

# WALNUT MANAGEMENT STUDY

SANTA CLARA COUNTY  
1950 THRU 1954  
FIFTH ANNUAL REPORT



Study Conducted by

THE AGRICULTURAL EXTENSION SERVICE  
UNIVERSITY OF CALIFORNIA COLLEGE OF AGRICULTURE  
and the  
UNITED STATES DEPARTMENT OF AGRICULTURE

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## INTRODUCTION

This is the fifth annual and final report of the Santa Clara County Walnut Management Study. This study was conducted by the Agricultural Extension Service in cooperation with a group of progressive local walnut growers to furnish valid, current local cost and management information for the benefit and use of local growers and the walnut industry of the state. With the scheduled five years of records over varying yield and cost conditions completed, the study is being discontinued.

The orchards included in this study are all good, well-cared-for orchards on good soil, so yields are probably better and costs of final product are probably lower than the average for all walnut orchards in the county. The figures in this report are represented only as averages for these orchards and for the years covered by the study.

Although some of these growers have not yet received final returns for the 1954 crop, this report shows prices and income as estimated at this time on the basis of virtually complete sales of the crop.

## EXPLANATION OF COSTS

Since different growers may figure costs in different ways, it has been necessary to standardize the procedures in this study so costs for each item and group are comparable from orchard to orchard. With this explanation, any grower may compile his costs by similar methods so he may compare his costs with the averages in this report as a check on his management.

Labor Costs are composed of the actual cost of hired labor, the value of the operator's own labor at the going wage rate, the value of truck and tractor work at its estimated costs and the actual costs of contract or hired work, including the cost of equipment furnished. Where tillage is performed with an owned tractor, a cost per hour for that tractor is estimated on the basis of its size and hours of annual use. This rate is presumed to cover the overhead costs of depreciation, interest on investment, and repairs as well as the fuel and other operating costs. Interest and depreciation on owned tillage equipment is, however, included in those items with other equipment rather than in the cultivation costs. Harvesting costs per hundredweight shown in table 2 include materials and interest and depreciation on owned harvesting, hulling and drying equipment so the totals are comparable whether hired or done by the operator with his own equipment. Labor costs are shown largely by separate operations in tables 3 and 4 with some minor operations in "miscellaneous."

Material Costs are simple in that they are largely as reported—the cost of fertilizer, irrigation water, etc. Table 3 shows water or power separately but combines pest control materials with application.

Cultural Costs are the total of labor and material costs in the orchard up to harvesting — the growing of the crop.

Harvesting Costs are the cost of knocking or shaking the nuts from the tree, picking them up, hauling them to huller and dehydrator, drying them and delivering them to the market or packing house. We were able to show this group in some detail in table 2.

Cash overhead costs are cash costs not directly connected with operations in the orchard. General Expense shown in table 4 is estimated at 5% of the total labor and material costs and is included to cover small unreported items, the

interest on operating capital, office and telephone expense and use of personal car for the walnut business. Compensation insurance, general repairs to equipment other than tractors and trucks are included as miscellaneous cash overhead as actually reported.

Depreciation is that part of the original cost of trees, improvements and equipment chargeable to each year of operation in order to absorb the capital outlay for each facility over its useful lifetime. A capital record of facility costs other than trees and land was taken with depreciation figured from actual cost and estimated useful life of each facility. Trees were all assumed to have a depreciation of \$15 an acre a year. This is based on an estimated cost of bringing the orchard into bearing of \$600 an acre and a productive life of 40 years.

Interest on Investment is computed at 5 per cent of the average value of facilities used. It is included as a valid part of the cost of production from an economic standpoint. Values used for interest purposes are average values over the useful life of each facility used, which would be half the original cost since depreciation reduces the capital invested from cost to zero. Land, however, was valued at an arbitrary scale of agricultural values of land according to its quality. These values upon which interest is computed are admittedly below the local market prices of close-in orchards for residential or subdivision purposes.

Total cost of production is the total of all the above cost groups. It includes actual cash expenditures plus the value of the operator's own labor, depreciation on his facilities and interest on his investment in trees, land, and other facilities. It does not include any allowance for his own management nor compensation for any time not charged as actual labor.

Management Income is the amount by which total income per acre exceeds the total cost of production as defined above. It is the amount left to reimburse management after all other costs have been met.

Capital and Management Income is the amount by which total income exceeds cash costs and depreciation. It is the amount left to reimburse invested capital and management after other costs are met.

### SUMMARY

The five years of this local study show good yields but rather high costs as compared to similar studies in other counties of California. Yields, size and quality of the walnuts produced have been somewhat stable in these orchards or in other words have not fluctuated very much from year to year although there was a drop in 1953 due to climatic conditions.

The principal reasons for high costs of production in the Santa Clara Valley are higher land values, county taxes and water costs. Rapid growth of suburban and industrial developments have influenced costs to a greater degree than in some of the more rural areas of California. Agricultural wage rates and contract costs of hiring certain operations may be a little higher than in some of the strictly farming areas. See table 5 for costs, returns and earnings over the five years.

Individual cooperators' reports compared for various material costs and number of applications indicate an abnormal variation for similar practices and materials used, such as, pounds of nitrogen applied for fertilizing, spray materials and hand work around trees. Some reduction in over-all costs could probably be affected by individual growers by closer analysis of their cultural practices and buying.

## ACKNOWLEDGMENTS

This study was originated and carried through the years 1950-53 by Farm Advisor, "Drape" Worswick as a service to the walnut growers of the county. Mr. Worswick retired in February of 1954 and the study was continued and completed to its original goal of five years with the assistance of Mr. Arthur Shultis, Extension Economist, University of California, Berkeley.

Credit for the successful completion of this study is due in large measure to the cooperation of the growers participating. In the past five years approximately 1200 monthly reports entailing an accurate and complete record of their expenses, cultural practices and materials used have been submitted to our office for analysis.

A special note of thanks is due to Mr. Herbert Hight, Manager of the Santa Clara Walnut Growers' Association, and his office staff who have faithfully supplied our office with the necessary yield and income reports of cooperators who were members of the Association. Without this information our Walnut Study would have been impossible to compile in its present form.

### C O S T S   P E R   P O U N D

Averages for Orchards in this Study

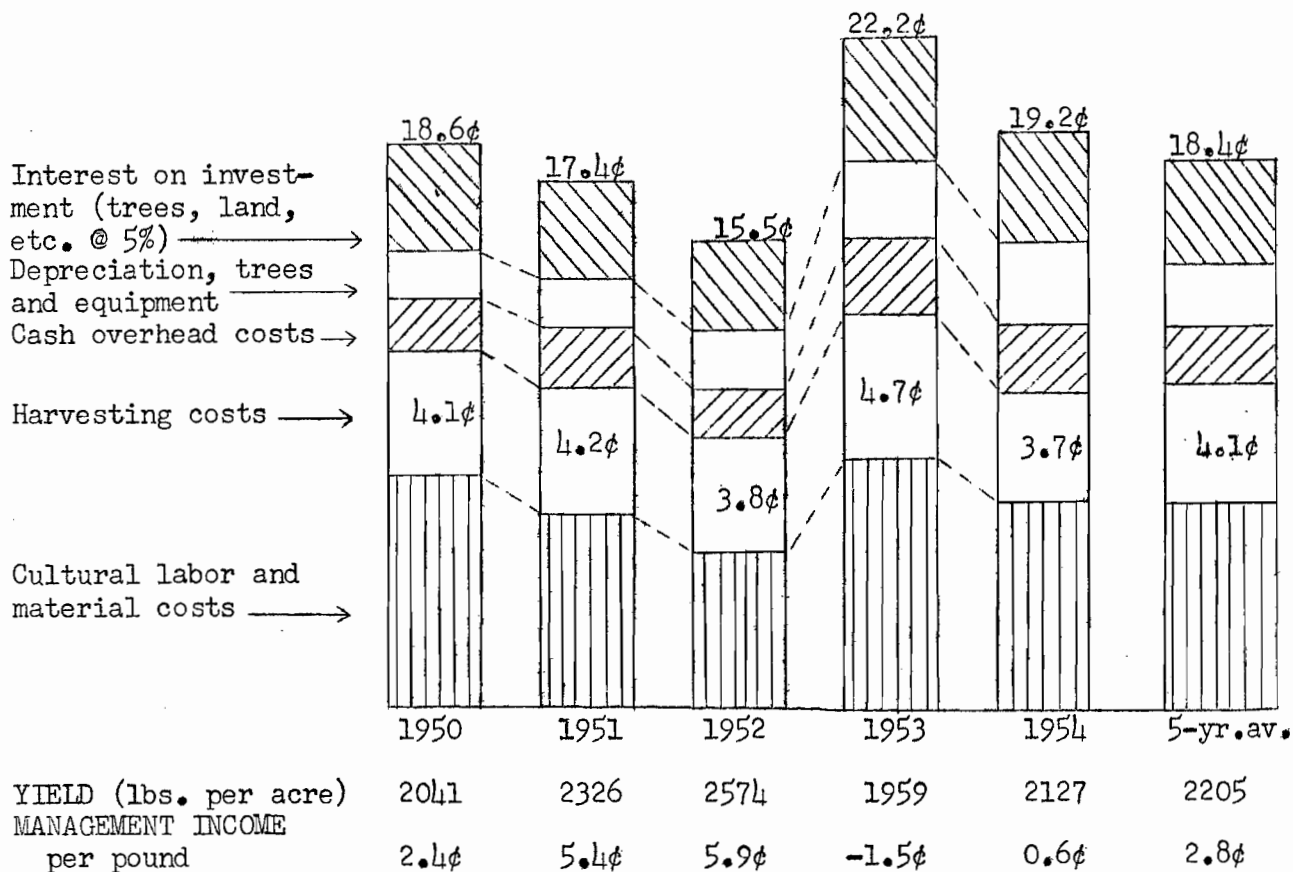


TABLE I MAIN PROFIT FACTORS, COSTS AND NET INCOME PER ACRE - 1954

Ser. No.	Age & Main Variety	Yield Total lbs. Per A	Av. Price Per Lb.	Total In- come	Cultur- al Labor	Harvest- ing	Mater- ial	Cash Over- head	Deprec- iation	Int. on Invest.	Total All Costs	Mgt. In- come	Capital & Mgt. Inc.
12	21P	2,886	20.3	585.12	90.37	79.08	54.20	47.47	66.22	88.59	425.93	159.19	247.78
9	42F	2,026	21.0	425.39	55.50	69.07	35.50	60.01	26.94	71.19	318.21	107.18	178.37
21	30C	2,714	17.7	480.40	48.33	108.83	39.45	45.89	68.77	77.47	388.74	91.66	169.13
7	22P	2,198	19.8	434.03	64.10	81.13	69.83	38.95	38.32	66.00	358.33	75.70	141.70
10	21H	2,877	20.3	582.79	213.66	106.50	48.92	48.16	81.97	101.37	600.58	-17.79	83.58
18	19P	1,007	19.1	192.72	52.63	36.16	28.62	24.26	49.26	49.78	240.71	-47.99	1.79
3	17P	2,349	20.2	473.65	104.47	109.45	126.42	48.79	58.09	86.25	533.47	-59.82	26.43
17	16IF	987	21.0	207.55	49.83	44.00	30.63	43.72	64.23	64.61	297.02	-89.47	-24.86
4	25P	1,920	18.4	353.32	113.83	87.19	75.11	98.58	39.11	72.37	486.19	-132.87	-60.50
23	20F,P	1,098	14.2	155.93	57.83	58.15	20.25	43.59	39.05	79.75	298.62	-142.69	-62.94
AV.1954	23	2,127	19.7	419.47	92.20	77.86	53.93	47.75	57.60	78.14	407.48	11.99	90.13

Individual records are listed above in order of management income per acre which appears in the next to the last column. In other words, the records are in order of profit. Notice also that the record with the highest yield - No. 12 - is at the top with the highest profit. On the other hand, No. 10, with almost as high a yield and with the same price per lb., had a minus management income, or loss, because of very high costs. Cultural labor was the item that was most out of line; at \$213 an acre, it was more than twice the average for the ten records of \$92.20 per acre. Harvesting and depreciation and Interest on Investment were also a little above average.

Yield per Acre times Price per Lb. determines income, and Income less Costs equals the profit. Any one of these three main profit factors - Yield, Price, or Cost per Acre - can pull down profit in an otherwise good orchard. Low costs can make a profit possible, even with rather poor yields. Orchard No. 9 was second in profit, with only 2026 pounds per acre because of the low total cost of \$318. No. 18, with a very low yield, was not hopelessly low in earnings because of a low total cost. On the average, these ten orchards had the good average yield of 2127 pounds per acre. The price was 19.7 cents per lb., which resulted in an income of \$419 per acre. Subtracting a cost of \$407 left a profit of about \$12 an acre over all costs. Where interest on investment is not considered a cost, the capital and management income averaged \$90 an acre.

TABLE 2. GRADES, PRICES AND COSTS PER HUNDREDWEIGHT 1954.

Ser. No.	Yield total lbs per A.	Per cent of orchard run				Shake & Knock	Pick	Haul out	Hull & Dry	Deliver	Int. & Depreo-Harv. E.	Total Harv. Cost	Total Cost	Av. Price	Mgt. Income
		L.	M.	S.	Mer.										
Dollars per hundredweight of orchard run walnuts															
12	2,886	53.6	19.4	19.5	92.5	.60	1.56		.54	.04	1.51	4.25	14.76	20.28	5.52
9	2,026						1.68	.25	1.36	.12		3.41	15.71	21.00	5.29
21	2,714	46.3	25.8	13.3	85.4	.29	1.63	.26	1.68	.15	1.69	5.70	14.32	17.70	3.38
7	2,198	56.2	19.6	15.7	91.5	.60	1.64	.15	1.22	.08	.82	4.51	16.30	19.75	3.45
10	2,877	50.8	22.1	22.7	95.6	1.18	1.43	.17	.85	.07	1.13	4.83	20.88	20.26	-.62
18	1,007	59.9	17.7	10.1	87.7	.44	2.13	.20	.61	.21	1.53	5.12	23.91	19.14	-4.77
3	2,349	49.7	24.7	21.5	95.9	1.03	1.66	.64	1.19	.14	1.49	6.15	22.71	20.16	-2.55
17	987	58.9	27.1	11.3	97.3	.71	1.48	.61	1.50	.16		4.46	30.10	21.04	-9.06
4	1,920					.58	1.68	.17	2.00	.11	1.32	5.86	25.32	18.40	-6.92
23	1,098	18.4	20.9	31.4	70.7	.84	1.66	.19	2.50	.11		5.30	27.21	14.21	-13.00
Av..1954	2,127	51.4	21.6	19.0	92.0	.70	1.61	.21	1.05	.09	1.39	5.05	19.15	19.72	.57

Costs in some detail per cwt. of nuts are shown above. The higher the yield, the lower tends to be the average cost per cwt., except in picking costs, which tend to be about the same, regardless of yield.

Both low yield and low price due to poor quality were responsible for the low income and high loss in Orchard No. 23. The per cent of large, medium, small, and total merchantable nuts shown above is an indication of quality which reflects climatic and cultural growing conditions in the different orchards. The difference between 100% and the per cent merchantable would be the culls and blows. Notice the contrast between Orchard No. 17, which had almost 60% large and 2.7% culls and blows, and No. 23, which had only 18% large and 29.3% culls and blows.

Harvesting at an average cost of 5¢ per lb. is over one-quarter of the total cost of production of walnuts; it, therefore, offers a considerable opportunity for economy or extravagance with the resulting high costs. If we include interest and depreciation on the harvesting, culling, and drying equipment owned, we get a total harvesting cost shown above to have varied from a low of \$3.41 to a high of \$6.15 per cwt. Inspection of the variations above should help some folks see an opportunity to reduce their costs.

TABLE 3 CULTURAL AND HARVESTING

COSTS PER ACRE, 1954

Ser. No.	Cultiv. Furrow & Weed Control	IRRIGATION		Pruning & Brush Disposal	Fertilizing Labor & Mat'l.	Spraying Dusting Labor & Mat'l.	Disease Control Hard Work	Cover Crop Labor & Seed	Miscel. Other Cultur. Costs	Total Cultural Costs	Shaking and Knocking	Pick and Haul M.	Hull Dry & Deliver	Total Harvest Costs
		Labor	Water or Power											
12	30.17	15.07	15.47	22.03	21.91	15.71	2.40	7.07	14.74	144.57	17.43	44.96	16.69	79.08
9	29.00	12.75	25.78	---	---	11.67	11.80	---	---	91.00	---	39.11	29.96	69.07
21	18.40	16.25	10.24	7.93	12.89	20.52	---	---	1.55	87.78	8.00	51.22	49.61	108.83
7	15.25	22.22	40.55	11.06	18.60	20.02	---	.83	5.40	133.93	13.24	39.44	28.45	81.13
10	58.55	9.80	20.43	70.71	16.53	25.21	4.60	4.80	51.95	262.58	33.92	45.95	26.63	106.50
18	26.53	5.21	16.32	7.24	---	20.00	.84	5.12	---	81.25	4.45	23.49	8.22	36.16
3	29.55	10.24	61.76	39.59	43.68	40.25	1.70	---	4.12	230.89	24.24	54.19	31.02	109.45
17	18.22	10.14	16.84	5.92	6.00	12.34	8.70	2.30	---	80.46	6.98	20.65	16.37	44.00
4	41.65	47.13	14.40	---	39.49	23.72	11.30	11.25	---	188.94	11.20	35.59	40.40	87.19
23	33.47	10.20	16.00	2.30	---	11.18	---	---	4.93	78.08	9.27	20.24	28.64	58.15
AV. 1954	31.41	14.27	23.18	24.34	22.60	20.34	4.62	5.51	17.21	146.13	14.80	38.62	24.44	77.86

Cultural costs shown above are for both labor and materials used in the orchard, with the exception of irrigation, where the labor and water or power costs are shown separately. Notice that the cultivation and weed control item shows a variation from about \$15 an acre in No. 7 to \$58 an acre in No. 10. Another high operation cost in Orchard No. 10 was pruning and brush disposal and miscellaneous other cultural costs, which brought the total cultural cost in that orchard to \$262 per acre, which is almost twice the average of \$146. Somewhere between the low of \$78 an acre and this high figure of \$262 should be a level of total cultural cost which would provide adequate cultural care. Some growers cannot reduce certain costs, such as water, but they can provide other operations to an adequate degree at less than some of the costs shown above.

TABLE 4 CASH AND INVESTMENT OVERHEAD COSTS PER ACRE

Ser. No.	Cash Overhead Costs per A				Depreciation Per A						Investment Per A			Total Int. On Invest At 5 %
	Gen'l. Expense	County Taxes	Repairs Ins.	Total Cash Overhead	Bldg. & Improv.	Irrig. System	Tillage Eqt.	Harvesting Eqt.	Miscel. Other	Total Deprec.	Irrig. System	Harv. Eqt.	Land	
12	11.18	29.69	6.60	47.47	4.27	5.05	4.65	33.85	3.40	66.22	77.00	197.15	1100.	88.59
9	8.01	30.00	22.00	60.01	.67	2.00	1.91	-----	7.36	26.94	30.00	-----	1000.	71.19
21	9.83	28.38	7.68	45.89	1.33	9.59	-----	39.90	2.95	68.77	96.25	121.00	1000.	77.47
7	10.75	25.25	2.95	38.95	2.22	5.39	-----	13.30	2.41	38.32	16.22	95.00	850.	66.00
10	18.45	26.57	3.14	48.16	1.63	21.00	4.97	21.12	18.25	81.97	202.50	226.88	1100.	101.37
18	5.87	16.25	2.14	24.26	2.32	16.56	1.21	10.68	3.49	49.26	143.70	94.23	400.	49.78
3	17.02	27.94	3.83	48.79	.88	8.96	3.44	25.40	4.41	86.25	39.50	193.00	1100.	86.25
17	6.22	28.67	8.83	43.72	1.13	28.60	2.00	-----	17.50	64.23	166.00	-----	700.	64.61
4	13.81	50.12	34.65	98.58	.37	5.07	1.12	15.80	1.75	39.11	73.70	189.00	850.	72.37
23	6.81	34.38	2.40	43.59	5.30	13.75	1.95	-----	3.05	39.05	137.50	-----	1,000.	79.75
AV. 1954	11.20	28.65	7.90	47.75	2.29	11.90	3.11	24.32	6.84	57.60	104.24	170.53	925.	78.14

Three main overhead cost groups are partly shown above. There is not much one can do about general overhead expense, and county taxes and repairs and compensation insurance will vary in different orchards and from year to year.

Depreciation, although not a cash outlay in every year, is a very real part of the cost of producing walnuts. Included in the total depreciation above is \$15 an acre for depreciation on trees. It was not shown since it was the same for every orchard. It is estimated on the basis of a \$600 per acre cost of developing an orchard good for 40 years of productive life.

Interest on investment is the last overhead cost group shown above. Most growers consider this as a return rather than a cost, but it depends on whether the operator is free of debt, or actually has interest to pay. Because of lack of space, the investment in the three major items only is shown above. The assumed value of trees was \$300 per acre in all cases. The total investment for trees, equipment, and land in each case would be 20 times the 5% interest shown in the last column. The average investment in the ten orchards was \$1563 an acre.



TABLE 5. GENERAL SUMMARY OF FIVE YEARS

	1950	1951	1952	1953	1954	5 year av.
Number of records	18	15	16	14	10	73
Total acreage	370.05	271.75	273.75	200.75	155.00	254.26
Average yield, pounds per acre	2,041	2,326	2,574	1,959	2,127	2,205
Percent of crop large size	54.5	67.8	54.1	31.3	55.8	52.7
Percent medium size	23.1	16.9	22.6	27.4	23.5	22.7
Percent babies	22.4	15.3	23.3	41.3	20.7	24.6
Total percent merchantable	90.9	88.2	92.1	85.7	92.0	89.8
Percent culls and blows	9.1	11.8	7.9	14.3	8.0	10.2
Average price per cwt. all nuts, orchard run	21.06	22.80	21.40	20.76	19.72	21.19
Total cost of production per cwt.	18.63	17.42	15.46	22.22	19.15	18.37
Management income per cwt.	2.43	5.38	5.94	-1.46	.57	2.82
Cultural labor cost per acre	102.45	106.20	80.38	97.01	92.20	95.65
Cultural material cost per acre	55.89	43.79	55.48	67.04	53.93	55.23
Total cultural costs per acre	158.34	149.99	135.86	164.05	146.13	150.88
Total harvesting cost per acre	82.86	96.92	98.44	92.17	77.86	89.65
Total cash overhead costs, taxes, etc.	35.23	40.50	40.68	49.82	47.75	42.79
Depreciation, trees, improvements, eqt.	32.44	42.64	46.36	50.25	57.60	45.86
Interest on total investment at 5%	71.23	75.08	76.46	78.88	78.14	75.96
Total all costs of production	380.10	405.13	397.80	435.19	407.48	405.14
Total income per acre	429.64	530.40	550.74	406.54	419.47	467.36
Management income	49.54	125.27	152.94	-28.65	11.99	62.22
Capital and management income	120.77	200.35	229.40	50.23	90.13	138.18

Averages for the orchard records completed each year are shown above. The last two years have not been quite as profitable as the first three because of lower yields and prices. But the five-year average is good with a yield of 2,205 pounds, a price of 21¢ and a capital and management income of \$138.18 an acre.

TABLE 6 COMPARISON OF INDIVIDUAL ORCHARD FIVE-YEAR AVERAGES, 1950-54

	9	12	3	10	7	4	17	18	Av. All
5-year av. yield lbs. per A	2,319	2,577	2,975	2,967	2,083	2,050	1,077	833	2,214
Percent walnuts of large size	---	52.8	47.3	53.8	57.8	---	60.5	62.7	52.7
Percent merchantable	---	90.8	86.4	93.5	89.0	---	96.4	87.7	89.8
Av. price received per cwt.	24.39	21.73	20.41	22.04	21.03	22.07	22.96	20.93	21.19
Total cost per cwt., all nuts	17.65	16.53	17.07	19.56	18.68	20.48	27.66	30.20	18.37
Management income per cwt.	6.74	5.20	3.34	2.48	2.35	1.59	-4.70	-9.27	2.82
Total harvesting cost per cwt.	4.72	3.72	3.51	4.46	3.96	4.47	3.73	4.27	4.07
Cultural labor cost per acre	\$74.58	\$95.64	\$84.92	\$159.94	\$90.39	\$96.37	\$51.18	\$52.81	\$95.65
Harvesting cost per acre	109.37	95.82	104.61	132.20	82.50	91.73	40.14	35.55	89.65
Material cost per acre	68.18	46.94	125.49	62.29	74.52	54.06	39.59	45.68	55.23
Cash overhead costs per acre	59.98	43.63	48.67	46.33	42.37	66.29	38.21	22.02	42.79
Depreciation per acre	26.24	57.04	58.05	78.26	34.01	39.11	64.23	46.86	45.86
Total cash and deprec. costs	338.35	339.07	421.74	479.02	323.79	347.56	233.35	202.92	329.18
Interest on investment	71.01	86.92	86.21	101.24	65.35	72.37	64.61	48.69	75.96
Total cost per acre	409.36	425.99	507.95	580.26	389.14	419.93	297.96	251.61	405.14
Total income per acre(5 yr. av.)	565.63	560.00	607.34	653.85	438.15	452.47	247.32	174.35	467.36
Management income per acre	156.27	134.01	99.39	73.59	49.01	32.54	-50.64	-77.26	62.22
Capital & management income	227.28	220.93	185.60	174.83	114.36	104.91	13.97	-28.57	138.18
Estimated capital income *	\$184.86	\$178.93	\$140.05	\$125.79	\$81.50	\$70.97	-4.58	-41.65	---
Agri. value to earn 5% on invest.	3697.	3579.	2801.	2516.	1630.	1419.	none	none	---

Annual averages for the 5-year period for the 8 orchards with continuous records for the five years are shown above with orchards listed in order of profit. Notice that the first 6 orchards were all profitable and all had average yields of over a ton to the acre. Notice also that the two orchards with low yields, 17 and 18, show a minus management income. The problem here is to get better yields and in No. 18 better fruit.

\*Capital income is estimated by subtracting an allowance for management of 7.5% of total income. The remaining capital income can be considered as a return on investment. The last line shows the investment or agriculture value on which the capital income is a 5% return. A good orchard is a good investment but a poor yielding one has no agricultural value.