

Economics of Commercial Grape Production

University of Maryland Extension

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Objectives

- ▶ Grower Goals
- ▶ Budgeting
- ▶ Financial Analysis
- ▶ Sample Model

What are grower's goals?

- ▶ Grapes can be substitute and a small farm enterprise
- ▶ Inherited or purchased a farm, wants to derive income from land.
- ▶ Interest in wine. Grape growing is a horticultural expression of that interest
- ▶ There are intensive labor and capital demands

What are enterprise budgets?

- ▶ Enterprise budgets –
 - An organized listing of your estimated gross income and costs which can be used to determine the expected net income for a particular enterprise
 - Budget on a per unit basis
 - – ex 1 acre, 1 bushel, 1 ton
 - Sections include
 - Income, Costs, Profit
- ▶ Traditional Crops
 - Very detailed, more accurate

- ▶ Livestock
 - Dairy
 - Beef
- ▶ Forages
- ▶ Specialty crops
 - Less detailed, less accurate

Who can use these budgets?

- ▶ Agricultural producers
- ▶ Extension specialists
- ▶ Financial institutions
- ▶ Governmental agencies
- ▶ Advisors of food & fiber

Budgets are used to:

- ▶ Itemize the receipts (income) received for an enterprise
- ▶ List the inputs and production practices required by an enterprise
- ▶ Evaluate the efficiency of farm enterprises
- ▶ Estimate benefits and costs for major changes in production practices
- ▶ Provide the basis for a total farm plan
- ▶ Support applications for credit
- ▶ Inform non-farmers of the costs incurred in producing crops
- ▶ Not an exact science – drought, disease etc.

6 Parts of a Budget

- ▶ Investment/Capital
- ▶ Gross Income
- ▶ Variable Costs
- ▶ Fixed Costs
- ▶ Net Income

Costs

- ▶ Variable costs - These are expenses that vary with output within a production period
 - Fuel, Fertilizer/Lime, Disease/Insect control
- ▶ Fixed Costs- Fixed costs are expenses that do not vary with the level of output.
 - Depreciation, Interest, Repairs, Building costs, Machinery Costs, Taxes, Insurance

Net Income

- ▶ Income over variable costs
- ▶ $\text{Income} - \text{Variable Costs} =$
- ▶ Income over variable and fixed costs
- ▶ $\text{Income} - (\text{Variable} + \text{Fixed Costs}) =$
- ▶ Decision making time....
- ▶ Can it cash flow

- ▶ Can I cover at least the variable costs
- ▶ Economies of scale
- ▶ Loans and payback ability

▶ **Assumptions used in financial analysis**

- ▶ Land is owned; purchase price not included in budgets
 - Have a \$63 land charge
- ▶ Models based on 1 acre + *Vitis vinifera* vineyard
- ▶ Excellent site, no crop reduction
- ▶ Labor at \$8.00 (unskilled) or \$18.00 (skilled)
- ▶ Operating expenses borrowed at 9% interest for 6 months of expenses.
- ▶ Excellent vineyard management, including consultant
- ▶ Irrigation is included, Deer fence is not
- ▶ Fixed costs are calculated from custom rate charges
 - You should use your actual fixed costs
- ▶ Grapes valued at \$600 to \$2,000/ton

	Tons	Price/Ton
Red	3-5 Tons	\$1,600-2,000
White	3-5 Tons	\$1,200-1,600
Hybrid	4-7 Tons	\$600-1,200

Model values used in financial analysis

Vineyard acreage	1
Training system	VSP
Row / vine spacing (feet)	10 x 6
Variety	White
Tons/acre at full crop	4.0
Value of crop (\$/ton)	\$1,450
Skilled labor (\$/hr)	\$18.00
“Unskilled” labor	\$8.00
Picking labor (\$/lug)	\$1.25

Generalized Equipment Inventory

55-hp, 4-wd tractor w/spraycab	\$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 (harvest, etc.)*	\$2,000
	\$73,500

Budgets include worksheets on:

- List of production inputs
- Establishment
- Year 1-5
- Summary Table

These are estimates based on information provided to the University of Maryland Extension.

Your costs will be different and should be calculated using this as a reference and/or template.

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WINE GRAPE ESTABLISHMENT	PER ACRE FOR			2015
ITEM	UNIT	QUANTITY	PRICE	TOTAL
GROSS INCOME				
YIELD	TON	0	1450	0
VARIABLE COSTS				
SOIL TEST	ACRE	1	2.33	\$2.33
GRASS SEED - FESCUE K-31	POUND	80	1.20	\$72.00
GRAPEVINES	UNIT	860	3.75	\$3,225.00
FERTILIZER (40Z 10-10-10 PER VINE)	POUND	215	0.59	\$126.85
LIME	TON	0.5	45.00	\$22.50
HERBICIDES	ACRE	1	21.11	\$21.11
INSECTIDES	ACRE	1	135.67	\$135.67
FUNGICIDES	ACRE	1	274.45	\$274.45
TRELLISING MATERIALS				
3"x4"x8' TREATED POSTS CCA	ACRE	150	5.99	\$898.50
8"x10' TREATED END POSTS CCA	ACRE	20	17.05	\$341.00
12'S GAUGE ALUMINUM CLAD WIRE	FEET	4500	0.03	\$135.00
14 GAUGE ALUMINUM CLAD WIRE	FEET	5000	0.07	\$350.00
TIGHTENERS	UNIT	38	5.50	\$209.00
WIRE CRIMPING SLEEVES	UNIT	6	6.60	\$39.60
BAMBOO SUPPORTS	UNIT	1500	0.16	\$243.00
EARTH ANCHORS	UNIT	75	8.00	\$600.00
TAPENERS & WINE TIES	UNIT	2	53.57	\$107.13
TRELLISING LABOR				
FIELD PREPARATION (UNSKILLED)	HOUR	20	8.00	\$160.00
LAYOUT, DISTRIBUTE AND DRIVE POSTS (SKILLED)	HOUR	15	18.00	\$270.00
LAYOUT, DISTRIBUTE AND DRIVE POSTS (UNSKILLED)	HOUR	20	8.00	\$160.00
AUGER AND SET END POST (SKILLED)	HOUR	3	18.00	\$54.00
AUGER AND SET END POST (UNSKILLED)	HOUR	3	8.00	\$24.00
MARK LINE POST FOR VINES (UNSKILLED)	HOUR	2	8.00	\$16.00
DRILL END POST FOR VIREVISES (UNSKILLED)	HOUR	4	8.00	\$32.00
INSTALL LINE POST STAPLES FOR WIRE (UNSKILLED)	HOUR	8	8.00	\$64.00
INSTALL END POST ANCHORS STRUCTURE (SKILLED)	HOUR	10	18.00	\$180.00
INSTALL BAMBOO STAKES (UNSKILLED)	HOUR	6	8.00	\$48.00
VINE PLANTING (UNSKILLED)	HOUR	55	8.00	\$440.00
INTEREST ON OPERATING CAPITAL		\$8,242.74	0.6%	\$49.46
TOTAL VARIABLE COSTS LISTED ABOVE				\$8,687.85
FIXED OVERHEAD COSTS (USING CUSTOM RATES)				
FERTILIZER APPLICATION	ACRE	1	6.90	\$6.90
DRILL SEED PLANTING	ACRE	1	17.20	\$17.20
PESTICIDE APPLICATIONS	ACRE	7	7.90	\$55.30
INTEREST ON CUSTOM CHARGES		\$73.50	0.6%	\$4.29
HAND TOOLS	UNIT	1	550.00	\$550.00
SAFETY EQUIPMENT	UNIT	1	250.00	\$250.00
LAND CHARGE	ACRE	1	63.00	\$63.00
TOTAL FIXED COST LISTED ABOVE				\$946.79
TOTAL VARIABLE AND FIXED COST LISTED ABOVE				\$9,634.64
NET INCOME OVER VARIABLE & FIXED COSTS LISTED ABOVE				-\$9,634.64

TRELLISING MATERIALS	Unit	Quantity	Price	Total
3"X4"X8' TREATED POSTS CCA	ACRE	150	5.99	\$898.50
5"X10' TREATED END POSTS CCA	ACRE	20	17.05	\$341.00
12.5 GAUGE ALUMINUM CLAD WIRE	FEET	4500	0.03	\$135.00
14 GAUGE ALUMINUM CLAD WIRE	FEET	5000	0.07	\$350.00
TIGHTENERS	UNIT	38	5.50	\$209.00
WIRE CRIMPING SLEEVES	UNIT	6	6.60	\$39.60
BAMBOO SUPPORTS	UNIT	1500	0.16	\$243.60
EARTH ANCHORS	UNIT	75	8.00	\$600.00
TAPENERS & VINE TIES	UNIT	2	53.57	\$107.13
TOTAL				\$2,923.83
TRELLISING LABOR	Unit	Quantity	Price	Total
FIELD PREPARATION (UNSKILLED)	HOUR	20	8.00	\$160.00
LAYOUT, DISTRIBUTE AND DRIVE POSTS (SKILLED)	HOUR	15	18.00	\$270.00
LAYOUT, DISTRIBUTE & DRIVE POSTS (UNSKILLED)	HOUR	20	8.00	\$160.00
AUGER AND SET END POST (SKILLED)	HOUR	3	18.00	\$54.00
AUGER AND SET END POST (UNSKILLED)	HOUR	3	8.00	\$24.00
MARK LINE POST FOR WIRES (UNSKILLED)	HOUR	2	8.00	\$16.00
DRILL END POST FOR WIREVISES (UNSKILLED)	HOUR	4	8.00	\$32.00
INSTALL LINE POST STAPLES FOR WIRE (UNSKILLED)	HOUR	8	8.00	\$64.00
INSTALL END POST ANCHOR STURUC. (SKILLED)	HOUR	10	18.00	\$180.00
INSTALL BAMBOO STAKES (UNSKILLED)	HOUR	6	8.00	\$48.00
VINE PLANTING (UNSKILLED)	HOUR	55	8.00	\$440.00
TOTAL		146		\$1,448.00

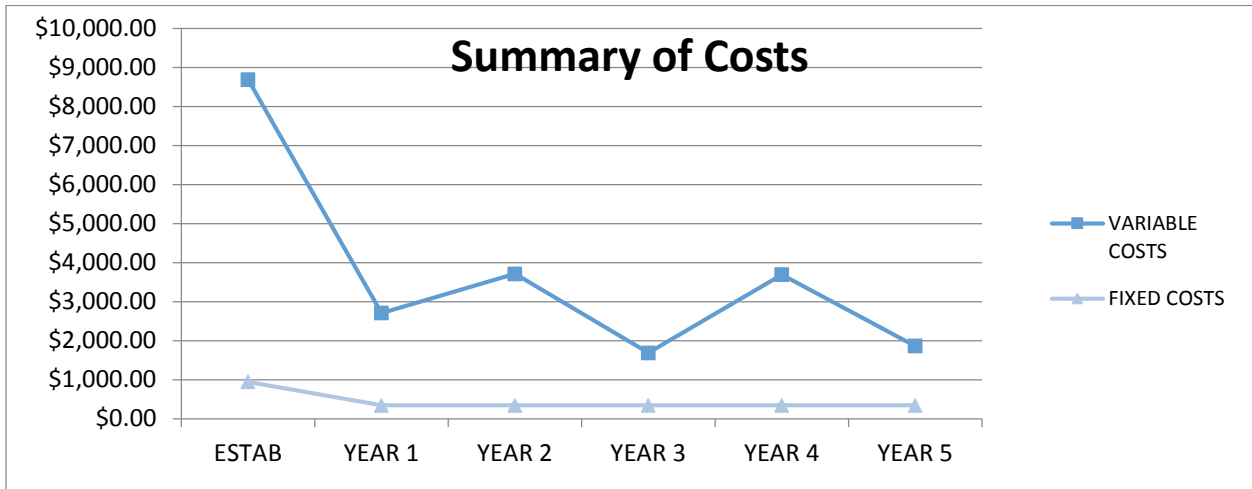
2015 Summary

- ▶ Establishment Cost - \$9,634.64 Cost, \$0 Income
- ▶ Year 1 - \$3,055.18 Cost, \$0 Income
- ▶ Year 2 - \$4,059.11 Cost, \$725 Income
- ▶ Year 3 - \$2,031.48 Cost, \$4,350 Income
- ▶ Year 4 - \$4,038.03 Cost, \$ 5,800 Income
- ▶ Year 5 - \$2,209.92 Cost, \$ 5,800 Income

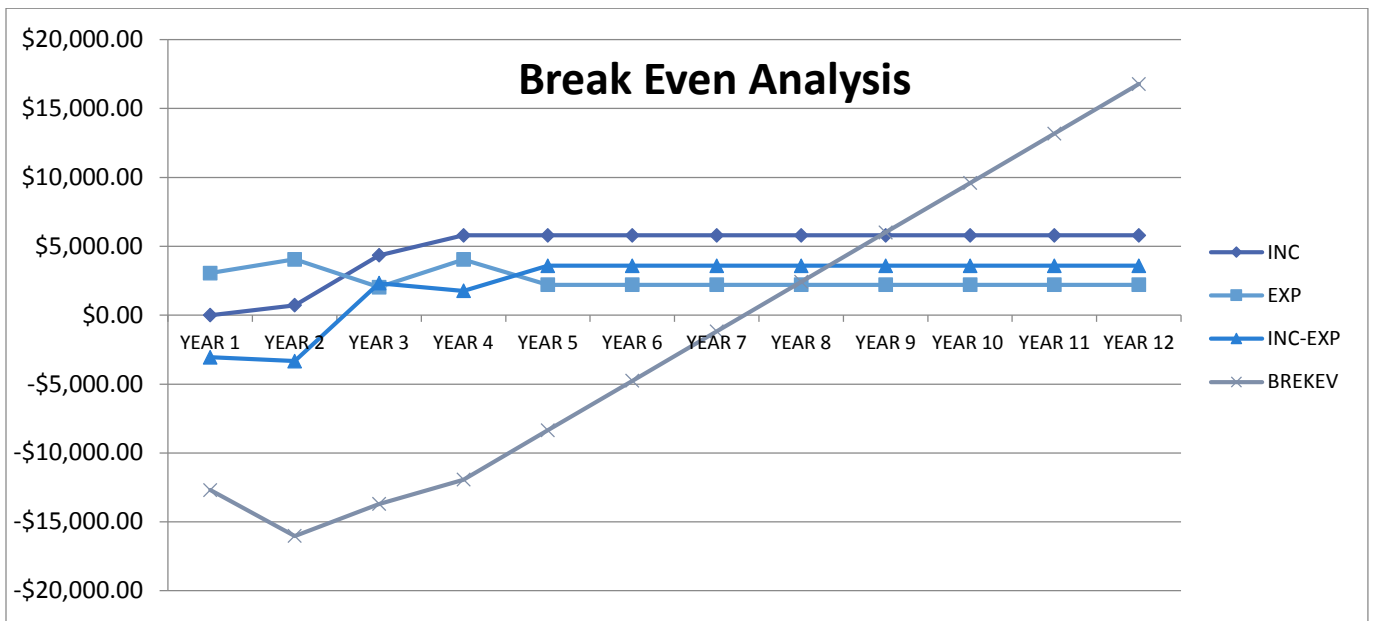
Positive Cash Flow in Year 3 and Break Even (without crop reduction) Year 8

Summary of Costs - Years 1-5							
		ESTAB	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
INCOME							
	ACRE	0	0	\$725.00	\$4,350.00	\$5,800.00	\$5,800.00
VARIABLE COSTS							
SOIL TEST	ACRE	\$2.33	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00
GRASS SEED - FESCUE K-31	POUND	\$72.00					
GRAPEVINES	UNIT	\$3,225.00					
FERTILIZER (4OZ 10-10-10 PER VINE)	POUND	\$126.85					
NITROGEN	POUND		\$14.70	\$14.70	\$14.70	\$14.70	\$14.70
PHOSPHOROUS	POUND		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
POTASH	POUND		\$21.60	\$21.60	\$21.60	\$21.60	\$21.60
LIME	TON	\$22.50	\$8.75	\$22.50	\$22.50	\$22.50	\$22.50
HERBICIDES	ACRE	\$21.11	\$24.12	\$24.12	\$24.12	\$24.12	\$24.12
INSECTIDES	ACRE	\$126.67	\$144.73	\$144.73	\$144.73	\$144.73	\$144.73
FUNGICIDES	ACRE	\$274.45	\$313.58	\$313.58	\$313.58	\$313.58	\$313.58
TRELLISING/IRRIGATION MATERIALS	ACRE	\$2,923.83	\$595.00				
VINEYARD LABOR	ACRE	\$1,448.00	\$1,430.00	\$1,190.00	\$1,040.00	\$1,170.00	\$1,210.00
LUGS	UNIT			\$1,773.75		\$1,773.75	
INTEREST ON OPERATING CAPITAL		\$445.11	\$138.91	\$190.35	\$86.47	\$189.27	\$94.90
TOTAL VARIABLE		\$8,687.85	\$2,711.39	\$3,715.33	\$1,687.70	\$3,694.25	\$1,866.13
FIXED COSTS							
		ESTAB	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
FERTILIZER APPLICATION	ACRE	\$6.90	\$6.90	\$6.90	\$6.90	\$6.90	\$6.90
DRILL SEED PLANTING	ACRE	\$17.30					
PESTICIDE APPLICATIONS	ACRE	\$55.30	\$118.50	\$118.50	\$118.50	\$118.50	\$118.50
MOWING	ACRE		\$46.00	\$46.00	\$46.00	\$46.00	\$46.00
IRRIGATION	ACRE		\$95.00	\$95.00	\$95.00	\$95.00	\$95.00
INTEREST ON CUSTOM CHARGES		\$4.29	\$14.39	\$14.39	\$14.39	\$14.39	\$14.39
HAND TOOLS	UNIT	\$550.00					
SAFETY EQUIPMENT	UNIT	\$250.00					
LAND CHARGE	ACRE	\$63.00	\$63.00	\$63.00	\$63.00	\$63.00	\$63.00
TOTAL FIXED		\$946.79	\$343.79	\$343.79	\$343.79	\$343.79	\$343.79
TOTAL VARIABLE AND FIXED		\$9,634.64	\$3,055.18	\$4,059.11	\$2,031.48	\$4,038.03	\$2,209.92

Total Costs



Summary



Interactive Enterprise Budgets

- ▶ Available at <http://extension.umd.edu/smallfruit/grapes>
- ▶ Excel Spreadsheet format or PDF files

WINE GRAPE ESTABLISHMENT				
PER ACRE FOR 2008				
ITEM	UNIT	QUANTITY	PRICE	TOTAL
GROSS INCOME				
YIELD	TON	0	1330	0
VARIABLE COSTS				
SOIL TEST	ACRE	1	2.33	\$2.33
GRASS SEED - FESCUE K-31	POUND	60	1.10	\$66.00
GRAPEVINES	UNIT	860	3.50	\$3,010.00
FERTILIZER (40Z 10-10-10 PER VINE)	POUND	215	0.30	\$64.50
LIME	TON	0.5	17.50	\$8.75
GRAMOZONE ENTRA	GALLON	0.25	31.44	\$7.86
SURFLAV	GALLON	0.5	65.45	\$32.73
DEVINOL 59DF	POUND	3	9.93	\$29.79
NEMACUR	GALLON	1	89.00	\$89.00
CAPTAN	POUND	9	5.13	\$46.17
DITHANE	POUND	28	2.23	\$62.44
SEVIN 4L	GALLON	1.5	39.50	\$59.25
NOVA	OUNCE	10	4.70	\$47.00
SULFUR	POUND	35	1.20	\$42.00
TRELLISING MATERIALS				
1"X4"X6 TREATED POSTS CCA	ACRE	150	5.75	\$862.50
3"X10 TREATED END POSTS CCA	ACRE	20	10.00	\$200.00
12" GAUGE ALUMINUM CLAD WIRE	FEET	4500	0.01	\$57.38
14 GAUGE ALUMINUM CLAD WIRE	FEET	5000	0.09	\$434.00
TIGHTENERS	UNIT	38	5.50	\$209.00
WIRE CRIMPING SLEEVES	UNIT	6	6.60	\$39.60
BAMBOO SUPPORTS	UNIT	1500	0.16	\$243.60
EARTH ANCHORS	UNIT	75	8.00	\$600.00
TAPENERS & VINE TIES	UNIT	7	53.57	\$375.00
TRELLISING LABOR				
FIELD PREPARATION (UNSKILLED)	HR	20	8.00	\$160.00
LAYOUT, DISTRIBUTE AND DRIVE POSTS (SKILLED)	HR	15	18.00	\$270.00
LAYOUT, DISTRIBUTE AND DRIVE POSTS (UNSKILLED)	HR	20	8.00	\$160.00
AUGER AND SET END POST (SKILLED)	HR	3	18.00	\$54.00
AUGER AND SET END POST (UNSKILLED)	HR	3	8.00	\$24.00
MARK LINE POST FOR WIRES (UNSKILLED)	HR	2	9.00	\$18.00
DRILL END POST FOR WIREVISES (UNSKILLED)	HR	4	8.00	\$32.00
INSTALL LINE POST STAPLES FOR WIRE (UNSKILLED)	HR	8	8.00	\$64.00
INSTALL END POST ANCHOR STRUCTURE (SKILLED)	HR	10	18.00	\$180.00
INSTALL BAMBOO STAKES (UNSKILLED)	HR	6	8.00	\$48.00
VINE PLANTING (UNSKILLED)	HR	55	8.00	\$440.00
INTEREST ON OPERATING CAPITAL		\$6,378.62	0.6%	\$344.45

Recommendations

- ▶ A vineyard is a labor- and capital-intensive enterprise.
 - Be sure to record the amount of time spent in the vineyard and take caution in major capital purchases.
- ▶ It takes considerable time (7 to 12 years) for a vineyard to become profitable, perhaps never if scale of operation is too small relative to capital investment.
- ▶ Row spacing and vine training, which affect yield, will have a major impact on vineyard profitability.
- ▶ Continue research and attend trainings on vineyard production and management
- ▶ Do your own budgets
 - estimated budget and an actual budget using
- ▶ Write and implement a farm business plan to set goals, manage finances and develop marketing

“Ideal” vineyard

- Manage capital assets (purchase used equipment, avoid buying unnecessary equipment, etc.), land expenses
- Use your own equity rather than paying interest
- Excellent site to avoid catastrophic crop loss
- High value crop with “high” yields of high quality fruit (close rows and divided canopy training)
- Acreage of 15 to 30 acres to make most efficient use of capital purchases, such as a sprayer or tractor

Conclusion

- ▶ Research Training Systems – including yield, labor requirement and establishment
- ▶ Research available markets
- ▶ Crunch the numbers and talk with your family, friends and lender
- ▶ Make decisions on profits, responsibilities and your farm business
- ▶ Enjoy your new Vineyard

References

- ▶ **Joe Fiola, University of Maryland**
- ▶ **Tony K. Wolf, Professor of Viticulture**
- ▶ **Bill Boyd, Surry Community College**

Some Helpful Resources

Crop budgets and production information

- www.extension.umd.edu/smallfruit

Business Planning and marketing information

- www.extension.umd.edu/mredc

Land use, on farm training and certifications

- www.extension.umd.edu/newfarmer
- The Economics of Wine Grape Production in Virginia (1998) VCE Publication #463-008
www.ext.vt.edu/pubs/viticulture/463-008/463-008.html

- 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, 2005. White and Pisoni, Cornell University (2005)

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

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