# ECONOMICS OF GRAPE PRODUCTION*

Allan EuGene Lines**

Good management, regardless of the enterprise, requires a thorough knowledge of the costs of production. The importance of costs are illustrated by the simple profit equation.

Profit = Income - Costs

Costs constitute half of the equation. Cost control is vital if a manager expects to generate a profit from the enterprise under his control. Cost control, or the lack of it, can spell the difference between success and failure. The good manager will be able to identify cost items, determine their expected and actual value, understand their effect on profit, and know how his decisions can influence costs. It is to these ends, for the grape producer, that this paper is prepared.

The data presented are the author's best estimate of costs that a grape producer might expect to incur during 1976. Recent cost studies on commerical grape farms in the Lake Erie grape belt were reviewed and provided the basis for these estimates.

---

* Paper presented to Ohio State Horticultural Society, February 3, 1976

** Extension Economist - Farm Management, Department of Agricultural Economics and Rural Sociology, The Ohio State University, Columbus, Ohio

Cost Components

A very conventional and useful way of identifying costs of production is to divide them into general groups -- fixed and variable. Fixed costs are broadly defined as those costs that remain constant as an individual's production changes. Figure 1 illustrates the general behavior of these types of costs.

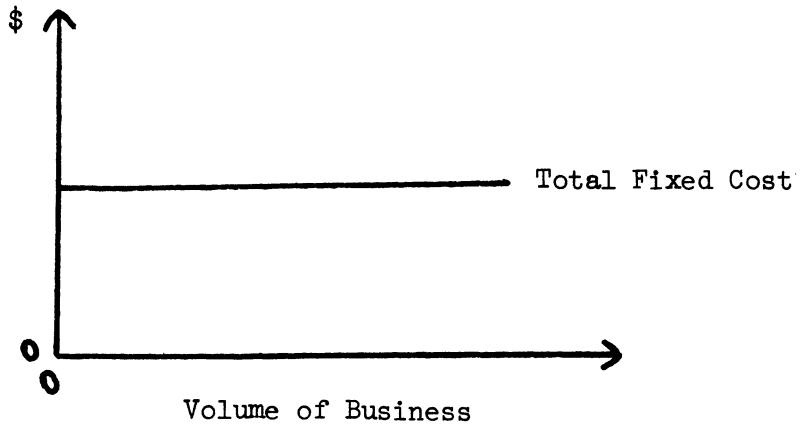


Figure 1

Fixed cost normally include the DIRTI 5 (depreciation, interest, repairs, taxes, and insurance) that would be associated with land, buildings, and equipment. Fixed costs are always determined in light of the current set of resources. In this sense, the volume of business on a grape farm is the tons of grapes produced from a given acreage with a specified set of equipment.

Variable costs, on the other hand, are generally defined as those costs that change as production changes. Figure 2 illustrates the general behavior of variable costs.

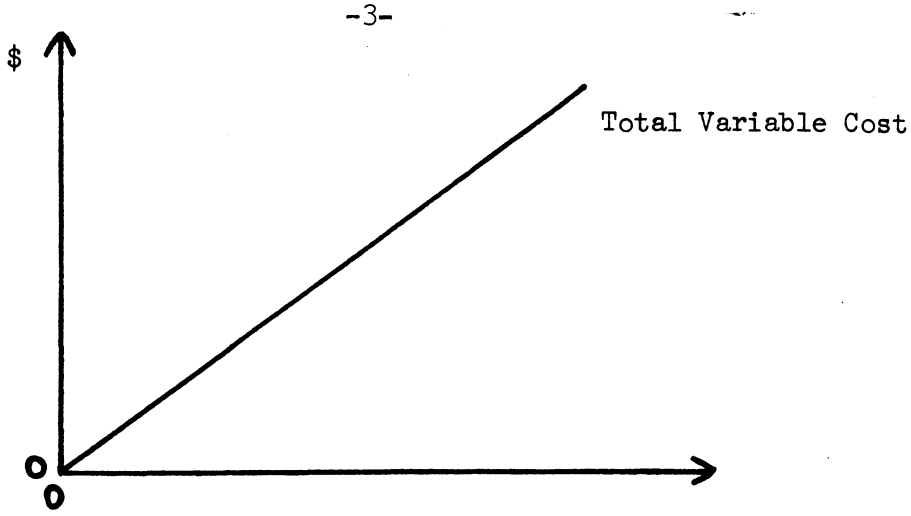


Figure 2

Variable costs would include inputs such as fertilizer, wire, twine, fuel, labor, and spray materials.

Fixed Costs

Fixed or overhead costs incurred in the production of grapes can be divided into eight areas and will vary somewhat depending upon the type of grape and type of trellis used. Admittedly the figures in Table 1 do not include all the detail one would like but they do present some indication of the magnitude of fixed costs in the production of grapes.

Table 1. Estimated Fixed Costs Per Acre for Growing Grapes 1/ - 1976

| | Cost Per Acre of Grapes | | |
|---|---|---|---|
| | Concords | | French |
| | Single Curtain | Double Curtain | Hybrid |
| Equipment | $174 | $174 | $186 |
| Shop and Storage Building | 27 | 27 | 27 |
| Vineyard Interest | 143 | 200 | 171 |
| Vineyard Depreciation | 37 | 83 | 60 |
| Taxes | 31 | 31 | 31 |
| Interest on Operating Capital | 18 | 21 | 22 |
| Utilities, Insurance, etc. | 23 | 23 | 23 |
| Management | 45 | 65 | 75 |
| Total | $498 | $624 | $595 |

1/ Based on 1974 data in: Good, D. L. and T. D. Jordan, "Economics of Grape Production...", A. E. Ext. 75-18, Department of Agricultural Economics, Cornell University, June, 1975. A 50 acre vineyard was used for the analysis. These data were increased by 15% to account for inflation from 1974 to 1976.

The data in Table 1 assume a 50 acre single enterprise farm and that 60 acres of land are required to yield 50 acres of grapes. The acreage operated plays a significant role in the fixed costs per acre. Assuming of course that the same complement of equipment is required whether the enterprise consists of 50, 25, or 10 acres of grapes. Increasing the number of acres decreases the fixed cost per acre simply by "spreading the overhead." The information in Table 2 demonstrates the effect of spreading the equipment cost in Table 1 over more or less acres for French hybrid grapes.

Table 2. Estimated Fixed Costs Per Acre - 1976
French Hybrid Grapes

| Item | Acres of Grapes | | | | |
|---|---|---|---|---|---|
| | 50 | 40 | 30 | 20 | 10 |
| Equipment | $186 | $233 | $310 | $395 | $ 798 |
| Other Fixed Costs | 409 | 409 | 409 | 409 | 409 |
| Total | $595 | $642 | $719 | $804 | $1107 |

The data from Table 2 are illustrated in Figure 3 and supports a fundamental thumb rule in farming -- "Be large enough to fully utilize one set of equipment."

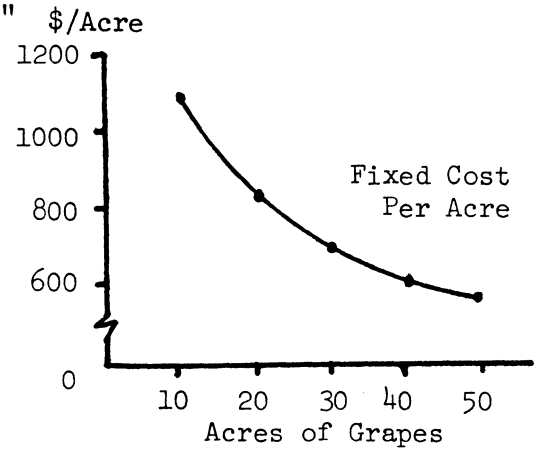


Figure 3 Fixed Cost Per Acre for Growing Grapes

1/ Assuming the same complement of equipment is required for all acreages, except that only 1 tractor was used on the 10 and 20 acreages whereas 2 were used on the 30, 40, and 50 acreages.

Variable Costs

Variable costs also play an important part in the decision making process. Cultural practices, labor, equipment, and materials constitute the majority of variable costs. For purposes of this discussion we will compare the variable costs of production for the same production systems used in our discussion of fixed costs. The estimated variable costs of production are included in Table 3 and represent costs for well established vineyards.

Table 3. Estimated Variable Costs of Growing Grapes - 1976[1/]

| Item | Cost Per Acre of Grapes | | |
|---|---|---|---|
| | Concords | | French Hybrid |
| | Single Curtain | Double Curtain | |
| Labor | $241 | $295 | $297 |
| Tractor Operation | 12 | 13 | 13 |
| Fertilizer | 33 | 46 | 33 |
| Spray Materials | 45 | 45 | 54 |
| Miscellaneous | 38 | 34 | 38 |
| Total | $369 | $433 | $435 |

Labor is the largest single item of expense for all three systems of production. Much of this labor is operator labor and in reality is not a cash cost (depending on business organization). However, grape producers must be paid for their labor if grape growing is to compete with alternative enterprises for operator labor. Operator labor or labor of operator quality (trimming, spraying, etc.) was charged at $3.85 per hour and part-time labor (tying, pulling brush, etc.) was charged at $2.60 per hour in this analysis.

1/ Assuming the same complement of equipment is required for all acreages, except that only 1 tractor was used on the 10 and 20 acreages whereas 2 were used on the 30, 40, and 50 acreages.

A producer can expect that labor will account for 65 to 70 percent of the total variable cost of growing grapes. Notice that the figures in Table 3 do not include harvesting costs. Harvesting costs will vary with the yield per acre and will be charged on a per ton basis when discussing the costs of producing a ton of grapes.

Total Costs Per Acre

Table 4 summarizes the total cost of growing grapes. The total cost per acre is lowest for the single curtain Concord and highest for the Concord double curtain.

Table 4. Estimated Costs Per Acre for Growing Grapes - 1976[1/]

| | Cost Per Acre of Grapes | | |
|---|---|---|---|
| | Concords | | French |
| | Single Curtain | Double Curtain | Hybrid |
| Fixed Equipment Cost | $174 | $ 174 | $ 186 |
| Other Fixed Costs | 324 | 450 | 409 |
| Variable Growing Cost | 369 | 433 | 435 |
| Total | $867 | $1057 | $1030 |

Fixed equipment costs appear to be about $12 higher per acre for the French hybrids, reflecting the necessity of brid control equipment. Other fixed costs are highest for the double curtain Concords, reflecting a greater investment in the trellis. Other fixed costs for hybrids is considerably higher than single curtain Concords because of a higher value vineyard and a higher management charge.

1/ Does not include harvesting. Assumes a 50 acre vineyard.

Total Cost Per Ton

In the final analysis it is the total cost per ton of grapes that a farmer can readily compare with the price he receives to determine whether or not he is making a profit. Based on the costs presented in Table 4 the total cost per ton of grapes was calculated for each system of production at alternative yield levels (Table 5).

Table 5. Estimated Cost Per Ton For Growing and Harvesting Grapes - 1976

| Yield Ton Per Acre | Cost Per Ton of Grapes 1/ | | | |
|---|---|---|---|---|
| | Concord | | French Hybrid | |
| | Single Curtain | Double Curtain | Machine Harvest | Hand Harvest |
| 2 | $464 | | $545 | $575 |
| 3 | 319 | | 373 | 403 |
| 3.5 | 278 | | 324 | 354 |
| 4 | 247 2/ | $294 | 288 | 310 |
| 4.5 | 223 2/ | 265 | 259 2/ | 289 2/ |
| 5 | 203 | 241 | 236 2/ | 266 2/ |
| 5.5 | 188 | 222 | 217 | 247 |
| 6 | 175 | 206 2/ | 201 | 231 |
| 6.5 | | 193 2/ | 188 | 218 |
| 7 | | 181 | 177 | 207 |
| 7.5 | | 171 | | |
| 8 | | 162 | | |
| 9 | | 147 | | |
| 10 | | 136 | | |

1/ Assuming a 50 acre vineyard. Concords and French hybrid - machine harvest were assumed to be custom machine harvested for $30 per TON. The French hybrid - hand harvest were assumed to be picked by hand and delivered to the processing plant for $60 per ton.

2/ Typical yield levels that can be expected with good management.

Now to address the cost per ton as the number of acres and yield per acre both vary. This analysis is very enlightening from an economic standpoint (Table 6 and Table 7).

Table 6. Estimated Cost Per Ton for Growing and Harvesting Grapes - 1976 French Hybrids - Hand Picked

| Yield Ton Per Acre | Acres of Grapes 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|
| 2 | $575 | $599 | $638 | $681 | $879 |
| 3 | 403 | 419 | 445 | 473 | 605 |
| 3.5 | 354 | 367 | 389 | 413 | 526 |
| 4 | 310 | 322 | 341 | 362 | 461 |
| 4.5 | 289 | 289 | 306 | 325 | 413 |
| 5 | 266 | 275 | 290 | 307 | 386 |
| 5.5 | 247 | 256 | 270 | 285 | 357 |
| 6 | 231 | 239 | 252 | 266 | 332 |
| 6.5 | 218 | 225 | 237 | 250 | 311 |
| 7 | 207 | 214 | 225 | 237 | 293 |

The analysis in Table 6 illustrates the importance of size and yield in reducing the cost per ton of grapes produced. Using yields of 4, 5, and 6 tons per acre the relationships of size and yield to cost per ton are illustrated in Figure 4.

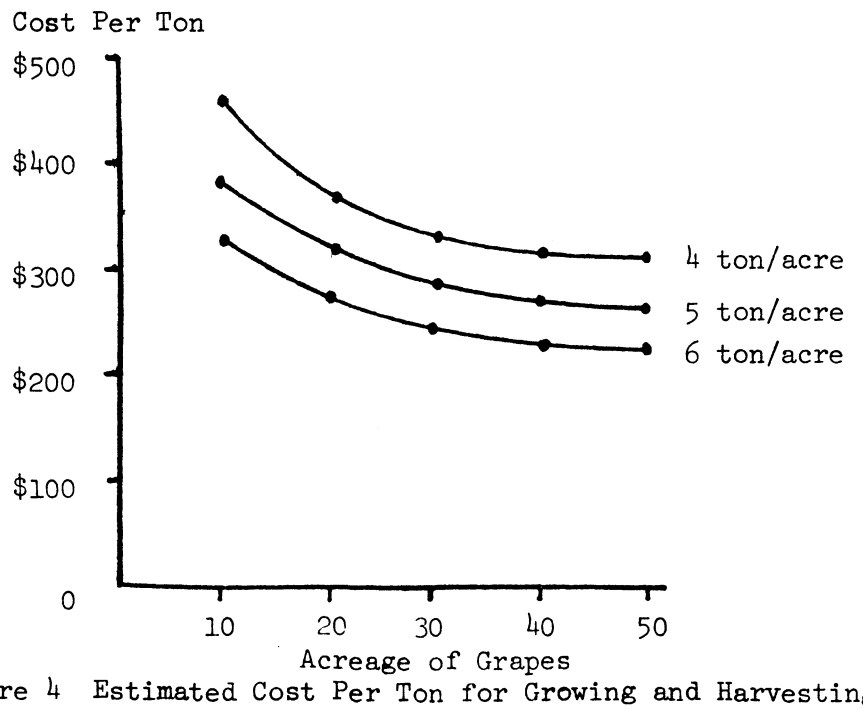


Figure 4 Estimated Cost Per Ton for Growing and Harvesting Grapes - 1976 French Hybrid - Hand Picked

The most common system of producing grapes in Ohio is the single curtain Concord - machine harvest. The same analysis as done above for the French hybrid - hand harvest is presented for the Concord single curtain - machine harvest system in Table 7.

Table 7. Estimated Cost Per Ton for Growing and Harvesting Grapes - 1976 Concord - Single Curtain - Machine Harvest

| Yield Ton Per Acre | Acres of Grapes 50 | 40 | 30 | 20 | 10 |
|---|---|---|---|---|---|
| 2 | $464 | $486 | $523 | $560 | $743 |
| 3 | 319 | 334 | 358 | 383 | 505 |
| 3.5 | 278 | 291 | 313 | 334 | 438 |
| 4 | 247 | 258 | 276 | 295 | 386 |
| 4.5 | 223 | 233 | 249 | 275 | 356 |
| 5 | 203 | 219 | 234 | 249 | 322 |
| 5.5 | 188 | 196 | 209 | 222 | 288 |
| 6 | 175 | 182 | 194 | 206 | 267 |

Using yields of 3.5, 4.5, and 5.5 the size, yield, and cost per ton relationships for Concord - single curtain - machine harvest are presented in Figure 5.

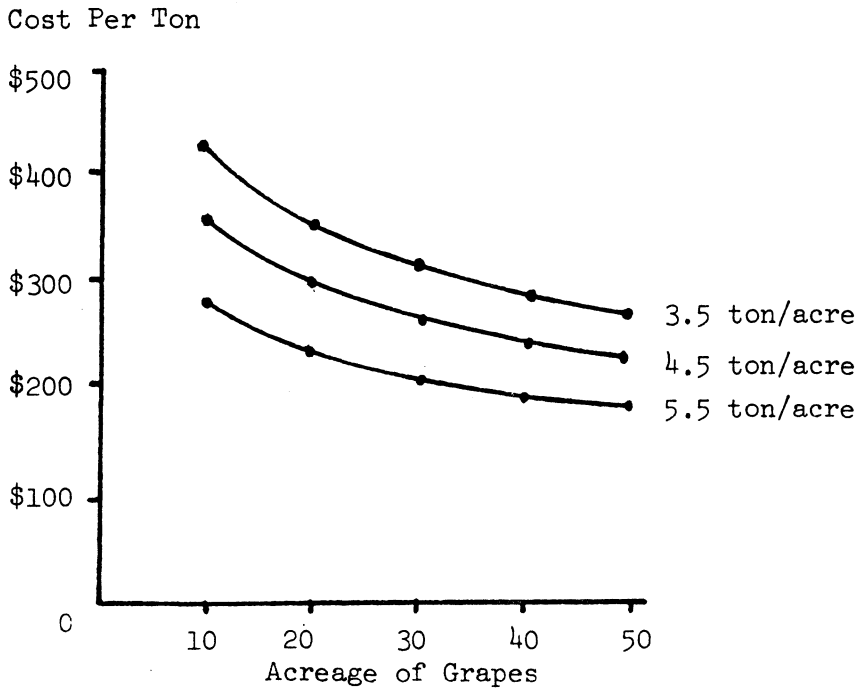


Figure 5 Estimated Cost Per Ton for Growing and Harvesting Grapes - 1976 Concord - Single Curtain - Machine Harvest

Summary

In summary one must remember that throughout this analysis the grape enterprise was considered by itself. Generally when the size of the grape enterprise is 30 acres or less it becomes a supplementary enterprise. As a supplementary enterprise the fixed cost of much of the equipment used in the grapes would be shared by other enterprises. This would reduce the cost per ton of grapes from those figures presented in this analysis. However, it is well to realize that if a small number of acres are expected to carry the entire or majority of fixed equipment costs, the cost per ton of grapes is going to be very high.

Another point to remember in this analysis is many of the costs identified may be non-cash costs, depending on the situation. The management charge is generally a non-cash item, but remember the operator must receive payment for his labor. Depreciation is also a non-cash item, but if an operator is to remain in the grape business he must generate funds to replace equipment, buildings, and vineyards. If the operator owes no money on his land, buildings, and equipment and doesn't have to borrow operating capital, the interest charges would be non-cash expenses. Remember however, that any capital invested in the grape enterprise should return a market rate to its owner. It is non-cash items such as these that often lull an operator into thinking he is running a profitable grape enterprise when in the final analysis he may not be.

It is hoped that the economic analysis presented in this paper will better enable operators in the grape business to appraise the profitability of their enterprise and will help them identify its strengths and weaknesses. The analysis is also intended to be of use to potential grape farmers as they evaluate returns to their labor, management, and capital from alternative uses of their resources.