

BUDGETS FOR COSTS OF ESTABLISHING AND OPERATING JUICE AND WINE GRAPE VINEYARDS

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Budgets were prepared to show the current investment costs of establishing grape vineyards. Prices were collected from a representative sample of firms which sell farm supplies in the Northwest Arkansas area.

Vineyard operational requirements were developed in terms of man and machine hours and chemical and material inputs. The combinations of data on costs and resources were entered into a budget generation program on the mainframe computer at the University of Arkansas. The results showed costs and return, by year of production.

Juice Grape Vineyard

Table 1 shows the total revenue, total 1986 costs, net returns, and cumulative costs per acre for Concord grapes sold for juice. Additional details of these budgets were published by Mr. David Kirchner, et. al. in Special Report 125, April 1987. Table 1 shows only irrigated grapes with the Umbrella Kniffin and Geneva Double Curtain trellis systems. Report 125 contains cost estimates for both irrigated and nonirrigated cultures with either trellis system.

At the end of Year 4 the cumulative costs were amortized over the remaining 26 expected productive years for the vineyard.

With the price for grapes at \$185 per ton as was received for the 1985 season, only the highest technology of the irrigated Geneva Double Curtain would be estimated to have a positive net return. And this was a relatively small figure so that it could be said that at \$185 per ton, new Concord juice grape vineyards would at best only be expected to break even.

In Table 2, the results of varying the price of grapes is illustrated. The 1986 costs of establishing vineyards were used to calculate what the levels of return would be at different prices for grapes. The returns per acre were estimated to become positive at \$200 per ton for the Geneva Double Curtain trellis system in both irrigated and nonirrigated vineyards. When the price of grapes was \$215 per ton or higher, all combinations of culture and trellis system were estimated to show positive returns. As cited by Kirchner, et. al. in the September-October 1987 issue of Arkansas Farm Research, the final settlement price for the National Grape Cooperative has ranged from \$156 to \$261 per ton during the 1976 through 1985 period. Reports indicate that the settlement price for the 1987 season will likely be in the upper reaches of that range.

Table 2 Estimated average net returns above 1986 specified costs per acre for Concord grapes at four price levels by cultural and trellis system in Northwest Arkansas.

Culture & Trellis	Average Price Per Acre			
	\$170	\$185	\$200	\$215
Nonirrigated	-----Returns Per Acre(\$)------			
UK	-192.39	-110.57	-28.75	53.07
GDC	-143.27	-37.66	67.95	173.56
Irrigated				
UK	-257.88	-132.41	-14.94	95.39
GDC	-139.52	4.58	148.69	292.79

UK = Umbrella Kniffin; GDC = Geneva Double Curtain.

Wine Grape & Vineyards

For cost estimates wine grapes were divided into the following three cultivar groupings:

1. *Vitis vinifera*
2. French American Hybrid
3. *Vitis labrusca* and *Vitis aestivalis*

Using 1987 resource prices to estimate the per acre establishment costs for *Vitis vinifera*, the projections were as follows:

Per Acre Establishment Charges

<i>Vitis Vinifera</i> Cultivars Per Acre	Cumulative Investment	Annual Establishment Charge
a. Pinot Chardonnay	\$2663.43	\$279.49
b. Cabernet Sauvignon	3499.08	367.09
c. White Riesling	4662.33	489.12

Table 1. Irrigated Concord grapes: Estimated revenue, cumulative costs, and returns per acre by year and trellis system, 1986.

Irr	Costs ¹ and Revenue	Year s of Establishment and Production				
		1	2	3	4	5-30
Umbrella Kniffin Trellis						
	Expected Yield Per Acre(tons)	0	0	3.0	5.0	6.653
	Market Price(\$)	185.00	185.00	185.00	185.00	185.00
	Total Revenue	0	0	555.00	925.00	1230.25
	Total Costs (\$)	1150.46	795.54	1119.84	1236.70	1362.22
	Net Returns above					
	Specified Costs (\$)	0	0	-564.84	-311.70	-132.41
	Total Cumulative Costs ²	1233.36	2028.90	2593.74	2905.44 ²	329.654
Geneva Double Curtain Trellis						
	Expected Yield per Acre (tons)	0	0	3.0	6.0	8.55 ³
	Market Price (\$)	185.00	185.00	185.00	185.00	185.00
	Total Revenue	0	0	555.00	1110.00	1581.75
	Total Costs (\$)	1253.99	881.03	1251.76	1417.47	1577.17
	Net Returns Above					
	Specified Costs (\$)	0	0	-696.76	-307.47	4.58
	Total Cumulative Costs ²	1336.89	2217.92	2914.68	3222.15 ⁴	365.594

¹ Details on equipment operations, spray schedule, revenue and costs are in Special Report No. 125.

² Establishment costs including preplanting preparation costs were amortized over the productive years.

³ In Years 5-30 yields were reduced by 5% from expected yield to reflect the risk of crop loss due to adverse weather and other factors.

⁴ Annual Establishment Charge which is the 4th year cumulative cost amortized over the remaining 26 seasons of expected vineyard life.

For Cost estimates wine grapes were divided into the following three cultivar groups:

1. *Vitis vinifera*
2. French American Hybrid
3. *Vitis labrusca* and *Vitis aestivalis*

Group 1

Using 1987 resource prices to estimate the per acre costs for *Vitis vinifera*, the projections were as follows:

<u>Vitis vinifera Cultivars</u>	<u>Per Acre Establishment Charges</u>	
	<u>Cumulative Investment/acre</u>	<u>Annual Estab. Charge</u>
a. Pinot Chardonnay	\$2663.43	\$279.49
b. Cabernet Sauvignon	3499.08	367.09
c. White Riesling	4662.33	489.12

As with juice grape vineyards the cumulative costs were amortized at the end of Year 4. The estimated market price per ton and yields, costs, and returns per acre were as follows:

Cultivar	Estimated Market Price Per Ton	Expected Yield Tons Per Acre	Expected Costs/Acre	Estimated Break Even Pts*		
				Expected Returns Per Acre	Price per Ton	Yield Tons/Ac
a. Pinot Chardonnay	\$1000	4.5	\$1964.52	\$2535.48	\$437.00	1.714
b. Cabernet Sauvignon	850	4.5	2052.19	1772.81	456.00	2.17
c. White Riesling	600	5.4	2255.22	984.79	415.00	3.47

*Break-even formula:

$$\text{Yield} = \frac{\text{Cost (other than harvesting)}}{\text{Selling price} - \text{per unit harvest cost}}$$

$$\text{Price} = \frac{\text{total cost}}{\text{yield}}$$

Break-even prices and calculated for each cultivar based on the estimated yield or selling prices in term.

Group 2

Per acre establishment costs were estimated for French-American Hybrid cultivars are as follows:

PER ACRE ESTABLISHMENT CHARGES		
French-American Hybrid Cultivars	Total Cumulative Investment/acre	Annual Establishment Charge
a. Vignoles	\$3115.45	\$326.84
b. Chambourcin	2888.45	303.03
c. Vidal and Seyval	3207.95	336.54
d. Chancellor	3306.28	346.86
e. Villard Noir	3767.19	395.21
f. Villard blanc	4392.62	460.83

Market prices per ton and yields, costs, and returns per acre plus break-even points were established as follows:

Cultivar	Estimated Market Price Per Ton	Expected Yields: Tons/acre	Expected Costs: Per acre	Expected Returns: Per acre	Estimated Break Even Points*	
					Price Per Ton	Yield Tons/Acre
a. Vignoles	\$500	5.0	\$1710.47	\$789.53	\$343	3.27
b. Chambourcin	400	6.3	1745.16	774.84	277	4.12
c. Vidal & Seyval	400	5.4	1738.17	421.83	322	4.22
d. Chancellor	350	6.3	1788.99	416.01	284	4.94
e. Villard noir	3.25	5.4	1796.84	-41.84	333	5.55
f. Villard blanc	220	9.0	2024.46	-44.46	225	9.25

Group 3

For *Vitis labrusca* and *Vitis Aestivalis* cultivars, the per acre establishment costs were estimated as follows:

PER ACRE ESTABLISHMENT CHARGES		
<i>Vitis labrusca</i> & <i>Vitis aestivalis</i> Cultivars	Total Cumulative Investment Per acre	Annual Establishment Charge
a. Cynthiana	\$2830.67	\$296.96
b. Niagara	2986.42	313.30
c. Catawba	3170.92	332.66
d. Concord	3147.33	330.18
e. Delaware	3278.90	343.99

The market price per ton and yields, costs and returns per acre were estimated along with the break-even points for each cultivar as follows:

<u>Cultivar</u>	<u>Estimated Market Price Per Ton</u>	<u>Expected Yields: Tons/acre</u>	<u>Expected Costs: Per acre</u>	<u>Expected Returns: Per acre</u>	<u>Estimated Break Even Points*</u>	
					<u>Price Per Ton</u>	<u>Yield Tons/Acre</u>
a. Cynthiana	\$650	4.05	\$1384.31	\$1248.19	\$342	1.99
b. Niagara	250	7.20	1542.40	257.60	215	5.95
c. Delaware	300	5.40	1492.09	127.91	277	4.90
d. Catawba	250	6.30	1521.26	53.74	242	6.04
e. Concord	200	6.65	1518.78	-188.78	229	7.99

Summary

In this research, investment costs were estimated for both juice and wine grape vineyards. The establishment costs were projected to range from approximately \$27,000 to \$47,000 per acre. Based on the expected market prices s listed, the returns were projected for the supposed 26 year productive span for a vineyard. These returns were observed to vary especially with the market price paid of grapes.

Caution should be given for the *Vitis vinifera* cultivars which showed the relatively highest returns:

1. There are major differences in topography and climate among the potential vineyard sites across Arkansas.
2. Alternating warm and freezing winter temperatures can result in serious injury to wine grape cultivars especially of the *Vitis vinifera* species.
3. Vineyards of vinifera cultivars in Arkansas have been successful only in carefully selected microclimates.
4. The majority of these best microclimates are found in the foothills of the Ozark Mountains and other similarly protected areas of the state.

Growers who are considering establishing new wine grape vineyards may want to consider negotiating long term marketing contracts with local wineries. If a contract agreement can be made to establish a range in prices and quantities or acceptable cultivars, some degree of insurance can be provided the grower for recovering vineyard investments and making a profitable return. Contracting may be one way of minimizing the mutual dependency risk of: (1) The winery processor looking for a stable supply of wine grapes and (2) the grower looking for a profitable market.