

Pre-plant Decisions for a Wine Grape Vineyard

The long-term success and sustainability of your vineyard will correlate strongly to your ability to answer all or most these questions correctly. Many will require an educated guess based on the best data and information available and interpretation and application by someone with local viticulture knowledge and experience. Vineyards are long-term projects that may extend across generations - you are starting this process so it is important to do it right from the beginning. Find the right place, plant suitable and healthy vines (variety, clone, rootstock), use the best vineyard materials and apply the best viticultural practices possible and you will have a chance of making fine wines. The mistakes you avoid will propel your success, the mistakes you make will hamper your progress, cost you time, money and frustration.

BEFORE YOU SPEND A SINGLE PENNY:

1. Some preliminary personal and economic considerations:
 - a. Why are you doing this?
 - i. True business venture
 - ii. Hobby – weekends and evenings
 - iii. Retirement occupation
 - b. Do have the passion and stamina to go the distance...
 - i. To endure the significant planning, development and operational costs
 - ii. Do you understand (really understand) the uncertainties of agriculture?
 - iii. Do you know how much work it is to maintain a successful vineyard?
 - iv. Do you like hard work? Working outside? Bugs, heat, humidity, rain, cold, etc.
 - v. Do you understand the necessity of using pesticides in agriculture?
 - vi. Is your family on board with this idea?
 - vii. How much time do you have to do this and who will take over when you are no longer around?
 - c. What and where do you want the vineyard to be in five or 10 years?
 - d. Do you have a business plan
 - e. What kind of wine are you going to grow and make? If an estate winery, decide on style, price point, customer and market demographics, etc.
 - f. Education - get the best and right information
 - i. Educational materials – books, internet, magazines, journals, etc.
 - ii. Local viticulture extension resources
 - iii. Private consultants – find one whose knowledge matches your grape/wine goals
 - iv. Visit local, regional, international vineyards and learn

SITE SELECTION AND EVALUATION:

2. The Absolute Importance of Proper Site Selection – THE most important decision is made before the first vine is planted or wine is made.
3. Understanding and achieving correct vine size and balance for the vineyard site. Understand Smart's Golden Rules and how these balance criteria will be achieved.

4. Site Evaluation – achieving correct vine size and balance by predicting vine vigor. Get the right people to do it. Data is only as good as the interpretation. Viticulture and agronomy are not the same.
 - a. Soils – dig backhoe pits and do proper soil testing and evaluation. Hire an expert!
 - i. Physical – affects on water, nutrition, etc.
 - ii. Chemical – adequate but not excessive nutrients
 - iii. Biological – not well understood but need a balance of fungi:bacteria
 - iv. Pests – phylloxera, nematodes (viruses), grape root borer
 - b. Climate – begin collecting and recording regional and local climate data as soon as possible.
 - i. length of season, growing degree days, diurnal temperature variations.
 - ii. Annual rainfall, timing of rain during the growing season especially post-veraison
 - iii. frost dates– last spring and first fall
 - iv. absolute winter low temperatures – 30 year data
 - v. extreme events – hurricanes, low pressure systems, hail, lightning, etc.
 - c. Elevation, slope, aspect are all very important to fine wine production. Slope is highly desirable as is a southeast to west aspect. Absolute and relative local elevation is critical to fruit ripening and avoidance of frost and winter injury
 - d. Vegetation – what can existing vegetation tell you about the property
 - e. Land use – agricultural zone, zoning restrictions,
 - f. Environmental impacts – waste, hazardous materials, pollution, drift, etc.
 - g. Hazards – biotic and abiotic
 - i. Diseases, virus, phytoplasma and others
 - ii. Trees/woods should be avoided in the vicinity of the vineyard, they block sun and wind and are hosts for numerous diseases, insects and other pests
 - iii. Pests – insects, birds, deer, rabbits, woodchucks, etc
 - iv. Neighbors - be prepared for at least one neighbor who will hate what you are doing. Plan education and diplomacy campaign.
 - v. Spray drift from other crops, especially 2,4-D products
 - vi. Airborne pollutants – locate sources
 - h. Testing: understand and, if necessary, amend the soil before you plant!
 - i. Soil chemistry and nutrient test
 - ii. Nematode tests
 - i. Prior use – what was the land used for and how does it affect
 - i. Nutrients, e.g. crop yields
 - ii. Residual herbicides
 - iii. Soil characteristics
5. Business and Economics – How much is this going to cost? Have enough capital to do the job right. Have a very, very firm grip on costs. Be conservative in all your estimates. It WILL cost more than you think it possible could.
 - a. Develop a detailed business plan for the vineyard and/or winery
 - b. Development costs
 - i. Pre-plant
 - ii. Development through the third year
 - iii. When will first crop arrive?
 - c. Fed/state/commercial/cooperative ag loans available
 - d. Cost of land
 - e. Ag conservancy programs – local and state
 - f. Possible tax advantages
 - g. Property zoning and local ordinances – know and understand these in detail!
6. Marketing grapes to wineries. Matching your philosophy and goals with a winery
 - a. Who are your customers? Personality, wine and business goals should be similar. A friendship and mutual respect should develop.
 - b. Where are they?

- i. In state – near or far?
 - ii. Out of state
 - c. Transportation issues
 - d. What is the target wine for the grapes you are planting?
 - i. Style
 - ii. Price point
 - iii. Red or white or both (reds are generally more difficult to grow and make)
 - e. Contracts – an essential of doing business
 - f. developing long term relationships

VINEYARD DEVELOPMENT:

- 7. Plant Materials
 - i. Species/varieties –native, hybrid, *vinifera*
 - ii. *Vinifera* clones
 - iii. Matching rootstocks to soil and vine performance. Very critical according to soil evaluation results
 - b. Nurseries – how to pick a nursery, payments, certified materials, highest possible available grade and quality, working with the nursery, hiring a plant material consultant
 - c. Time of order and delivery of plants
- 8. Design of the vineyard and other permanent needs
 - a. Row width, direction and length
 - b. Vine density and spacing
 - c. Block shape and size
 - d. headlands
 - e. Dealing with contours
 - f. Access roads
 - g. Loading and working areas
 - h. Fuel supplies – regular and diesel
 - i. Water – source and cost of development
 - i. Drip irrigation
 - ii. Spraying – contained filling site, hazmat
 - iii. drinking
 - j. Shop and storage sheds – location, size
 - k. Crew facilities
 - l. Electricity – 3 phase?
 - m. Designing the vineyard for low input and sustainable practices
- 9. Vendors and services – who has what you need and can they get it to you when you need it?
- 10. Drip irrigation – is it necessary and cost effective?
- 11. Drain tile – consultants, engineers, NRCS
- 12. Deer fence – full exclusion
- 13. Trellis and training systems – set up to divide if necessary, single or divided canopy?
 - a. Single or divided systems?
 - b. Metal or wood stakes
 - c. End assembly design
 - d. Distance between line posts
 - e. Height of fruiting wire and overall canopy heights
 - f. Catch wires – numbers and positions
- 14. Materials and installation instructions
 - a. Endposts and line posts – metal or wood, get the maximum gauge materials, galvanized if possible
 - b. End assemblies
 - c. Wire – best possible quality, correct gauge for specific use.

- d. Anchors – may not be needed with metal end stakes
- e. Wire tensioners and splicers – nicopress or gripple/
- f. Training stakes – rolled steel is best
- g. Other
- 15. Preparing the Field for Planting
 - a. Soil Preparation - Cultivation
 - i. How, when, who and why? Critical decisions. Rip or not to rip? Winged plow. Rip on vine rows. Timing and soil condition are critical.
 - ii. Who has the right equipment?
 - iii. Amendments – fertilizer, lime, etc.
 - b. Weed control – an absolute must for new vineyards.
 - c. Nematodes: Bio-renovation or fumigation?
 - d. Vertebrate pests
- 16. Vineyard installation – who is going to do the job correctly? You? Hired?
- 17. Layout
 - a. Survey and marking accurately
- 18. Planting – storage and planting instructions
 - a. Storing and preparing the plants for planting.
 - b. Inspect all vines BEFORE planting
 - c. By hand – shovel, auger, proper tamping technique, relative position to stake,
 - d. By machine – laser planters, tree planters
 - e. When – soil condition
 - f. How deep? Graft union, root pruning, filling the hole, etc.
 - g. fertilizer, water, VAM
 - h. grow tubes, milk cartons, mulch

VINEYARD OPERATIONS:

- 19. Critical resources
 - a. Labor – who does the work – development and ongoing operation? Where will they come from? Need to find reliable and trained crew. Extra people needed at harvest (not friends and neighbors).
 - b. Management – who takes over when you are on vacation?
 - c. Clerical – payroll, taxes, forms
 - d. Compliance and regulation – if you have employees, this is huge. Also, worker protection standards, MSPA, FLSA, all need to be considered.
 - e. Safety First! Safety program and training.
- 20. Training new vines
 - a. Straight trunks – use stiff training stakes (rolled steel or rebar)
 - b. How many trunks? How, where and when to top the vine.
 - c. Training to cordon or canes?
 - d. Tying equipment – use the right type and size of tie product and material.
- 21. Weed control in first year
 - a. Herbicides
 - b. Cultivation – mechanical or hand hoeing
 - c. Other – flame, alternative materials
- 22. Disease and insect control in first year – absolutely essential for proper vine growth
- 23. Crop load – early years depends completely on vine size
 - a. Year 1 – no fruit
 - b. Year 2 – possible but improbable
 - c. Year 3 – small crop, one cluster per shoot
- 24. Cover crop – when and what to install. For what purpose?
- 25. Vine and vineyard nutrition – hold off unless indicated by vine or testing.

- a. Petiole sampling – every year
- b. Soil sampling - every 3rd year
- 26. How many years to full production? How much crop in year 2? Pruning after year 1?
- 27. Replanting costs and affects on quality
- 28. Winter injury avoidance (active and passive methods) – hilling up, pruning, other tactics?
- 29. Frost – a constant threat, best treatment is site selection.
 - a. Protection – wind machines, heaters, cultural practices
- 30. Equipment, supplies and materials – who and where is the supply infrastructure.
 - a. Tractor w/ cab – correct PTO hp and engine hp for application
 - b. Fungicide sprayer – consider recirculating/tunnel if terrain is acceptable
 - i. Obtain PA Private Pesticide Applicator’s License (contact local extension office)
 - c. Mower – flail and grass
 - d. Herbicide sprayer – a dedicated boom herbicide applicator
 - e. Vine hedger
 - f. Grape hoe for weeds and hilling up
 - g. Post pounder
 - h. Various types of cultivators
 - i. Weather station – data logger to record weather conditions on your site
- 31. Training – do you know how to operate and maintain farm equipment properly and safely.
 - a. Can you pound in a nail without hitting your thumb?
 - b. Tractor driving
 - c. Large equipment usage
 - d. Can you properly calibrate a herbicide and-or airblast sprayer? If not, who will?
- 32. Fixing things – this is farming, equipment and materials break and wear out, usually at the most inopportune time. Can you fix it? If not, do you know who can?
- 33. Available vendors and services – who will be your key suppliers? How knowledgeable are they about vineyards?
- 34. Sustainable and organic wine growing – should you do it? Are you ready? Why are you doing it?
- 35. Mistakes and brilliant ideas

EDUCATION AND INFORMATION

- 36. Get the best and right information: important sources of information (see Penn State Viticulture Information Resources list for expanded options)
 - a. People
 - i. Industry – visit other vineyards and ask questions. Don’t just look, observe!
 - ii. Education, research and extension primarily at your state land grant institution. Sign up for all available learning resources.
 - iii. Vendors – they know a lot about the products and services you will use.
 - iv. Vineyard consultants – extremely important! Get the right people to give you good advice, both in the region and from beyond. Cooperative extension can help. Local growers can give valuable advice. Advice is most critical in first 2 years for planning and early development
 - v. Vineyard installation/development/management services
 - b. Books – many, many practical, hands-on guides to wine growing are available.
 - c. Magazines – Practical Vineyard and Winery, Wine East, Wine Business Monthly, Australian Viticulture, Australia and New Zealand Wine Maker and Grape Grower.
 - d. Websites – just google viticulture, grapes, wine, enology and start reading
 - e. Meetings and workshops – great for contemporary information and ideas
 - i. Virginia Tech new grower check list:
http://arecs.vaes.vt.edu/arec.cfm?webname=winchester§ion=about_us&subsection=6946&PID=westover

- f. Viticulture and horticulture programs – there is no substitute for formal knowledge and education. While it is not essential, it will definitely make you a better wine grower.
 - i. Penn State University (undergraduate and graduate horticulture program)
 - ii. Cornell University (undergraduate and graduate viticulture and enology program)
 - iii. Virginia Tech (undergraduate and graduate horticulture program, graduate enology program)
 - iv. Brock University/CCOVI, Ontario (undergraduate and graduate programs in viticulture and enology)
 - v. Harrisburg Area Community College, Harrisburg, PA
 - vi. Surrey CC, Dobson, NC
 - vii. Niagara College, Ontario
37. Join your industry associations – local, regional and national. They have events that are important to attend. It is important not to grow wine in a vacuum. There are local and state politics that affect everyone in the business. To the extent that you can, get involved and work for a better industry for everyone.
38. Taste wines all the time by yourself and with other knowledgeable people. Understand the benchmarks of the varieties you are growing. Get a perspective on what you are doing.
39. No shortcuts. Do not skimp on quality. Be creative and observant. Be patient and persistent. Learn as much as you can constantly. Travel and ask questions.
40. Have fun. The moment you do not look forward to entering the vineyard is when the game is up. So do not do more than you can do within all of life's constraints. Do not ignore your family. Find the right balance. Vineyards take a ton of work and love. But they are not humans and not as important. Keep everything in close perspective. Be introspective, passionate but realistic and pragmatic. Measure everything twice.

This is a long list but each item is important. Please consider each one carefully and try to learn as much as you can about each decision. If you cannot make an educated decision, get help from someone who can.

Good luck and have fun!

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