

# Economics of commercial grape production



**Tony K. Wolf, Professor of Viticulture**

**Grower perspective: Jim Benefiel**

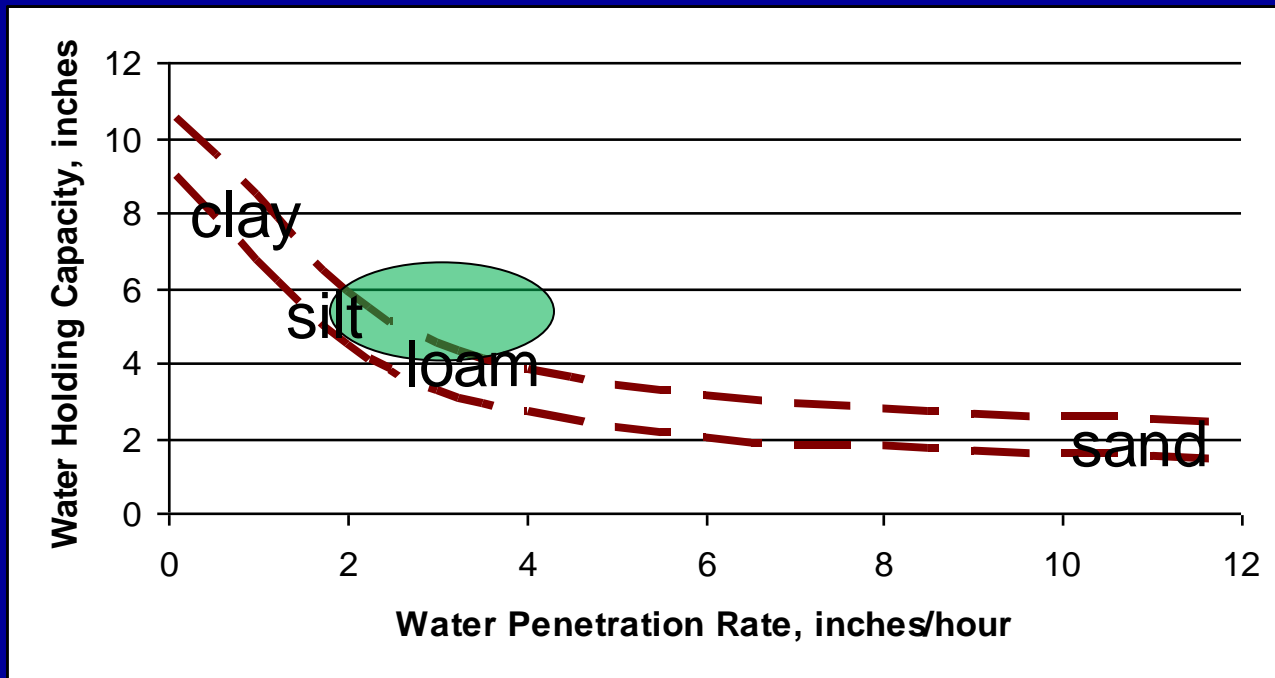
# Expectations

- What is your market? Area wineries:
  - Varieties
  - Lot Sizes
  - Quality Specifications
  - Prices
  - Transportation/Logistics
- What are reasonable labor and capital demands?
- Compare grape growing to other opportunities
  - investment
  - lifestyle?



# The first (and Most Important) Question

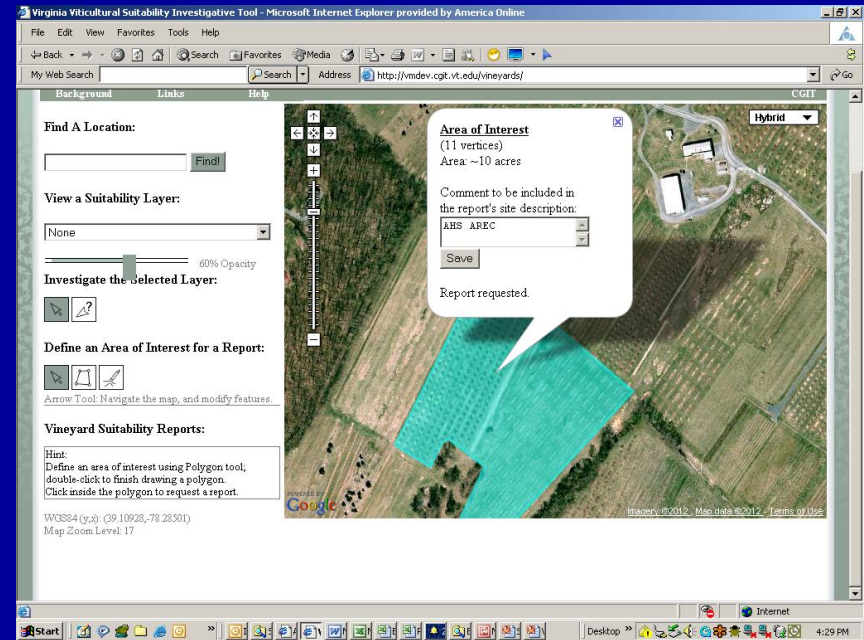
- How does my site measure up? Site—not property
  - Well drained (water and air)
    - Water = 2 – 4 inches per hour drainage, 4 - 8 inches total holding capacity
    - Air = no frost pockets, >2% slope (unless eastern shore)
  - Minimum of 180-day growing season



Now you have achieved a score of 60+ on the:

# Vineyard Site Evaluation

- Consider your score a **GENERAL** indication of your **POTENTIAL** annual cash flow at your site
- Specify your block(s) to maximize score (not maximize acres)
- Use Topo maps and USGS Soil Surveys to narrow focus



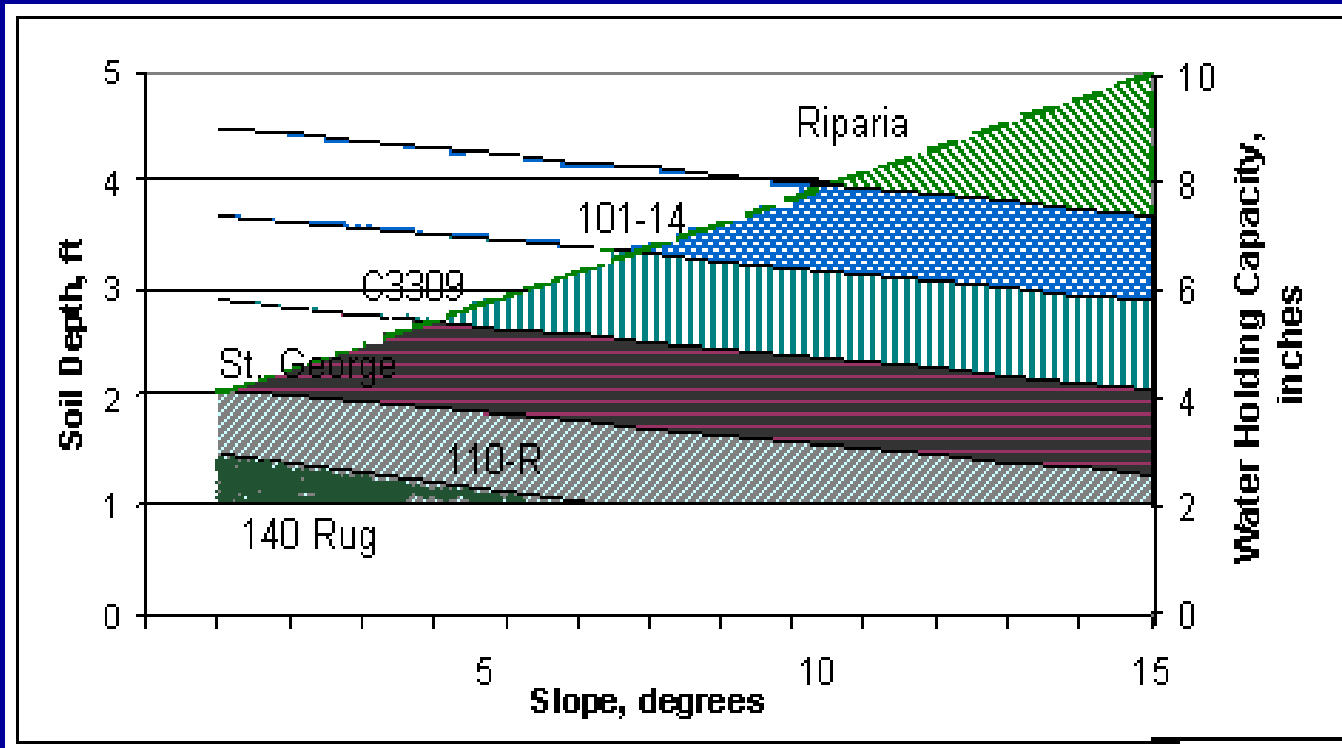
- Walk the property--Look for swales, outcrops; observe vegetation/status
- Consider a private soil survey



# Your Irreversible Decisions

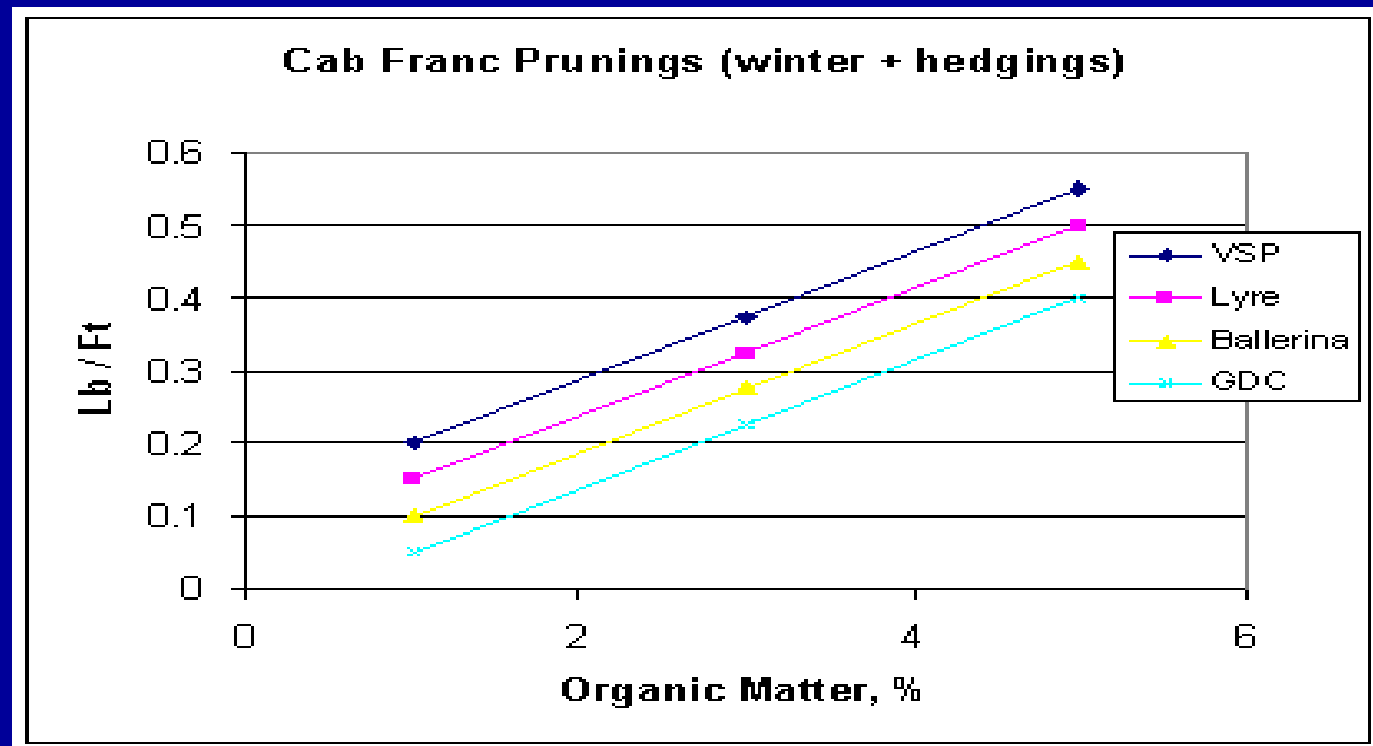
1. What varieties to plant?
  - What do area wineries want?
  - What might grow well on your site?
2. What clones to select (Ignore, first time out, unless a winemaker commits to one—“I’d like to try” is not a commitment.)
3. What rootstock to use?
  - Match to soil depth, water capacity, pH
4. What trellis system?
  - Match to water capacity
5. What spacing?
  - Between rows = tractor access
  - Between vine = match vine vigor and rootstock to water capacity

### 3. Matching Rootstock to site

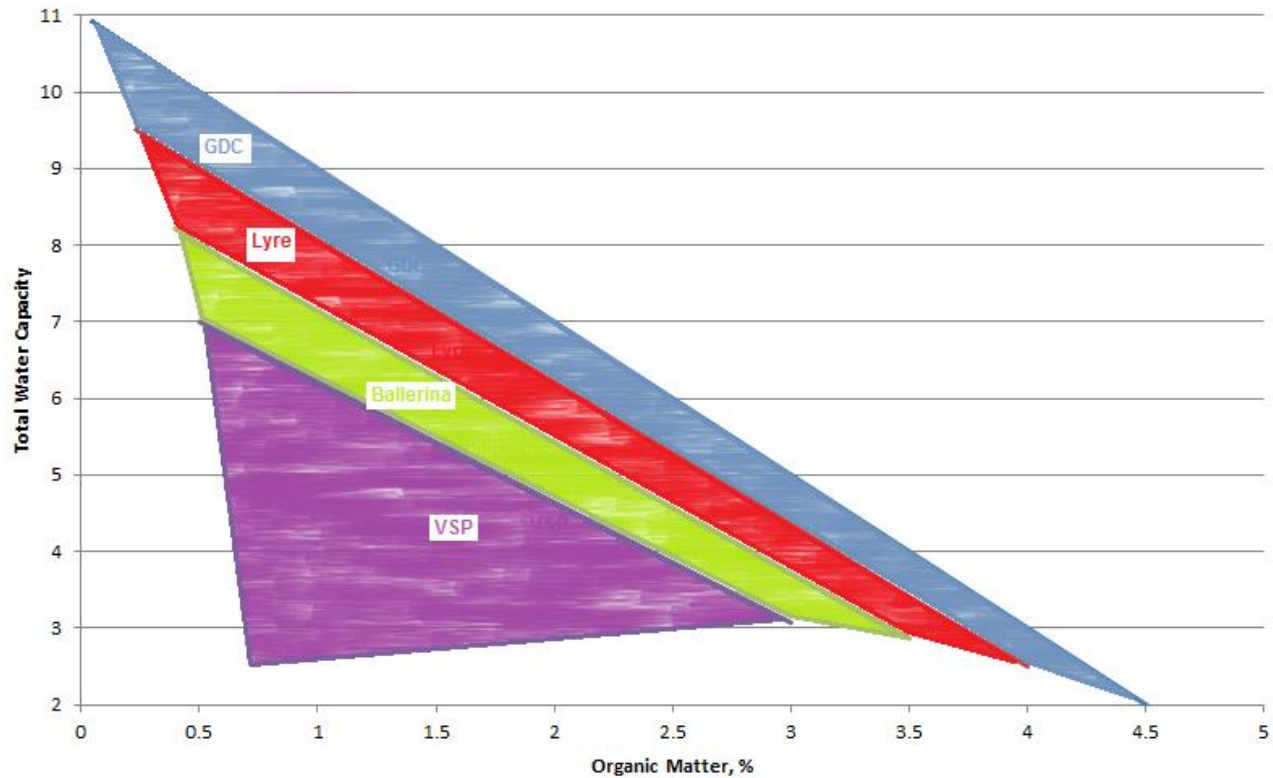


Confirm acceptable pH.

## 4. Matching Trellis to Site



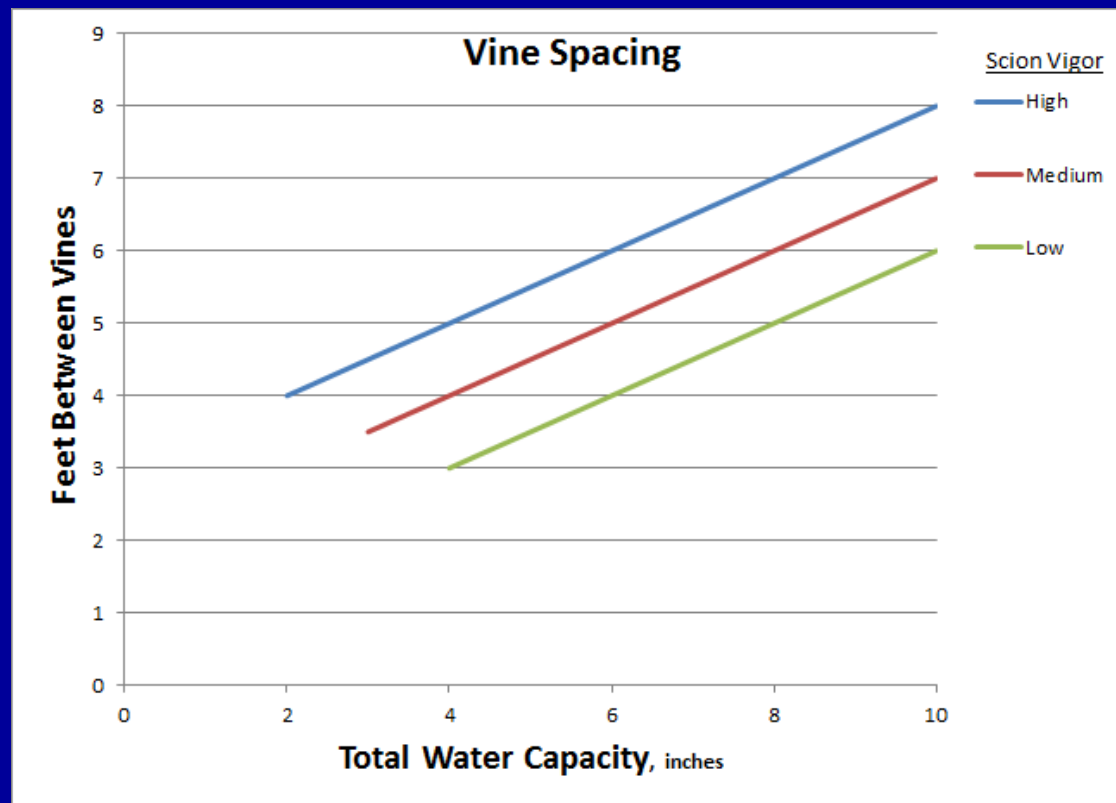
# Matching Trellis to Site, continued





# 5. Vineyard Spacing

- Between rows
  - Tractor access (outside tire + maneuverability)
  - At least as wide as canopy as canopy is high
- Between vines (within rows)



# Generalized costs and returns (per acre)

(Cabernet franc, Smart-Dyson training, 10X7 spacing, 10 acres)

		<u>Grower Perspective</u>
• Vineyard establishment (years 0 - 2)	\$12,000-17,000	\$15,000
• Annual variable, operational expenses	\$2,500-3,000	\$3,900-4,500
• Total annual expenses (incl. fixed costs)	~\$4,000	\$5,400
• Expected returns	4.5-6.0 T/A= \$6,300-8,400	3.2-3.8T @ \$1,700 = ~\$6,000
• Annual net	\$4,000	<u>\$40-\$1,000</u>

Costs in 2013 dollars

# Generalized costs and returns (per acre)

(‘Cabernet franc’, VSP training, 10’ X 7’ spacing)

	10 A	20 A	50 A	20A
	<u>Virginia Tech</u> <u>projections</u>	<u>Oregon</u> <u>projections</u>	<u>Finger Lakes</u> <u>projections</u>	<u>Grower</u> <u>Perspective</u>
• Vineyard establishment (years 0 - 4)	\$12,000-17,000	\$26,000	\$18,800	\$16,000
• Annual variable, operational expenses	\$2,500-3,000	\$3,675	\$2,950-3,050	\$3,900-4,500
• Total annual expenses (incl. fixed costs)	~\$4,000	\$5,560	\$5,350	\$5,200
• Expected returns	[~4.5 T/A @ \$1,400] ~\$6,200	[2.6-3.0T @ \$1,700 ] ~\$5,160	[2.6-3.0T @ \$1,700 ] ~\$5,160	[2.6-3.0T @ \$1,700 ] ~\$5,160
• Annual net	<u>\$2,200</u>	<u>(\$400)</u>	<u>(\$200)</u>	<u>(\$40)</u>

Note: Oregon and Finger Lakes projections include a 1,500 sq. ft shop

Costs in 2013 dollars

# General Equipment Inventory

(not updated to 2013 costs)

	New	Used	Already Own
55-hp, 4-wd tractor w/ spray cab	\$30,000		
4-wd pick-up truck	\$20,000		
50-gal herbicide sprayer	\$2,700		
300-gal airblast sprayer	\$12,500		
5-ft rotary mower	\$1,600		
Fertilizer spreader/broadcaster	\$1,500		
Post driver	\$2,000		
Auger	\$1,200		
Trailer	\$2,000		
	<b>73,500</b>		

# An Example of the Need to be Skeptical-- Schedule of Fixed Costs from one reference

	Year 0	Year 1	Year 2	Year 3	Year 4
Site preparation	261				
Vineyard lay-out		141			
Planting		3,291			
Trellis (mat. & labor)		2,396	559		
Hand tools	62				
Equipment	542	3,543	741	825	862
Irrigation (amort.)		171	171	171	171
Deer fence (amort.)	39	39	39	39	39
Safety equipment		19	16	16	16
Picking trays			120	480	600
Other	89	89	89	89	89
					881
<b>Sum fixed costs</b>	<b>\$993</b>	<b>\$10,471</b>	<b>\$1,736</b>	<b>\$1,621</b>	<b>\$1,178</b>

# Generalized costs and returns (per acre)

(‘Cabernet franc’, GDC training, 10’ X 7’ spacing)

	<u>Grower Perspective</u>
• Vineyard establishment (years 0 - 4)	\$17,500
• Annual variable, operational expenses	\$4,500
• Total annual expenses (incl. fixed costs)	\$5,620
• Expected returns	[4.0-4.5T @ \$1,700 ~\$7,225
• Annual net	<u>\$1,200-2,000</u>

Costs in 2013 dollars



# Sensitivity (per acre)

(‘Cabernet franc’, GDC training, 10’ X 7’ spacing)

Total annual expenses	Annual Yield	
	4.0T	4.5T
\$5,120	\$1,680	\$2,530
\$6,120	\$680	\$1,530

Costs in 2013 dollars

# Assumptions used in financial analysis

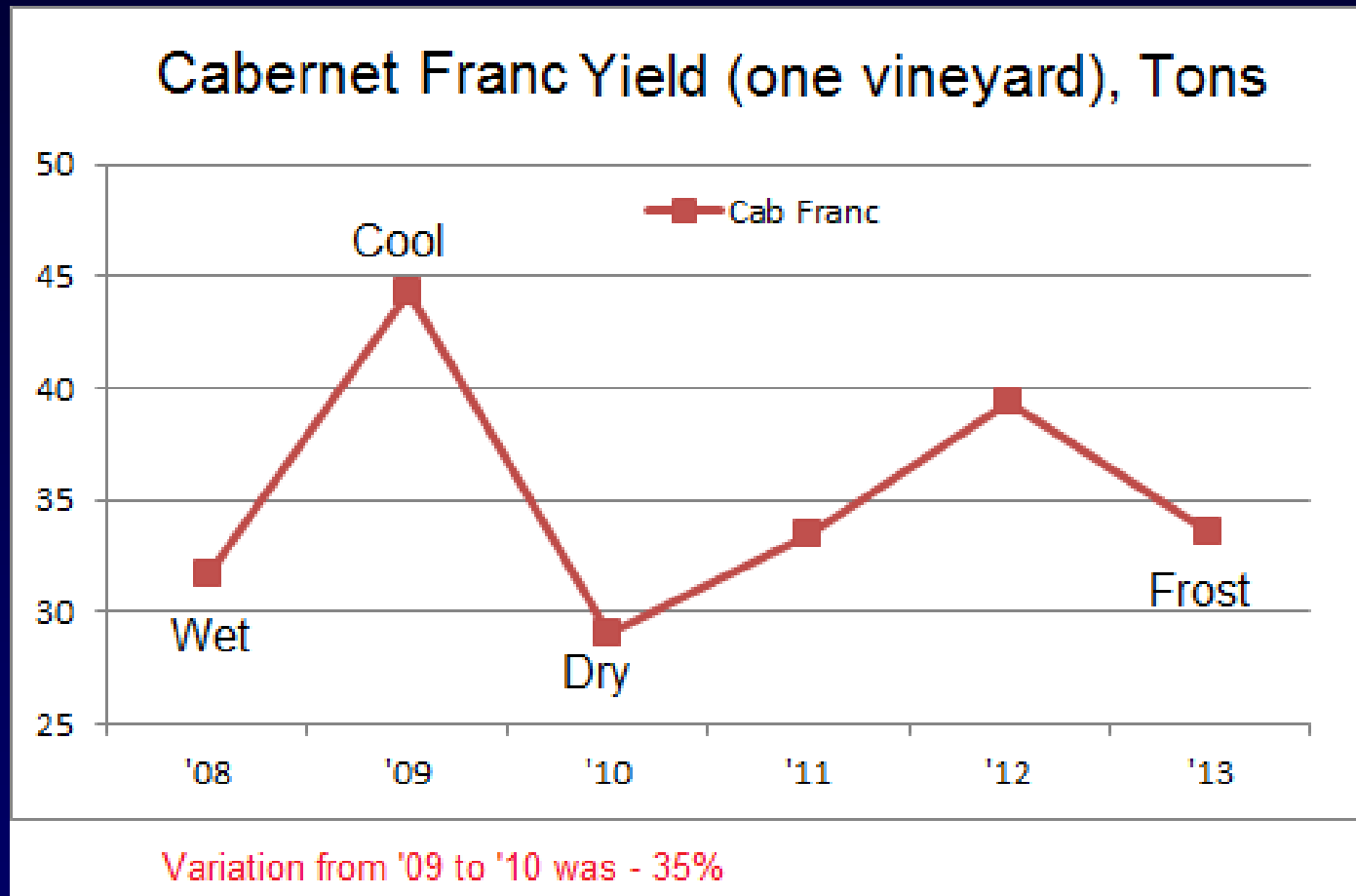
- Yields at 4.0 to 6.0 tons/acre, depending upon training
- Data from training system comparison at Winchester VA
- All vines at 10-foot rows x 8-foot vine spacing

<b>CABERNET FRANC</b>	<b>Tons/acre</b>				<b>Grower perspective</b>
	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	
Geneva Double Curtain	4.1	7.1	9.2	7.4	4 – 4.5
Smart-Dyson	3.3	6.5	7.9	8.1	3.2 – 3.8
Vert. Shoot Positioned	3.0	3.8	5.4	5.4	2.6 - 3.0

# Historical yields for Virginia

	Tons per Acre							average	yrly trend
	2006	2007	2008	2009	2010	2011	2012		
<u>all Vinifera</u>	2.97	2.32	2.85	2.51	2.38	2.67	2.49	2.59	-1.5%
Albariño				1.38	1.28	1.83	1.04	1.38	-4.1%
Cabernet Franc	3.07	2.68	2.92	2.87	2.95	2.82	2.85	2.87	-0.5%
Cabernet Sauvignon	2.43	2.24	2.34	1.94	1.94	1.98	1.90	2.10	-3.7%
Chardonnay	2.65	1.86	2.92	2.52	2.15	2.86	2.55	2.49	1.4%
Gewurztraminer	2.30	2.00	2.73	1.74	1.76	2.00	1.45	2.03	-5.3%
Merlot	3.28	2.62	3.11	2.65	2.25	2.84	2.86	2.77	-0.9%
Petit Manseng				2.91	2.70	3.41	2.62	2.91	-0.3%
Petit Verdot		1.99	2.30	2.43	2.61	2.45	2.21	2.35	2.2%
Pinot Gris/Grigio				2.40	2.31	2.61	2.29	2.41	1.4%
Pinot Noir	2.93	2.08	2.14	1.60	1.37	1.70	1.73	1.92	-6.7%
Riesling	2.30	1.70	2.32	2.14	1.86	2.33	2.24	2.13	1.0%
Sauvignon Blanc	3.63	3.25	2.56	2.40	2.32	2.74	2.13	2.65	-6.1%
Syrah				2.18	2.60	1.69	2.24	2.18	1.4%
Viognier	2.82	1.93	3.05	2.46	2.38	2.76	2.25	2.50	-1.1%
<u>all Hybrid</u>	2.51								
Chambourcin	2.23	2.85	2.85	3.64	3.67	3.99	3.26	3.32	8.2%
Seyval	2.12	2.38	2.38	2.24	2.47	2.07	2.17	2.26	-0.4%
Traminette	2.58	3.33	3.33	2.95	2.85	3.18	2.82	3.00	-0.1%
Vidal Blanc	3.32	3.34	3.34	3.72	4.31	3.41	3.45	3.53	1.5%

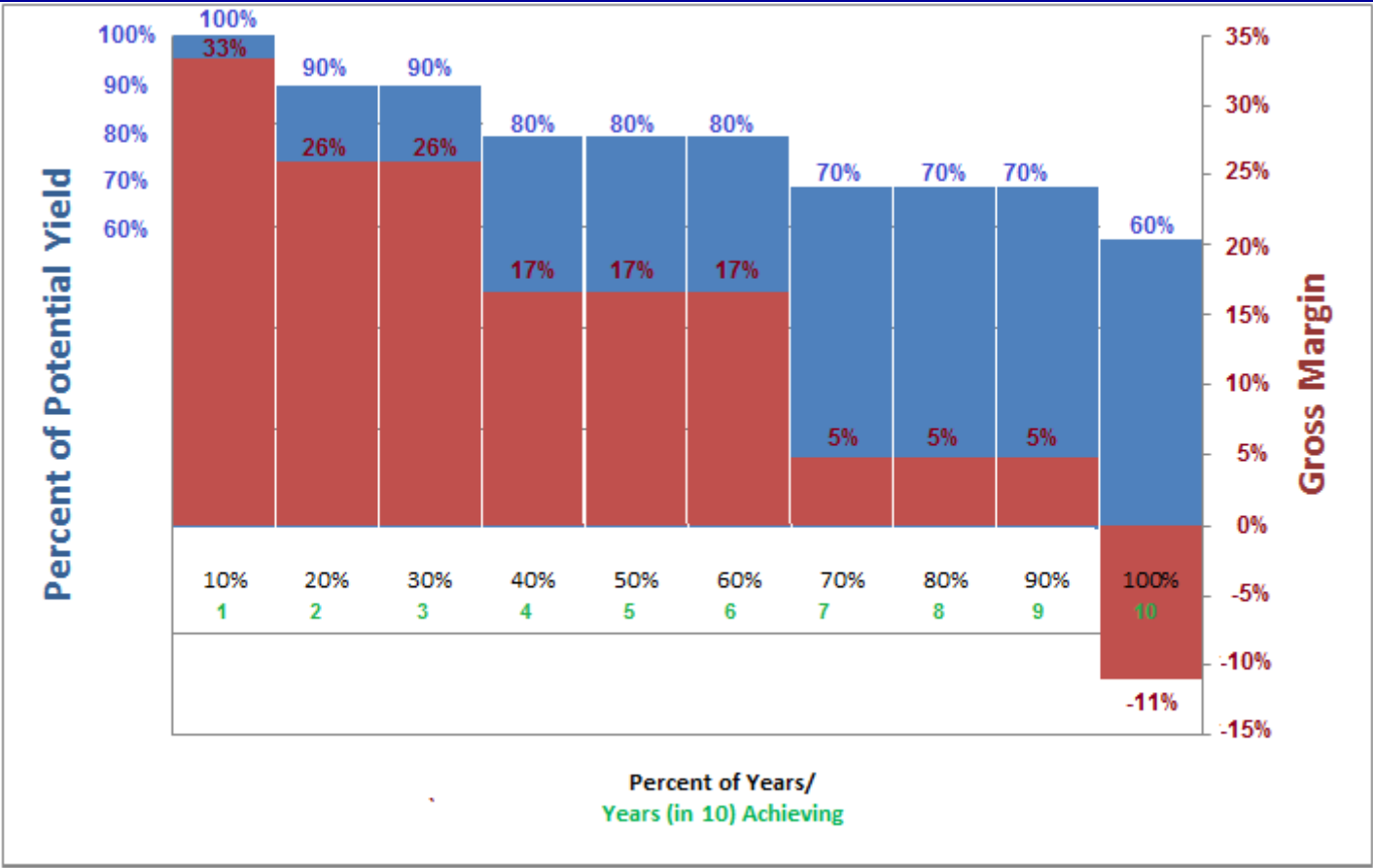
# Individual Vineyard variation is much greater



Other factors:

animal damage; diseases

# So what might your Yields and Margins be?



# Annual Calendar

Operation	Hrs/A	1/1	1/15	2/1	2/15	3/1	3/15	4/1	4/15	5/1	5/15	6/1	6/15	7/1	7/15	8/1	8/15	9/1	9/15	10/1	10/15	11/1	11/15	12/1	12/15
Repair trellis wire	4	1.0	1.0	1.0	1.0																				
Reset leaning trellis posts	9	2.3	2.3	2.3	2.3																				
Spread lime	0						0.0																		
Fertilize	6							6.4																	
Set up and run irrigation	8							8.0																	
Plant replacements	6							6.2																	
Spray herbicides1	1							1.0																	
Gross pruning	33							33.1																	
Kill wild grapevines	1								1.0																
Raise swing arms	2									2.4															
Rub off suckers	8									8.0															
Thin clusters and shoots1	28									28.0															
Scout GBM1	0.3									0.3															
Spray herbicides2											XXX														
Thin clusters and shoots2	28												28.0												
Lower swing arms	2												2.4												
Petiole sampling	0.2												0.2												
Foliar spray	0.3													0.3											
Scout GBM2	0.3														0.33										
Position shoots	31												10.2		10.2		10.2								
Spraying									XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX							
Mowing										XXX		XXX		XXX		XXX		XXX		XXX					
Scout GBM3	0.3																								
Thin clusters and berries	8																								
Layout bird protection	2																								
Harvest	73																				2.4				
Wash lugs	2																				36.5	36.5			
Totals	254	3.3	3.3	3.3	3.3	0.0	0.0	54.7	1.0	38.8	0.0	0.0	40.9	0.3	10.6	0.0	18.1	0.0	38.9	36.5	0.0	1.6			
for 20 acres	5,088	66	66	66	66	0	0	1094	20	775	0	0	817	6	211	0	361	0	778	730	0	32			



# What might your annual cash flow look like?

Site Suitability Score	Potential /Acre	Average /Acre	Return on Assets	Return on Equity*
100	\$2,700	\$1,110	6.4%	16.8%
90	\$2,430	\$1,000	5.7%	13.6%
80	\$2,160	\$890	5.1%	10.4%
70	\$1,890	\$780	4.4%	7.2%
60	\$1,620	\$670	3.8%	4.1%

\*Borrow 80%

# How can you improve your yields and quality?

- **Study the Wine Grape Production Guide for Eastern North America**
- **Talk with interested winemakers once you have planted.**
- **Talk with friendly growers in your area.**
- **Read, read, read.**
- **Come to the annual VVA meetings and socialize.**

# Summary

- Appreciate that a vineyard is a labor- and capital-intensive enterprise
- It takes considerable time (~7 years) for a vineyard to become profitable and 15 to 25 years to return your investment, perhaps never if scale of operation is too small relative to capital investment or site is poor.
- Row spacing and vine training, which affect yield, will have a major impact on vineyard profitability.
- Capital and operating costs discourage many from this enterprise.

# Some helpful resources

Wine Grape Production Guide for Eastern North America (NRAES, 2008)

Vineyard Economics, IN: Oregon Viticulture (2003), Oregon State University Press, Corvallis.

Cost of establishment and production of vinifera grapes in the Finger Lakes region of New York, 2001. White and Pisoni, Cornell University (2002)

<http://dspace.library.cornell.edu/handle/1813/424>

Production budgets for Arkansas wine and juice grapes, #976 (2005)

<http://www.uark.edu/depts/agripub/Publications/bulletins/>

**Virginia Viticulture Suitability Investigative Tool**

<http://vmdev.dgit.vt.edu/vineyards/>

<http://vmdev.cgit.vt.edu/ecvineyards/>

# Your Homework

- What is your market?
- How good is your candidate site?
- What varieties will you plant?
- What clones might you select?
- What rootstock will you use?
- What trellis system will you employ?
- What spacing will you establish?

Everything else, you can learn on the fly!