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COSTS AND RETURNS ON
CHAUTAUQUA COUNTY GRAPE FARMS
1958 and 1968

by

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INTRODUCTION

Economic studies were made of grape production in Western New York during the 1956, 1957, and 1958 seasons. They involved a combination of survey and directed records to obtain the economic information. Twenty producers continued in the study group through the three-year period. Several additional producers were in one or two of the three-year period. During 1958 twenty-one cooperators participated in the study.

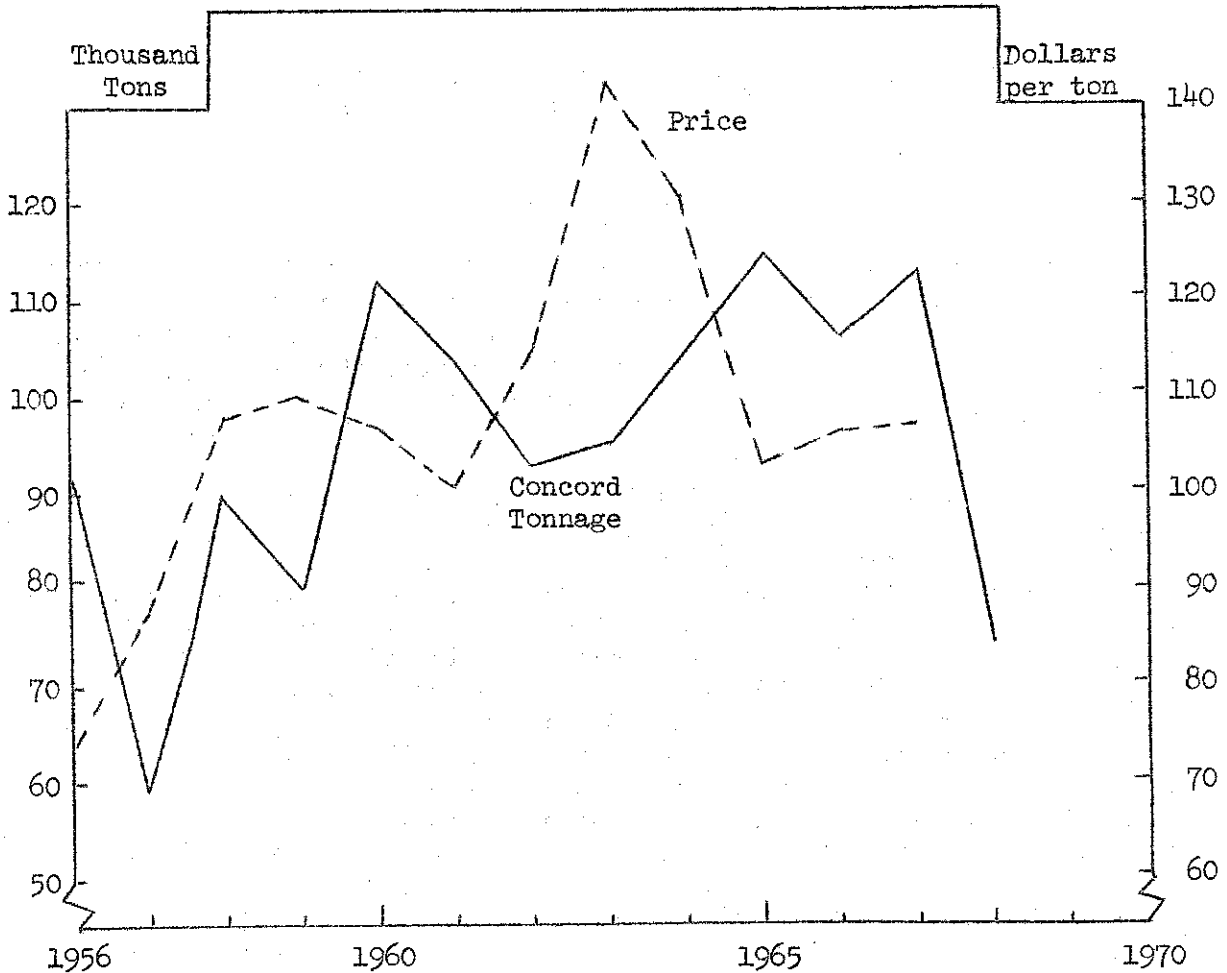
In 1967 the growers included in the earlier studies were contacted to obtain their cooperation during the 1968 season. They were given forms and asked to record beginning inventories for 1968 and expense and receipt items during the year. After the middle of the year each grower was visited to determine his progress in recording the data and to give any assistance necessary. At the end of 1968 each grower was visited to obtain the year's record. The purpose of this study was to determine the physical inputs and financial returns on these farms and the changes that have occurred during the past ten years. Records were obtained from 21 of the farms included in the earlier studies. Six of the farms had been sold to other producers during the ten-year period. The acreage of bearing grapes averaged 33.5 in the earlier studies but by 1968 had increased to 50. Nearly all were of the Concord variety in both years. Sixteen growers had increased their bearing grape acreage, two had decreased their acreage, while three had the same acreage.

This is not a random sample of growers producing grapes, and the results reported herein should be considered with this in mind. Growers included were those interested in studying the economics of their farm businesses and comparing their operations with the average of other producers. Grapes were by far the most important enterprise on most of the farms studied. Their grape enterprises were well above average in size. These producers averaged 54 acres of grapes (bearing and non-bearing) while the average in Chautauqua County in 1966 was 15 acres. In 1968 these producers marketed 4,200 tons of grapes or 3.6 per cent of New York State's total production. In the 1957 and 1958 studies they produced 3 per cent of the State's output.

New York is the leading state in the production of the American, or slip-skin type grape of which Concord is by far the leading variety. The volume of Concord grapes purchased by New York State wineries and processing plants increased with some wide year-to-year swings from 1956 to 1967 (Figure A). By

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Figure A.



CONCORD GRAPE TONNAGE PURCHASED BY NEW YORK STATE WINERIES
AND PROCESSING PLANTS AND AVERAGE PRICE PAID GROWERS

far the greatest proportion of this volume came from New York State farms. Small quantities were imported from other states and Canada. Prices generally vary inversely with crop size. The volume purchased in 1958 totalled 90 thousand tons and price averaged \$108 per ton. In 1968 processors purchased 74 thousand tons and the price averaged close to \$125 per ton.

Within New York State, grape production is concentrated mainly in four areas. The Chautauqua area, where the studies were conducted, is by far the largest, producing 55 per cent of the State's annual crop. The Finger Lakes area of Central New York accounts for about 30 per cent of the State's

production. The Hudson Valley and Niagara and Erie Counties combine to make up the remainder of the crop.

In 1964 there were 18.6 million bearing grape vines reported in New York State (Table 1). Very little change occurred in the number between the census years of 1959 and 1964. Based on that trend and the number of non-bearing vines that existed in 1959 (1.2 million) and 1964 (1.4 million), it is estimated that very little net change has occurred since 1964. Although a substantial acreage of young wine grape vineyards was planted, some old, non-productive Concord acreage went out of commercial production during the same period. Certainly the primary factor in expanded production was increased per-acre yields. Yield per vine and per acre approximately doubled from the early 1950's to the mid-1960's reaching a high of 17 pounds per bearing vine in 1967. However, the 1968 crop was only 15 per cent greater than the 1958 crop.

Table 1. BEARING GRAPE VINES, PRODUCTION AND AVERAGE YIELD PER BEARING VINE, NEW YORK STATE

Year	Number of bearing vines	Production	Yield per bearing vine
	millions	thousand tons	pounds
1950-54	19.6	76.0	7.8
1955-59	18.9	90.4	9.6
1960-64	18.6	116.0	12.5
1965	18.6	153.0	16.5*
1966	18.6	132.0	14.2*
1967	18.6	158.0	17.0*
1968	18.6	116.0	12.5*
1969	18.6	120.0	12.9*

* Yields for these years based on an estimate of no change in number of bearing vines since 1964.

Source: U. S. D. A. Production Reports and U. S. Census

LABOR INCOMES

In this study an analysis was made of income and expenses for the entire farm business. Labor income was computed and used as a measure of return to farm operators for their labor and management after paying all farm expenses, and deducting a charge for unpaid family labor and for interest on all the capital invested in the farm business. In 1958, interest was charged at 5 per cent. In 1968, it was estimated that the interest charge averaged 6 per cent.

During the ten-year period, the average farm inventory more than doubled, from just under \$47 thousand to over \$95 thousand (Table 2). Receipts from grapes also more than doubled. Receipts from crops other than grapes remained virtually unchanged. Farm expenses also more than doubled, to almost \$24 thousand. Farm income averaged almost two thousand dollars more in 1968 than in 1958.

After deducting interest, labor incomes in 1968 averaged \$2,351 compared with \$3,792 in 1958. In 1958, labor incomes on these farms ranged from a -\$1,958 to +\$7,556. Only one grower had a minus labor income. In 1968 the spread in labor incomes among farms varied much more. Eight growers had minus labor incomes. The range in labor incomes was from -\$7,086 to +\$14,618.

In 1958 all 21 farmers recorded some income from the 1957 crop as well as the 1958 crop. All except three of the 21 also received some income from the 1956 crop in the form of grape certificates.^{1/} In calculating labor income in 1958, the certificates were valued at 35 per cent of the face value, which was their approximate market value in January, 1959.

In 1968 all growers received some income for the 1968 crop. All but four received some income from the 1967 crop. Thirteen of the 21 farmers received some income from the 1966 crop and all but four received some from the 1966 crop in the form of grape certificates. In computing labor incomes in 1968, certificates were valued at 53 per cent of face value. This was the approximate market value in January, 1969.

In each study, income was received on most farms from three crop years. Therefore, the picture of what these farms earned in 1958 and 1968 is not clear. This method of calculating returns tends to even out the ups and downs in labor incomes by spreading the income from good and poor crops over the three-year period.

^{1/} These are evidences of equity issued by a cooperative in partial payment for grapes delivered. They are payable in cash in 20 years or earlier at the discretion of the cooperative.

Table 2.

LABOR INCOMES
(21 Chautauqua County Farms 1958 and 1968)

Item	Average per farm	
	1958	1968
	dollars	
Average farm inventory	<u>46,754</u>	<u>95,440</u>
Farm receipts, grapes (cash receipts*)	12,777	26,512
Farm receipts, other	<u>5,449</u>	<u>5,241</u>
Total farm receipts	18,226	31,753
Farm expenses	<u>12,096</u>	<u>23,676</u>
Farm income	6,130	8,077
Interest on capital**	<u>2,338</u>	<u>5,726</u>
Labor income per farm	3,792	2,351

* In calculating receipts, all income for grapes received during the year was included regardless of what crop the payment was for. All grape certificates received were valued at the then current cash market value and added to cash receipts.

** In 1958, interest charged at 5 per cent. In 1968, interest charged at 6 per cent.

ALTERNATIVE CALCULATION OF LABOR INCOME,
USING ESTIMATED PRICES FOR THE 1958 AND 1968 CROPS

Another method of calculating labor incomes on these farms is to estimate the total return which growers actually received for the grape crop produced during each of the two years under comparison. In the calculation of labor incomes in Table 3, it is estimated that the growers eventually received \$100 per ton for the 137 tons of grapes produced and sold per farm during 1958 and \$125 per ton for the 200 tons produced and sold per farm during 1968.

These calculations show the profits based on the crops produced during 1958 and 1968. This method reflects the variation in production and prices more clearly than the calculations in Table 2. In 1958, labor income per farm calculated on the cash basis was \$4,715 compared with \$3,792 when calculated on the basis of money actually received during 1958 from several different crops. In 1968, labor income per farm was only \$839 when calculated on a cash basis. This compares with \$2,351 when calculated on the basis of returns actually received during calendar 1968 from several different crops.

Table 3. LABOR INCOMES USING ESTIMATED RECEIPTS
FROM THE 1958 AND 1968 GRAPE CROPS
(21 Chautauqua County Grape Farms, 1958 and 1968)

Item	Average per farm	
	1958	1968
	dollars	
Average farm inventory	<u>46,754</u>	<u>95,440</u>
Farm receipts, grapes	13,700*	25,000**
Farm receipts, other	<u>5,449</u>	<u>5,241</u>
Total farm receipts	19,149	30,241
Farm expenses	<u>12,096</u>	<u>23,676</u>
Farm income	7,053	6,565
Interest on capital***	<u>2,338</u>	<u>5,726</u>
Labor income per farm	4,715	839

* Assumes \$100 per ton for grapes sold during 1958.

** Assumes \$125 per ton for grapes sold during 1968.

*** In 1958, interest charged at 5 per cent. In 1968, interest charged at 6 per cent.

CAPITAL INVESTMENT

Based on end-of-year inventory values, the total capital investment on the 21 farms included in the 1958 study averaged \$46,855 (Table 4). By 1968 the average had increased to \$96,120. Investment per man increased from \$16,734 to \$29,127. Investment per acre of grapes did not show as great an increase. In 1958 the figure was \$1,291 and in 1968 it was \$1,780.

Table 4. END-OF-YEAR FARM INVENTORIES
 (21 Chautauqua County Farms)

Item	Average per farm	
	1958	1968
Livestock	\$ 285	\$ 95
Crops, feed and supplies	687	1,555
Machinery and equipment	6,832	11,822
Land and buildings	<u>39,051</u>	<u>82,648</u>
Total farm inventories	\$46,855	\$96,120
Man equivalent	2.8	3.3
Investment per man	\$16,734	\$29,127
Number of acres of grapes	36.3	54
Total investment per acre of grapes	\$ 1,291	\$ 1,780
Number of crop acres	57	60
Investment per acre in crops	\$ 822	\$ 1,602

Investment per man and total dollar investment increased constantly during the three-year period of study in the late 1950's. By 1968 the value had almost doubled. Investment per acre in grapes did not change much during the 1950's but by 1968, it had increased almost 40 per cent.

<u>Year</u>	<u>Total investment</u>	<u>Investment per man</u>	<u>Investment per acre in grapes</u>
1956	\$40,188	\$15,449	\$1,339
1957	45,117	16,113	1,267
1958	46,855	16,734	1,291
1968	96,120	29,127	1,780

SOURCES OF INCOME

Income from grapes during 1958 accounted for 70 per cent of total farm receipts on the 21 farms studied (Table 5). By 1968 this percentage had increased to 84 per cent of the total indicating that these farms had become much more specialized in the production of this one fruit (Table 6). In 1958 income from the sale of livestock and livestock products accounted for 5 per cent of total receipts. Ten years later less than one per cent was received from this source.

Table 5. FARM RECEIPTS
(21 Chautauqua County Farms, 1958)

Item	Average per farm	Per cent of total
Grape receipts:		
1958 crop	\$ 6,657	
1957 crop	4,654	
1956 crop (certificate)	<u>1,466</u>	
Total grape receipts*	\$12,777	70
Other crop receipts	3,215	18
Livestock products and livestock sales	894	5
Work off farm	458	2
Miscellaneous receipts	681	4
Increase in inventory	<u>201</u>	<u>1</u>
Total farm receipts	\$18,226	100

* Cash received during 1958, plus the cash value of grape certificates calculated at 35 per cent of face value.

Table 6.

FARM RECEIPTS
(21 Chautauqua County Farms, 1968)

Item	Average per farm	Per cent of total
Grape receipts:		
1968 crop	\$12,486	
1967 crop	9,277	
1966 crop	687	
1966-67 crop (certificate)	<u>4,062</u>	
Total grape receipts*	\$26,512	84
Other crop receipts	1,011	3
Livestock products and livestock sales	64	-
Miscellaneous receipts	2,807	9
Increase in inventory	<u>1,359</u>	<u>4</u>
Total farm receipts	\$31,753	100

* Cash received during 1968, plus cash value of 1966-67 grape certificates calculated at 53 per cent of face value.

FARM EXPENSES

In 1958 farm expenses on these 21 Chautauqua County farms averaged \$12,096 (Table 7). Hired labor was the most important item, and accounted for 44 per cent of the total. By 1968, total expenses had increased to \$23,676. Labor cost had more than doubled and comprised 49 per cent of total costs compared with 45 per cent in 1958. In each year, equipment costs were the next largest expense. They included the combined values of gas and oil, auto and truck, equipment repair, custom work hired, and new machinery. In each year they accounted for 20 per cent of the total. The amount spent for spray materials increased almost three times during the ten-year period. The increase is accounted for by larger grape acreages and the fact that weed spraying was practiced on all farms by 1968. The amount spent for custom work was much higher in 1968 than in 1958. Part of this increase was for mechanical harvesting of grapes on some farms. Taxes increased almost three times during the ten-year period. Part of this increase was accounted for by the average grower having more acres of grapes.

Table 7. FARM EXPENSES
(21 Chautauqua County Farms, 1958 and 1968)

Item	1958		1968	
	Average per farm	Per cent of total	Average per farm	Per cent of total
Livestock expense	\$ 532	4	\$ 27	***
Lime and fertilizer	582	5	735	3
Seeds and plants	206	2	303	1
Storage and containers	135	1	17	***
Spray materials	547	4	1,418	6
Vineyard and other crop expense	376	3	499	2
Gas and oil	489	4	713	3
Auto and truck	384	3	199	1
Equipment repair	395	3	1,011	4
Custom work hired	198	2	937	4
Real estate upkeep	118	1	150	1
Regular hired labor*	2,500	21		
Other hired labor*	2,750	23	11,540	49
Telephone and electricity	137	1	214	1
Taxes	613	5	1,715	7
Insurance	321	3	**	
Miscellaneous farm expense	494	4	1,080	4
New buildings	96	1	939	4
New machinery	997	8	1,873	8
Livestock bought	147	1	13	***
Unpaid family labor	79	1	293	1
Total farm expense	\$12,096	100	\$23,676	100

* In some cases, the division of labor expense between regular and other had to be estimated.

** Not separated as an individual item but included in miscellaneous.

*** Less than one per cent.

COST OF PRODUCING GRAPES

Growers and handlers continue to be keenly interested in calculating the cost of producing grapes. The data obtained from the two studies can be used to calculate the cost per farm, per acre and per ton. To do this some assumptions must be made.

Grapes were the major enterprise on these farms, but some income was received from sources other than grapes on each farm. The first assumption which must be made, then, is that all income other than from grapes was produced at cost. On farms where other income was relatively unimportant, this assumption does not greatly affect the cost-of-production calculation.

The second assumption, or estimate, must be made as to the value of the operator's labor and other family labor which was not paid for in cash. It is unlikely that any two operators will agree on the value of labor and management which they contribute to the farm business during the year. In 1958, the operators did estimate the time they actually spent in the vineyards. These estimates averaged 1,230 hours per year. For this calculation, it was assumed that this work could have been hired for \$1.35 per hour. Labor hired for grape work did cost, on the average, about \$1.35 per hour in 1958. This estimate does not include the value of management, nor does it include time spent in attending grape meetings, negotiating for the sale of grapes, trading machines, and other time-consuming activities which are connected with the grape enterprise.

In 1968, operators estimated that on the average they spent 10 months on the grape enterprise. Using eight hour days and 26 day months it was estimated that \$2.00 per hour would have been required to hire this work done.

The cost of producing grapes is shown in Table 8 for 1958 and 1968. Cost per farm in 1968 was almost three times the cost in 1958. Cost per ton per farm averaged \$142 compared with \$78 in 1958. (If the 1958 figure of 1,230 hours per operator was increased the same amount as size of business increased from 1958 to 1968 -- 48.8 per cent -- the result would be 1,830 hours. This multiplied by \$2.00 would be \$3,660 or \$500 less than the estimate using 10 months. Using this method, the estimated cost of producing a ton of grapes in 1968 would be \$139).

Any use of the data on the cost of producing grapes should be tempered with the realization of the assumptions that were made relative to non-grape income and the value of the operator's labor in each year. It is emphasized that this cost of production data do not include a charge for the operator's management.

Table 8. AVERAGE COST OF PRODUCING GRAPES PER TON AND PER ACRE
(Chautauqua County Grape Farms, 1958 and 1968)

Item	1958	1968
Cash expenses per farm	\$12,096	\$23,676
Interest on average investment*	2,338	5,726
Operator's labor (estimated)	<u>1,660</u>	<u>4,160</u>
Total costs	\$16,094	\$33,562
Total farm receipts	\$18,226	\$31,753
Less grape receipts	<u>12,777</u>	<u>26,512</u>
Other farm receipts	<u>\$ 5,449</u>	<u>\$ 5,241</u>
Total costs less other farm receipts (grape costs per farm)	\$10,645	\$28,321
Tons of grapes sold	137	200
Cost per ton of grapes sold	\$ 78	\$ 142
Acres in bearing grapes	34.6	50.0
Cost per acre in bearing grapes	\$ 308	\$ 566
Acres in grapes (bearing and non-bearing)	36.3	54.0
Cost per acre in grapes	\$ 293	\$ 524
Average yield per acre (tons)	4.0	4.0

* In 1958, interest charged at 5 per cent. In 1968, interest charged at 6 per cent.

FARM MACHINERY COSTS

All machinery costs including depreciation and custom work hired totalled \$2,629 on the farms in 1958 (Table 9). Machinery cost per acre in grapes averaged \$72 while machinery costs per man averaged \$939. By 1968, machinery costs had increased to \$4,434 and averaged \$82 per acre in grapes and \$1,344 per man. Efficiency in the use of equipment continues to be an important factor affecting profits in farming.

Table 9. FARM MACHINERY COSTS
(21 Chautauqua County Grape Farms, 1958 and 1968)

Item	Average per farm	
	1958	1968
	dollars	
Beginning inventory	6,713	11,951
New machinery	<u>997</u>	<u>1,873</u>
Total	7,710	13,824
End inventory	6,832	11,822
Sale of old machinery	<u>-</u>	<u>367</u>
Total	<u>6,832</u>	<u>12,189</u>
Depreciation	877	1,634
Interest on average capital	362*	713**
Gas and oil	422	713
Equipment repair (tractor and other)	386	977
Truck expense	216	***
Farm share of auto	168	197
Custom work hired	198	1,030
Electricity (farm share)	***	<u>29</u>
Total machinery costs	2,629	5,293
Income from machine work	***	817
Gas tax refund	***	<u>42</u>
Net machinery cost	2,629	4,434

Acres in grapes	36.3	54
Machinery cost per acre in grapes	\$ 72	\$ 82
Man equivalent	2.8	3.3
Machinery cost per man	\$ 939	\$1,344

* Five per cent used in 1958.

** Six per cent used in 1968.

*** Not separated as an individual item.

FACTORS AFFECTING PROFITS

Size of business, labor and equipment efficiency and rates of production all have a close association with labor incomes. Each measure of size showed an increase between 1958 and 1968 (Table 10). Total acres in bearing grapes increased from 34.6 to 50.0 while the number of non-bearing acres increased from 1.7 to 4.0. Tons of grapes produced per farm increased from 137 to 200.

Improvements took place in most measures of labor efficiency. Tons of grapes produced per man increased from 49 to 61 and the number of acres of grapes per man increased from 13 to 16. Machinery costs per man increased from \$939 to over \$1,300 and machinery cost per acre in grapes went from \$72 to \$82.

Although grape yields generally increased significantly in New York State during the ten-year period, they were identical in 1958 and 1968 on these farms. The average per farm during each year was 4.0 tons.

These growers continue to become more specialized in the production of this one fruit. In 1968, the per cent of all work units expended on grapes was 89 while ten years earlier the average was 81. The proportion of all receipts from grapes increased even more during the ten-year period.

Table 10. CHAUTAUQUA COUNTY GRAPE GROWERS
SUMMARY

1958 and 1968

<u>Measures of size</u>	<u>Average per farm</u>	
	1958	1968
1. Acres in bearing grapes	34.6	50.0
2. Acres in non-bearing grapes	1.7	4.0
3. Total acres in fruit	41	56
4. Total crop acres	57	60
5. Man equivalent	2.8	3.3
6. Total work units	559	771
7. Tons grapes produced	137	200
<u>Labor efficiency</u>		
1. Acres in bearing and non-bearing grapes per man	13	16
2. Tons grapes produced per man	49	61
3. Work units per man	200	234
<u>Rates of production</u>		
1. Grape yield per acre (tons)	4.0	4.0
2. Grape receipts per acres of bearing grapes	\$ 369	\$ 530
<u>Degree of specialization</u>		
1. Per cent of work units on grapes	81	89
2. Per cent of all receipts from grapes	70	83
<u>Capital efficiency</u> <u>dollars</u>		
1. Capital investment	46,855	96,120
2. Investment per man	16,734	29,127
3. Investment per acre of grapes	1,291	1,780
4. Investment per crop acre	822	1,602
<u>Machinery costs</u>		
1. Total machinery cost per man	939	1,344
2. Total machinery cost per acre in grapes	72	82

DISCUSSION AND CONCLUSIONS

This study compares the farm businesses and labor incomes earned by vineyard operators on the same 21 farms in 1958 and 1968. During this period these farm businesses increased an average of almost 50 per cent in size, going from 35 acres and 137 tons of grapes in 1958 to 50 acres and 200 tons in 1968. The labor efficiency on these farms increased an average of 23 per cent in terms of acres of grapes per man and 24 per cent in tons of grapes produced per man. In addition, work units per man went up 17 per cent.

These farms also became more specialized, with an average of 89 per cent of the work units allocated to grapes in 1968 as compared with 81 per cent in 1958. Further indication of greater specialization is a 19 per cent increase in the proportion of total farm receipts from grapes.

To accomplish these size and efficiency increases, more capital was required. The total investment in these farms more than doubled, from an average of \$46,754 to over \$95,000 with the investment per acre of grapes climbing from \$1,291 to \$1,780.

Primarily as a result of these changes in their farm businesses, this group of vineyard operators averaged 74 per cent higher gross farm receipts in 1968 than in 1958. But farm expenses were up 96 per cent so the net result was significantly lower labor incomes than was the case in 1958. The conclusion is inescapable -- that the raw product price, at a constant yield level, had not increased sufficiently between 1958 and 1968 to cover the increased costs of production in spite of significant production efficiencies adopted by the operators of these farm businesses.

Using the cash price method (Table 3) of calculating labor income, a yield close to 4.8 tons per acre would have been required in 1968 for these growers to have received the same labor income as in 1958. However, a yield of over 5 tons per acre at a price of \$125 per ton or a price of about \$150 per ton with a four ton yield would have been necessary to provide the same purchasing power as the 1958 dollars provided.