Guide for Eastern North America, Wolf,T.K.,(ed.), Natural Resource Agriculture and Engineering Service Cooperative Extension, NRAES-145 (2008).

calculation as described on page 45 , this study finds \$8060 to be the cash outlay to cover the establishment and operational costs per acre for a 30 acre Norton vineyard. As for when each type of vineyard starts to obtain positive returns, the *Guide* has it beginning in Year 4, while the Norton vineyard has it starting in Year 6. As previously mentioned, a vinifera vineyard has significantly higher harvest income to offset the planned expenses.

As with any study comparison, the devil is in the detail. Where one study felt a deer fence to be important, another might believe additional canopy care might be required. A future viticulturist should understand all the variations and how they may apply to his/her particular situation.

- Losses can be carried back 2 years and forward by as many as 20 years. If someone is planning on starting a vineyard with its inherent loss structure, make the decision quickly in line with a career change so as to have prior earnings (and taxes paid) be offset by subsequent losses.
- Consider starting a small winery. Adding value to the grapes by processing small batches into wine provides greater margins than trying to sell grapes alone.
- Though it prolongs the period to get in the black, consider a staggered approach to implementing the full vineyard. Regardless of the amount of homework you do, many lessons are learned the hard way. Mistakes with a few acres are more tolerable than a huge error recognized amongst 30 acres.

APPENDIX A

Vineyards / Wineries in Virginia that Promote and/or grow Norton Grapes

Winery	Where?	Wine Region
Abington	Abington	Blue Ridge
Barrel Oak	Delaplane	Northern Virginia
Belle Mount	Warsaw	Chesapeake
Bluemont	Bluemont	Northern Virginia
Boxwood	Middleburg	Northern Virginia
Bright Meadows	Nathalie	Southern Virginia
Burnley	Barboursville	Central Virginia
Byrd	Goochland	Central Virginia
Cana	Middleburg	Northern Virginia
Casanel	Leesburg	Northern Virginia
Chrysalis	Middleburg	Northern Virginia
Cooper	Louisa	Central Virginia
DeVault	Concord	Central Virginia
Desert Rose	Hume	Northern Virginia
DuCard	Etlan	Central Virginia
Elk Island	Goochland	Central Virginia
Glass House	Free Union	Central Virginia
Greenhill	Middleburg	Northern Virginia
Hampton Roads	Elberon	Hampton Roads
Horton	Gordonsville	Central Virginia
Hummel	Montross	Chesapeake
Jacey	Wicomico Church	Chesapeake
Keswick	Keswick	Central Virginia
Lexington Valley	Rockbridge Baths	Shenandoah Valley
Molliver	Nathalie	Southern Virginia
Mountain Cove	Lovingston	Central Virginia
New Kent	New Kent	Hampton Roads
Paradise Springs	Clifton	Northern Virginia
Potomac Point	Stafford	Northern Virginia
Rappahannock	Huntly	Northern Virginia
Rockbridge	Raphine	Shenandoah Valley
Twin Oaks Tavern	Bluemont	Shenandoah Valley

Veramar	Berryville	Shenandoah Valley
Weston Farm	Louisa	Central
White Wall	Louisa	Central Virginia
The Winery at Bull Run	Centreville	Northern Virginia
The Winery at LaGrange	Haymarket	Northern Virginia
Wisteria	Stanley	Shenandoah Valley

Info. Source: Virginia Wineries Association (10/2013)

APPENDIX B

FARMLAND AVAILABLE IN VIRGINIA IN FEBRUARY 2016 (Filters and considerations noted below)

Location of land	Wine Region	Asking Price	Actual # of acres
Laurel Fork	Blue Ridge	150,000	45
Floyd	Blue Ridge	139,900	50.52
Bland	Blue Ridge	139,000	54
Elliston	Blue Ridge	134,900	35.96
Bastian	Blue Ridge	95,000	75
Draper	Blue Ridge	85,000	31.7
Independence	Blue Ridge	130,000	32.74
Floyd	Blue Ridge	114,900	38.41
Stuart	Blue Ridge	128,000	40
Stuart	Blue Ridge	94,750	42.1
Ararat	Blue Ridge	78,900	33.62
Pearisburg	Blue Ridge	118,000	30.43
	AVERAGE	117,363	
Aylett	Chesapeake Bay	99,950	32.4
King William	Chesapeake Bay	99,950	32.4
	AVERAGE	99,950	
Appomattox	Central Virginia	104,900	41.52
Buckingham	Central Virginia	77,280	55.2
Farmville	Central Virginia	129,900	45.53
Pamplin	Central Virginia	124,900	60
Prospect	Central Virginia	111,000	37.7
	AVERAGE	109,596	
Gloucester	Hampton Roads	149,900	36
Port Haywood	Hampton Roads	99,900	130
	AVERAGE	124,900	
Valentines	Southern Virginia	150,000	137
Nathalie	Southern Virginia	129,900	47.81
Ridgeway	Southern Virginia	119,900	53
Kenbridge	Southern Virginia	119,500	35.29
Nathalie	Southern Virginia	110,000	44
Gretna	Southern Virginia	79,900	52.13
Chatham	Southern Virginia	149,900	44.42
Danville	Southern Virginia	135,000	80
Danville	Southern Virginia	135,000	78
Gretna	Southern Virginia	49 129,000	30.66

Gretna		Southern Virginia	129,000	30.66
Chatham		Southern Virginia	88,900	37.88
Buffalo Junction		Southern Virginia	139,500	56
Martinsville		Southern Virginia	129,900	35.96
Chase City		Southern Virginia	125,000	34.09
Martinsville		Southern Virginia	115,000	56
Java		Southern Virginia	99,800	38.5
		AVERAGE	122,263	
Rocky Mount		Virginia Mountains	120,000	31.23
Rocky Mount		Virginia Mountains	149,900	39.57
		AVERAGE	134,950	
		OVERALL AVERAGE	118,773	
Wine Regions not represented: The North Fork of Roanoke				
		Rocky Knob AVA		
		Monticello		
		Northern Neck		
		Eastern Virginia		
		Eastern Shore		
		Heart of Appalachia		
		Northern Virginia		
		Middleburg Virginia AVA		
		Shenandoah		
		Shenandoah AVA		
Assumptions in reviewing land:				
(1) filters used were total property less than \$150,000 and greater than 30 acres				
(2) no consideration given for a house on the property				
(3) reasonable belief that land is cleared or easily clearable (i.e. no timberland)				
(4) slope and elevation of the land not considered				
Information obtained at Landsofvirginia.com 2/19/16				

APPENDIX C : Norton Vineyard Research Project – Informational Data Pertaining To Start-up and 2014

Results

General Questions:

1. How many total acres of grapevines do you have? _____
2. Of these, how many acres of these are Nortons ? _____
3. This equates to approximately how many Norton vines? _____
4. Norton row spacing? _____ Vine spacing? _____
5. The trellis / training system in practice is: _____
6. Is the vineyard irrigated? _____
7. Are all of these Norton vines producing? _____
8. What was the harvest yield for Nortons in 2014? _____
9. Was the harvest used fully for in-house processing or was it sold? _____
If sold, what was the revenue per ton? _____
10. When were the Norton vines established? _____
11. Are you planning on expanding your number of Norton vines? _____

The following questions pertain to costs associated with 2014 output.

Will the figures provided be interpolated as **a percentage of total vineyard costs** or **were the costs kept separate from the other operations?** (circle one)

Labor / Prunings & Thinning(leaf and cluster / Canopy Management:

12. How many dormant prunings were performed? _____ Man hours: _____
13. How many subsequent handlings were performed? _____ Man hours _____
Describe type of work _____
14. How often was the vineyard mowed? _____ Number of man hours per? _____
15. For vineyard labor, what was the direct cost per hour? _____

Labor / Sprayings:

16. Did you follow Dr. Mizuho Nita's guide for fungicide spraying? Yes / No
17. How often was spraying performed on the vines? _____
18. Total man hours required (including set up and cleaning) per spraying? _____
(If direct labor cost is different than described in #13 above, please define: _____)
19. Was spraying supplemented with manual labor, such as weed wacking? _____
If so, how many hours? _____

Labor / Harvest:

20. Was harvest done manually or mechanically? _____
21. Total man hours required for harvest? _____

APPENDIX C : Norton Vineyard Research Project – Informational Data Pertaining To Start-up and 2014 Results - continued

22. Splits / Cost of labor: (a) Man hours by full / part time employees: _____
 Cost per hour: _____
 (b) Man hours by contracted labor: _____
Cost per hour or total cost : _____
 (c) Man hours by volunteers : _____
 Expenses associated with volunteers : _____

Chemical and Other General Costs:

1. What were the primary chemicals used in each of the applications:
 - (a) As fungicides _____
 - (b) As insecticides _____
 - (c) As herbicides _____
2. Assuming fungicides and insecticides were combined, referring to the answer in #14, what was the cost per spray application? _____ or Total cost for the season? _____
3. Based on the experience of 2014, are you likely to perform about the same number of sprays in 2015? Yes / No
4. Assuming herbicides were used, how many sprayings were performed?
 Cost per spray? _____ or Total cost for the season? _____
5. For herbicide spraying: was it inter-row, intra-row, or both? (circle one)
 Did you perform any pre-season spraying with pre-emergents or to kill winter or early weeds? _____
6. Were there any other significant costs pertaining to the Norton vines and trellising, such as:
 - (a) Repairs(not machinery)? _____ Cost: _____
 - (b) Replacement vines ? _____ Cost: _____
 - (c) General machinery repairs, replacements, or upgrades? _____
 - (d) Bird, rodent, or deer control? _____
 - (e) Other ? _____

Start-Up Costs for the Norton Vineyard:

Please check the items below that were purchased to service or establish the vineyard?

Were these shared costs (refer to questions 1 and 2 above)? _____ What percentage? _____

- | | | |
|---------------------------------------|--|------------------|
| Tractor _____ | Trailer _____ | ATV _____ |
| Air blast Sprayer _____ | Other sprayers _____ | Lugs _____ |
| In-row cultivator _____ | Tiller _____ | Truck _____ |
| Irrigation system _____ | Deer Fence _____ | |
| Sheds _____ | Post driver _____ | Auger _____ |
| Front end loader/ forks _____ | Mower _____ | Cover Crop _____ |
| Grow Tubes _____ | Seed / compost / fertilizer spreader _____ | |
| Wind machine (Frost protection) _____ | | Consulting _____ |
| Soil prep / Lime or fertilizer _____ | Other significant field prep. _____ | |

APPENDIX D

SURVEY RESULTS and ASSUMED VINEYARD LAYOUT & OPERATION

	<u>Survey Range</u>	<u>Planned Vineyard</u>
Vines per acre	500 -833 (637 = mean)	635
Trellis system	Single wire(2),Lyre (1),GDC(3)	GDC (4 wire incl.drip)
Row spacing	7' to 12' (10 1/4' = mean)	10' 280 total rows rows 408' long
Vine spacing	4' to 8' (5'8" = mean)	6'
Irrigation system	1 @ no, 5 @ yes	yes
Dormant prunings	once per season	once per season
Manhrs. /dormant pruning	51.9 hrs./acre (mean)	40 hrs./acre
# of additional vine handlings	0 to 5 (2.3 = mean)	2
Add'l manhrs. vine maint.	No firm data	22 hrs./acre each
Spraying-F & I Control	3 – 18 sprays per season	4 sprays
Harvest yield	1.71 - 3.33 tons/acre (2.48 tons = mean)	2 1/2 tons
Harvest man-hours	7 1/2 - 15 hrs. /ton (10.6 hrs. =mean)	12 hrs. / ton

APPENDIX E				
CAPITAL EQUIPMENT REQUIRED FOR YEAR ONE				
Description	Cost	Depreciation Period	Depreciation per year*	
35 hp. Tractor	\$24,000	7 years	\$3,428.57	
hydraulic post driver	\$2,399	Section 179		
3-pt. broadcast seeder	\$373	Section 179		
transit & tripod	\$410	Section 179		
equipment shed (20' x 40')	\$2,490	20 years	\$124.50	
pick-up truck (used with 4WD,V8,crewcab,tow)	\$38,388	5 years	\$7,677.60	
irrigation system - major components	\$8,831	15 years	\$589.00	
trellis posts - line & end (not cross pcs)	\$50,533	7 years	\$7,219.00	
			Σ	\$19,038.67
CAPITAL EQUIPMENT REQUIRED FOR YEAR TWO				
3-pt. air blast sprayer (100 gal.)	\$2,896	7 years	\$413.71	
Stihl weed wackers (2)	\$526	Section 179		
Hand-held augers (2)	\$790	Section 179		
3-pt. in-line cultivator	\$6,445	7 years	\$920.71	
3-pt. bush hog (6')	\$1,750	7 years	\$250.00	
Spinning Jenny	\$144.56	Section 179		
Irrigation - minor components	\$37,411.00	15 years	\$2,494.00	
			Σ	\$4,078.42
CAPITAL EQUIPMENT REQUIRED FOR YEAR THREE				
Bird repellent device	\$738.40	Section 179		
Harvest lugs (180)	\$1,638.00	Section 179		
Macrobins (10)	\$3,111.70	Section 179		
Trellis cross pieces,anchors,wires	\$52,691.00	7 years	\$7,527	
NOTE: all depreciations shown using a straight line method				
Section 179 expense can only be implemented in years where there is taxable income and at a maximum of \$25,000 / year. It is assumed that there is some carryover income.				
Greater offsets may be possible using those items noted as being depreciated.				

APPENDIX F								
PESTICIDE PROGRAM AND COSTS FOR A 30 ACRE VINEYARD								
							Single Application	
	Application Rate	Pests	Package Size	Unit Cost	Frequency	Extended Cost	Seasonal	
Fungicides	(based on vineyards)				of Applica.	for 30 acres	Cost**	
Sulforix*	1.25 gal./acre		2 x 2.5 gal.	\$19.50/gal.	dormancy	use only if req'd		
Manzate Pro-Stick	4# / acre	BR,Ph,DM,PM	8x6# bags	\$4.75 / lb.	2x	\$570.00	\$1,140.00	
Rally 40W	5 oz./acre	BR,PM	(5 x 4oz.) x 12= 15#	\$57.00 / lb.	up to 2x	\$534.38	\$1,069.00	
Phostrol	2 qts. / acre	DM	2.5 gal.	\$23.00/gal.	2x	\$345.00	\$690.00	
Vanguard	10 oz./acre	Botrytis	4x50 oz.	\$4.50 / oz.	1x	\$1,350.00	\$1,350.00	
Captan 80WG	2.5#/acre	DM,Ph,BR	30# bag	\$3.00 / lb.	1x	\$225.00	\$225.00	
Abound	10 oz./acre	BR,Ph,DM,PM	2x2.5 gal.	\$258.00 / gal.	Not chosen	\$604.69		
Quintec	4 oz./acre	PM	10 x 30 oz.	\$98.50 / 30 oz.	Not chosen	\$394.00		
Elevate	1# / acre	Botrytis	6x2#	\$39.75 / lb.	up to 1x	\$1,192.50	\$1,192.50	
Nu-Surf 80	1 pt. / application	Surfactant	2.5 gal.	\$1.38 / pt.	24x***	\$11.04	\$33.12	
						Σ	\$5,699.62	
NOTE: * Lime sulfur applications made during dormancy only; Norton grapevines have a negative response to sulfur.								
**Assumes a 20 week spray schedule with applications approximately every other week starting at bud break.								
***Assumes a 100 gallon tank adjusted to a spray rate of 25 gallons per acre.								
Insecticides								
Carbaryl 4L	1.5 qts./acre		2.5 gal.	\$42.00 / gal.	5x*	\$472.50	\$2,362.50	
NOTE: *Use as required. Allows for application about June 1st through July. Apply with fungicides.								
Other broad spectrum insecticides may be substituted.								
Herbicides								
Liberty	6.5 oz. / acre	Contact non-selective	2.5 gal.	\$59.60 / gal.	6x	\$90.80	\$544.80	
Parrot DF	3/4 lb./acre	Pre-emerg.starting yr.4	5#	\$70.99 / 5#	1x	\$319.46	\$319.46	

APPENDIX G					
MATERIAL COST DETAIL - MATERIALS REQUIRED TO ESTABLISH A 30 ACRE VINEYARD					
(for Pesticides and most Capital Equipment, refer to separate listing)					
Item		Detail description	Cost per unit	Comments	
bamboo		3' x 3/8" dia.	\$61.98 / 500	Use 1 per vine	
clips		wire clips to attach bamboo to drip wire	\$290.16 / 300	Use 1 per panel to support wire & drip tube	
end posts		5-6" x 10'	\$14.72 each	2 per row	
line posts		3-4" x 8'	\$7.75 each	16 per 408' row	
T's for top post assy.		4"x4" plus lags	\$4.04 / assy.	18 per row (one per post)	
drip tubing		1/2" PVC 500' rolls preferred	\$65.95 / 500'	splice couplings not considered	
emitters		1/2 gallon per hour	\$25.00 / 100	attached affter planting	
trellis hangers		to attach 1/2" tubing to trellis wire	\$11.00 / 100	require 4 per 24' panel	
seed		Blended mix of timothy, fescue, and clover	\$3.00/pound	25# per acre	
Norton grapevines		ungrafted	\$3.75 each	635 per acre	
hi-tensile wire		4000' rolls of 12 1/2 gauge	\$110 / roll	splices not considered	
Grapples Plus-1		wire grippers at row ends	\$205.89 / 200	2 per wire per row required	
2" barbed staples		1# = 50 staples	\$22.95 / 10#	use one per line post per wire	
row tags		pre-numbered	\$.95 each	2 per row	
earth anchors		48" x 3/4" rod with 6" helix	\$54.91 / 6	2 per row	
end post anchor system		includes pre-measured cable w/ grippers	\$476.32 / 120	2 per row	
diesel fuel		as of 2/20/16	\$1.93 / gal.	burn rate at 3/4 gal. / acre	
fertilizer		33-0-0 at a rate of .45#/vine (= 1 cup)	\$17.90 / 50#	adjust NPK ratios as required	
irrigation system		S/A Flow-Gard Vert. Media Filters	\$5300. each	170-245 gpm	

ACKNOWLEDGEMENTS

The process of gathering information that would become the bedrock for creating a working Norton vineyard involved having access to several vineyards in Virginia. These were chosen because of past interactions with Virginia Tech's viticulture department, and because they all had a vested interest in growing Norton grapes and producing a value-added product from their harvesting.

Those vineyards that were involved in this data gathering were open and forthright. What is eye-opening about this was that all knew that I personally had a vineyard that grew Norton grapes (as well as other varieties) and that they were still willing to provide historical information, some data driven, some anecdotal, that promoted their successes and their weaknesses. I have found this typical within the industry. Of course there are always those individuals that hold information close to the vest, but most are willing to share and promote the industry for the good of all. The competition that one envisions from Business 101 isn't there. Sure, everyone is challenged to make a better wine than the "guy down the street", but the fact is that the Virginia vintner never seems to have any easy lessons learned.....they are all hard fought. Maybe it is this recognition that everyone in the industry goes through similar grief that allows one to share their experiences so easily.

The other thing that was intriguing was that all of those I spoke to understood the theory behind doing things a certain way, but they were willing to explore alternatives to book-driven processes to see if they could improve upon their grape production in both quality or yield. It was with these alternatives that I was able to compare my methods of trellising, pruning, spraying, and harvesting with those offered to improve upon the efficiencies and production within my vineyard. The report combines the best of ideas from my host vineyards and my own experiences that led to the assumptions in developing this report.

My sincere thanks go to: Cooper Vineyards
DuCard Vineyards
Glasshouse Winery
Rappahannock Vineyard
Veramar Vineyard
White Walnut Vineyard