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ESTIMATED COST OF PRODUCING APPLES IN THE WENATCHEE AREA

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NOTE

Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in:

- . Capital, labor, and management resources.
- . Type and size of machinery complement.
- . Cultural practices.
- . Crop yields.
- . Input prices.
- . Commodity prices.

Costs can also be calculated differently depending on the intended use of the cost estimate. The information in this publication serves as a general guide for a modern and well-managed apple orchard in the Wenatchee River Valley of Central Washington as of 1987. To avoid drawing unwarranted conclusions about costs and returns for any particular farm or group of farms, the reader must closely examine the assumptions used in this publication. If they are not appropriate for the situation at hand, adjustments in the costs and/or returns should be made.

1987 ESTIMATED COST OF PRODUCING APPLES IN THE WENATCHEE AREA

Peter A. Dickrell, Herbert R. Hinman, and Paul J. Tvergyak^{*/}

INTRODUCTION

The fruit growing area centered around Wenatchee, Washington, is a relatively narrow river valley of central Washington in which suitable planting sites are limited by the meandering of the river and the high mountains on either side. Practically all of the developed agricultural land in this area is devoted to either apple or pear production. The objective of this study is to estimate the costs and returns associated with producing apples in this area.

It is anticipated that growers, prospective growers, agricultural lenders, and others concerned with the Washington fruit industry will find the information reported herein helpful in estimating the physical and financial requirements of producing apples. While the acreages and the practices outlined may not fit all conditions, they represent current trends.

SOURCE OF DATA

The data presented in this publication were compiled from a committee of experienced apple growers in the Wenatchee River Valley. In group meetings, the growers described what they considered to be a common situation and the practices which apple growers in the area would be expected to use to produce apples. The growers provided estimates as to the requirements of labor, equipment, and materials. From this information, it was possible to estimate the costs of labor, equipment, pesticides, fertilizers, taxes, interest, insurance, and other related expenses. After the data were assembled, members of the committee reviewed the results to identify areas of possible misunderstanding. Due to the procedures used in this study, the data in the publication should be viewed as "typical" or "representative" of costs associated with producing apples in the Wenatchee area rather than a mathematical average of a large number of producers. Where such factors such as orchard size, equipment complement, machinery use, cultural practices, and input prices differ from those assumed in this publication, quite different production costs may result.

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BUDGET ASSUMPTIONS

The value of orchards in the Wenatchee area varies considerably depending on the age of the trees and their current and potential production levels. The better apple orchards in this valley are 10-20 years old with an annual production level of 30 bins per acre. Such an orchard is currently valued at approximately \$12,000 per acre. The objective of this study is to project what an existing planting would require in the way of equipment, materials, supplies, and labor, and what the potential returns would be for a person with a 20-year planning horizon purchasing this orchard. Therefore, the assumptions utilized in developing this information were:

1. The orchard operation has 60 acres of trees; 40 acres of apples and 20 acres of pears.
2. The apple trees are a mix of approximately 1/3 non-spur on semi-dwarf rootstock and 2/3 spur on seedling rootstock.
3. The apple planting is 10 by 20 feet with 218 trees per acre. Four of every five rows are planted to Red Delicious apples. Every fifth row of trees is planted to Golden Delicious to serve as a pollinizer row. Trees are set in this fashion rather than scattered as individual trees throughout the planting to facilitate the management and harvesting of Golden Delicious apples for their fresh market value.
4. Estimated production is 30 bins or 750 boxes per acre. Three-fourths of the production or 22.5 bins are Red Delicious, the remaining 7.5 bins are Golden Delicious. Estimated revenue to the grower for combined Red and Golden Delicious apples is \$120.00 per bin.
5. The orchard, including the irrigation system but excluding buildings, is currently valued at \$12,000 per acre. In 20 years, the value of the orchard will decrease, due to age of trees, to approximately \$9,000 per acre.
6. An under-tree permanent sprinkler irrigation system with lateral lines every 40 feet and risers every 30 feet is used in this orchard. Annual repairs, primarily to sprinkler heads, is \$15 per acre. Water charge is \$45 per acre from the irrigation district. The electricity required to pump water is \$40 per acre. The cost of the irrigation system is tied into the investment cost of the orchard.
7. Buildings include a workshop and machine shed valued at \$20,000 and housing for labor valued at \$50,000.
8. New purchase costs are used for all machinery, equipment, and buildings. The use of new purchase prices may overstate costs currently being experienced by fruit growers. However, it provides an indication of the earnings needed to replace depreciable assets. Recent increases in prices paid for new machinery and equipment mean that the depreciation claimed on older purchases substantially understates the amount of capital required

to replace that asset. When looking at the long-term viability of our enterprise, it is important to consider its ability to replace its depreciable assets on a new cost basis.

9. The property tax on the orchard, irrigation system, and buildings, excluding the house, is \$60 per acre.
10. Labor is valued at \$5.50 per hour plus housing. This includes wages, industrial insurance, social security, and the cost of other fringe benefits.

ANNUAL PRODUCTION COST

The estimated costs of production are shown in two tables. Table 1 outlines the schedule of field operations by calendar month, the type of machinery and labor used, and the hours used per acre for producing apples.

The costs of field operations are divided into two categories. The first is the cost of equipment, building and orchard ownership, or fixed costs. The second category, variable costs, is associated with operating equipment, hiring labor, and purchasing services and materials. Total cost is the sum of fixed costs and variable costs.

Equipment fixed costs include depreciation, interest on the average investment, property taxes, and insurance. These costs are incurred whether or not a crop is grown and do not vary with the enterprise, given ownership of a specific equipment complement. Per-hour fixed costs for equipment are determined by dividing the total annual fixed cost per machine by the annual hours of equipment use over all enterprises for the representative farm. For a specific field operation, equipment fixed costs are determined by multiplying the equipment hours per acre times the equipment per-hour fixed costs. Fixed costs for the machine shed and shop, housing for labor, and some miscellaneous equipment are determined on a per-acre basis by dividing the total annual fixed cost by the number of acres. The per-hour (acre) fixed and variable costs for all equipment and buildings are presented in Table 4.

Interest on investment represents the opportunity cost (returns foregone by investing in the orchard) or interest paid to finance the purchase of the orchard. Total interest cost is calculated on the average value of the orchard (\$10,500) over the 20-year planning horizon. A 10% interest charge is made against this average value. Orchard depreciation costs represent the loss in orchard value over the 20-year period. These costs need to be recaptured over the life of the investment if the investment is to be profitable.

Variable costs depend directly on the number of acres produced. These costs include fuel, oil, repairs, fertilizer, chemicals, custom work, overhead, and interest on operating capital. Labor is also included as a variable cost.

The second table, Table 2, presents a summary of costs appearing in Table 1. Most items are self-explanatory; however, "Machinery Interest" and Building Interest" warrant additional explanation. These figures represent opportunity costs (returns foregone by investing in the given equipment and building complement rather than in alternative investments) or interest paid to finance the given equipment and building complement.

Total interest cost on these capital purchases is calculated on the average value of the machinery and buildings over their respective years of use. The 10% interest charge made against this "average" value represents the total interest cost.

DISCUSSION OF PRODUCTION PRACTICES

The practices used in this study, and outlined in Table 1, warrant some clarification. Pruning and training are performed during the dormant period with no summer pruning. Hand tools and hydraulic position and pruning equipment are used to do the pruning. Prunings are chopped up with the rotary mower during the mowing operations except where large limbs must be cut up with a chain saw and removed.

Chemical applications applied throughout the year are summarized in Table 3. Primary emphasis on insect control is during March-April with dormant and prebloom sprays. Insects damaging the fruit require additional cover sprays in June and August. Frost control is needed in the spring if warranted by weather conditions. A growth regulator is applied in April to promote higher quality apples.

Fruit thinning requires a chemical thinning in May plus hand thinning in June. Fertilizer is applied twice a year in March and November by hand. Weed control requires the application of herbicides in July and October. Gopher and mouse control requires ground application of strychnine milo for gophers and zinc phosphide pellets for mice in November.

The use of grass sod requires three mowings per year; each mowing requires two trips across the field to complete the mowing of the space between rows. Irrigation, with a solid set system requires 36-acre inches of water per year.

The harvest operation consists of simultaneously distributing and picking up the bins throughout the plantings. Pickers are paid as to the number of bins picked. Approximately 20 pickers would be used to harvest 40 acres. Each picker would be supplied with a shoulder harness, picking bag, and ladder. The fruit is collected into large bins for transport out of the orchard by tractor to trucks which haul the bins of fruit to the centralized packinghouses. In this study, it was assumed that custom hauling was used to the warehouse.

It should be noted that in the Wenatchee area, if seasonal labor is to work in the area, a certain amount of housing must be provided by the producer. The cost of this housing, as indicated in the budget, can be a very substantial part of total production costs.

EQUIPMENT AND BUILDING COMPLEMENT

Table 4 presents the equipment and building complement used to derive the cost estimates, including current purchase prices, annual hours of use, and per-hour or per-acre fixed and variable costs.

Equipment and building fixed costs include depreciation and interest on investment, property taxes, and insurance--costs that do not vary with the number of acres produced. It should be noted that interest on investment represents a 10% opportunity cost to the enterprise. These are earnings foregone by investing money in the equipment and building complement rather than an alternative investment. This may also represent interest on funds borrowed to finance equipment and building purchases.

Equipment variable costs include equipment repair, electricity, fuel, and lubrication costs--costs that vary with the number of acres produced.

SUMMARY OF RECEIPTS, COSTS, AND PROFITABILITY PER ACRE

Per-acre costs, returns, and profitability for apples under the given budget assumptions are presented in Table 5. Gross receipts are based on the assumption of 7.5 bins of Golden Delicious and 22.5 bins of Red Delicious, returning \$120 per bin to the grower. Final returns are calculated as net returns to management. This is the return the owner-operator realizes to his management after accounting for all costs including \$5.50 per hour for any labor he contributed to the production of the crop.

BREAK-EVEN RETURNS

Break-even returns to the fruit grower for different levels of enterprise costs are presented in Table 6. The first break-even return is that necessary to cover total variable costs--those costs that occur only if the crop is produced. If the return received does not equal or exceed this break-even return, producing apples becomes uneconomical, even in the short-run, for the added costs of production are greater than the added returns.

The second break-even return is that necessary to cover total cash costs, assuming no interest on outstanding loans or land rent. If other cash costs do exist on an individual's orchard, these costs must be identified and included in the cash cost break-even return calculation. This return may be viewed as that return necessary to economically produce in the short-run.

The third break-even return is that of total cash cost plus depreciation on machinery, buildings, and orchard investment. This return must be realized to stay in the business over the long-run.

However, if farmers do not include the opportunity costs they forego from their investments in the orchard, equipment, and buildings in calculating their total cost break-even return, they are overlooking

the profitability of farming relative to alternative uses of their resources. Only if the fourth break-even value, the total cost break-even return, is received, will the owner-operator be able to cover all his out-of-pocket expenses, plus realize a competitive return to his equity capital invested in land, trees, equipment, and buildings. Failure to obtain the break-even return means that the owner-operator will not receive a return on his capital contributions equal to what he could earn in an alternative use. Attainment of a return above the fourth break-even level means that in addition to covering all cash and opportunity costs, the operator will get a return to his management and to the risk he assumed.

SUMMARY

This study represents what experienced fruit growers in the Wenatchee area anticipate from a planting of four-fifths Red Delicious and one-fifth Golden Delicious in their prime production years. Under the assumptions of this study, if a person was to enter the apple production business given current market prices and interest rates, he would likely find the venture to be somewhat marginal, returning approximately 5% to the average investment. However, for this study to be of practical use to potential investors, the assumptions require careful study. In the calculations to demonstrate profitability per-acre and break-even selling prices, an average production level of 30 bins per acre was assumed. Average production, however, does differ for different orchards and managers. Furthermore, apple prices may drop or rise in years to come. To help investors better analyze their potential situation, Table 7 illustrates likely per-acre returns from varying yields and per-ton returns to the fruit grower. The solid line dividing the lower right-hand figures from those in the rest of the table indicates break-even combinations.

Table 8 presents the list of prices used for selected inputs used in this study.

TABLE 1: COST OF PRODUCING APPLES IN THE WENATCHEE RIVER VALLEY;
SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE

OPERATION	TOOLING	MTH YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
						FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
					\$	\$	\$	\$	\$	\$	\$	\$
PRUNING & TRAIN	HAND LABOR AND PRUNING TOOLS	FEB 1987	9.00	89.00	48.86	26.69	489.50	.00	.00	34.41	550.60	599.47
BUCK & COL. LIMB	HAND LABOR AND CHAINSAW	MAR 1987	2.00	8.00	2.38	4.46	44.00	.00	.00	2.83	51.28	53.66
CHOP BRUSH	50HP-WT, ROTARY MOWER	MAR 1987	1.00	1.20	10.73	3.40	6.60	.00	.00	.58	10.58	21.31
FERTILIZE	50HP-WT, TRAILER	MAR 1987	.50	1.00	4.14	1.22	5.50	.00	32.70	2.30	41.72	45.85
DORMANT SPRAY	50HP-WT, BLAST SPRAYER	MAR 1987	.40	.48	5.01	2.11	2.64	.00	11.36	.94	17.05	22.06
DELAYED DORMANT	50HP-WT, BLAST SPRAYER	MAR 1987	.40	.48	5.01	2.11	2.64	.00	20.12	1.45	26.32	31.33
GROWTH REGULATOR	50HP-WT, BLAST SPRAYER	APR 1987	.40	.48	5.01	2.11	2.64	.00	99.34	5.20	109.29	114.31
THINNING SPRAY	50HP-WT, BLAST SPRAYER	APR 1987	.40	.48	5.01	2.11	2.64	.00	5.28	.50	10.53	15.54
FROST CONTROL	LABOR, WIND MACHINE	MAY 1987	.00	1.00	143.00	89.10	5.50	.00	.00	3.94	98.54	241.54
THIN SPRAY (GOLD)	50HP-WT, BLAST SPRAYER	MAY 1987	.20	.24	2.51	1.05	1.32	.00	22.75	1.05	26.17	28.68
IRRIGATE#	SOLID SET 36 AC.IN.	SEA 1987	.00	2.00	.00	.00	11.00	100.00	.00	7.40	118.40	118.40
POST BLM (RED)	50HP-WT, BLAST SPRAYER	MAY 1987	.40	.48	5.01	2.11	2.64	.00	2.87	.32	7.94	12.95
MOW COVER (3X)	50HP-WT, ROTARY MOWER	SEA 1987	1.20	1.44	12.87	4.08	7.92	.00	.00	.80	12.80	25.67
COVER SPRAY	50HP-WT, BLAST SPRAYER	JUN 1987	.40	.48	5.01	2.11	2.64	.00	21.13	.86	26.75	31.76
CALCIUM SPRAY	50HP-WT, BLAST SPRAYER	JUN 1987	.40	.48	5.01	2.11	2.64	.00	1.08	.19	6.02	11.03
HAND THINNING	LABOR, LADDERS	JUN 1987	.00	35.00	2.06	1.33	192.50	.00	.00	6.46	200.29	202.36
HERBICIDE SPRAY	50HP-WT, WEED SPRAYER	JUL 1987	1.00	1.20	9.18	3.10	6.60	.00	15.83	.64	26.17	35.35
COVER SPRAY	50HP-WT, BLAST SPRAYER	JUL 1987	.40	.48	5.01	2.11	2.64	.00	13.88	.47	19.09	24.11
CALCIUM SPRAY	50HP-WT, BLAST SPRAYER	AUG 1987	.40	.48	5.01	2.11	2.64	.00	1.08	.10	5.92	10.94
COVER SPRAY	50HP-WT, BLAST SPRAYER	AUG 1987	.40	.48	5.01	2.11	2.64	.00	4.08	.15	8.97	13.99
STOP DROP & FUNG	AERIAL APPLICATION	SEP 1987	.00	.00	.00	.00	.00	10.00	6.93	.14	17.07	17.07
BIN DIST & SWAMP	50HP-WT, BACKFORK	SEP 1987	3.00	3.60	23.82	6.91	19.80	.00	.00	.22	26.93	50.75
PICKING	LABOR, LADDERS, PICKING BAGS	SEP 1987	.00	.00	3.99	3.67	.00	330.00	.00	2.78	336.45	340.44
LOADING	50HP-WT, HIGHLIFT FORK	SEP 1987	3.00	3.60	31.92	11.29	19.80	.00	.00	.26	31.35	63.27
HAULING	CUSTOM	SEP 1987	.00	.00	.00	.00	.00	90.00	.00	.75	90.75	90.75
HERBICIDE SPRAY	50HP-WT, WEED SPRAYER	OCT 1987	1.00	1.20	9.18	3.10	6.60	.00	29.61	.00	39.31	48.49
FERTILIZER	50HP-WT, TRAILER	NOV 1987	.50	1.00	4.14	1.22	5.50	.00	32.70	3.61	43.03	47.17
GOPHER CONTROL	50HP-WT, TRAIL BUILDER	NOV 1987	.75	.90	8.04	3.08	4.95	.00	3.09	1.02	12.14	20.18
MOUSE CONTROL	50HP-WT, TRAILER	NOV 1987	.25	.50	2.07	.61	2.75	.00	3.15	.60	7.11	9.17
CLEAN-UP & MISC.	50HP-WT, TRAILER	SEA 1987	2.00	2.40	16.54	4.87	13.20	.00	.00	1.20	19.28	35.92
MISC. USE	1/2 TON PICK-UP TRUCK	ANN 1987	8.00	8.00	35.11	43.07	44.00	.00	.00	6.53	93.60	128.71
MISC. USE	SHOP TOOLS	ANN 1987	.00	.00	51.61	33.33	.00	.00	.00	2.50	35.83	87.44
MISC. USE	THREE WHEELER	ANN 1987	3.00	3.00	6.10	6.01	16.50	.00	.00	1.69	24.20	30.29
MACHINE SHED	MACHINE SHED 30X70	ANN 1987	.00	.00	31.78	.00	.00	.00	.00	.00	.00	31.78
HOUSING	LABOR QUARTERS	ANN 1987	.00	.00	79.44	.00	.00	.00	.00	.00	.00	79.44
OVERHEAD	UTILITIES, LEGAL, ACCT. ECT.	ANN 1987	.00	.00	.00	.00	.00	107.57	.00	.00	107.57	107.57
TAXES	LAND	ANN 1987	.00	.00	60.00	.00	.00	.00	.00	.00	.00	60.00
INVESTMENT COST	ORCHARD DEPRECIATION	ANN 1987	.00	.00	150.00	.00	.00	.00	.00	.00	.00	150.00
INVESTMT COST##	INTEREST	ANN 1987	.00	.00	1050.00	.00	.00	.00	.00	.00	.00	1050.00
TOTAL PER ACRE			40.40	169.08	1849.58	272.66	929.94	637.57	326.99	91.90	2259.06	4108.65

#IRRIGATION INTEREST AND DEPRECIATION INCLUDED IN INVESTMENT COST.

##INTEREST ON AVERAGE ORCHARD VALUE.

TABLE 2: COST OF PRODUCING APPLES IN THE WENATCHEE RIVER VALLEY;
ITEMIZED COST PER ACRE

		PRICE OR	VALUE OR	YOUR
		UNIT COST/UNIT	QUANTITY	FARM
VARIABLE COSTS				
NITROGEN	LB.	\$.30	218.00	\$65.40
ZINC SULFATE	GAL	1.42	8.00	11.36
SUPERIOR OIL	GAL	2.48	6.00	14.88
PARATHION	PT	2.84	1.00	2.84
SOLUBOR	LB.	.60	4.00	2.40
PROMALIN	PT.	45.30	2.00	90.60
REGULAD	QT	5.54	1.00	5.54
SORBA-SPRAY MG	QT.	3.20	1.50	4.80
ELGETOL	PT	3.52	1.50	5.28
AMID-THIN	LB.	12.68	1.25	15.85
SEVIN	LB.	2.30	4.25	9.77
GUTHION	LB.	6.00	2.00	12.00
PHOSPHANIDON	PT.	8.67	.50	4.33
FOLIAR NUTRIENT	LB.	1.00	4.00	4.00
CALCIUM CHLORIDE	LB.	.27	16.00	4.32
ROUND-UP	GAL	85.86	.34	29.20
2,4D	QT.	3.73	.33	1.23
AERIAL	ACRE	10.00	1.00	10.00
ZIRAM	GAL	6.67	1.00	6.67
NAA	OZ	.13	2.00	.26
PRINCEP	LB.	3.50	.67	2.34
SINBAR	LB.	18.91	.67	12.67
STRCHNINE MILO	LB.	1.03	3.00	3.09
Z-P PELLETS	LB.	1.05	3.00	3.15
LABOR	ACRE	929.94	1.00	929.94
PICKERS	BIN	11.00	30.00	330.00
HAULING	BIN	3.00	30.00	90.00
IRRIGATION ELEC.	ACRE	40.00	1.00	40.00
IRRIGATION CHARGE	ACRE	45.00	1.00	45.00
IRRIGATION REPAIR	ACRE	15.00	1.00	15.00
TRACTOR REPAIR	ACRE	23.55	1.00	23.55
TRACTOR FUEL/LUBE	ACRE	15.13	1.00	15.13
MACHINERY REPAIRS	ACRE	175.82	1.00	175.82
MACHINE FUEL/LUBE	ACRE	58.16	1.00	58.16
OVERHEAD	ACRE	107.57	1.00	107.57
INTEREST ON OP. CAP.	DOL.	.10	918.96	91.90
TOTAL VARIABLE COST				\$2259.06

TABLE 2: CONTINUED

		PRICE OR		VALUE OR	YOUR
		UNIT COST/UNIT	QUANTITY	COST	FARM

FIXED COSTS					
TRACTOR DEPRECIATION	ACRE	\$65.64	1.00	\$65.64	-----
TRACTOR INTEREST	ACRE	60.28	1.00	60.28	-----
TRACTOR INSURANCE	ACRE	3.62	1.00	3.62	-----
TRACTOR TAXES	ACRE	10.85	1.00	10.85	-----
MACHINE DEPRECIATION	ACRE	159.66	1.00	159.66	-----
MACHINE INTEREST	ACRE	143.79	1.00	143.79	-----
MACHINE INSURANCE	ACRE	8.63	1.00	8.63	-----
MACHINE TAXES	ACRE	25.88	1.00	25.88	-----
BUILDING DEPREC.	ACRE	38.89	1.00	38.89	-----
BUILDING INTEREST	ACRE	58.34	1.00	58.34	-----
BUILDING INSURANCE	ACRE	3.50	1.00	3.50	-----
BUILDING TAXES	ACRE	10.50	1.00	10.50	-----
ORCHARD DEPREC.#	ACRE	150.00	1.00	150.00	-----
INT. ON AVE. INVEST#	ACRE	1050.00	1.00	1050.00	-----
LAND TAXES	ACRE	60.00	1.00	60.00	-----
TOTAL FIXED COST				\$1849.58	-----
TOTAL COST				\$4108.65	-----

#INCLUDES IRRIGATION INTEREST AND DEPRECIATION ON THE IRRIGATION SYSTEM.

Table 3: Summary of Chemical Applications per Acre to the Apple Orchard.

Operation	Month	Chemical Applied
Fertilize	March	109 pounds Nitrogen
Dormant Spray	March	8 gallons of Zinc Sulfate
Delayed Dormant	March	6 gallons Superior Oil 1 pint Parathion 4 pounds Solubor
Growth Regulator	April	1 quart Regulaid 2 pints Promalin 1 quart Sorba-spray mg.
Thinning Spray (Red & Gold)	April	1.5 pint Elgetol
Post Bloom Thinning (Gold)	May	1.25 pounds Amid-Thin 3.0 pounds Sevin
Post Bloom Thinning (Red)	May	1.25 pounds Sevin
Cover Spray	June	2.0 pounds Guthion .50 pint Phosphomidon 4.0 pounds Foliar Nutrient .25 quart Sorba-spray mg.
Calcium Spray	June	4.0 pounds Calcium Chloride
Cover Spray	July	2.0 pounds Guthion 4.0 pounds Calcium Chloride .25 quart Sorba-spray mg.
Herbicide Application	July	.17 gallon Round-up .33 quart 2,4-D
Cover Spray	August	.50 pound Guthion 4.0 pounds Calcium Chloride
Calcium Spray	August	4.0 pounds of Calcium Chloride
Stop Drop and Fungicide	Sept.	1.0 gallon Ziram 2.0 ounces NAA
Herbicide Spray	Oct.	.67 gallon Princep .17 pound Round-up .67 quart 2,4-D
Fertilizer	November	109 pounds Nitrogen
Gopher Control	November	3.0 pounds Strychnine mils.
Mouse Control	November	3.0 pounds Z-P Pellets

TABLE 4: EQUIPMENT AND BUILDING COMPLEMENT

TABLE 4. EQUIPMENT AND BIDDING COMPONENTS												
MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL DEPREC- EST#	INTER- ANCE	INSUR- ANCE	TAXES	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST	
	\$						-----COST PER HOUR-----					
50HP-WT,	18,400.00	10	400	3.24	2.98	.18	.54	6.94	1.16	.75	1.91	8.85
PRUNING TOOLS	50.00	3	60	.28	.04	.00	.01	.33	.28	.00	.28	.61
ROTARY MOWER	3,000.00	10	150	1.62	1.19	.07	.21	3.10	1.30	.00	1.30	4.40
P & P EQUIPMENT##	8,500.00	10	270	3.15	1.57	.09	.28	5.10	2.69	.00	2.69	7.79
TRAILER	1,000.00	15	200	.30	.28	.02	.05	.64	.33	.00	.33	.97
BLAST SPRAYER	9,500.00	10	300	2.57	1.88	.11	.34	4.90	3.17	.00	3.17	8.07
HIGHLIFT FORK	3,500.00	10	180	1.58	1.16	.07	.21	3.01	1.66	.00	1.66	4.67
TRAILBUILDER	1,000.00	10	50	1.62	1.19	.07	.21	3.10	2.00	.00	2.00	5.10
PICKUP TRUCK	12,000.00	7	500	2.50	1.53	.09	.27	4.39	3.43	1.95	5.38	9.77
THREE-WHEELER	2,000.00	7	180	1.16	.71	.04	.13	2.03	1.51	.49	2.00	4.04
CHAINSAW	300.00	4	60	.76	.35	.02	.06	1.19	1.25	.98	2.23	3.42
WEED SPRAYER	1,200.00	10	120	.81	.59	.04	.11	1.55	1.00	.00	1.00	2.55
BACKFORK	200.00	10	100	.16	.12	.01	.02	.31	.20	.00	.20	.51
							-----COST PER ACRE-----					
PICKING BAG	21.00	3	-	.06	.03	.00	.00	.10	.12	.00	.12	.21
LADDERS	80.00	10	-	.05	.04	.00	.01	.10	.07	.00	.07	.17
SHOP TOOLS	20,000.00	10	-	27.03	19.82	1.19	3.57	51.61	33.33	.00	33.33	84.94
WIND MACHINE	15,000.00	30	-	50.00	75.00	4.50	13.50	143.00	50.00	39.10	89.10	232.10
IRRIGATION SYSTEM###	.00	0	-	.00	.00	.00	.00	.00	15.00	40.00####	55.00	55.00
MACHINE SHED	20,000.00	30	-	11.11	16.67	1.00	3.00	31.78	.00	.00	.00	31.78
LABOR HOUSING	50,000.00	30	-	27.78	41.67	2.50	7.50	79.44	.00	.00	.00	79.44

* Ten percent opportunity cost. This is earnings foregone from alternative investments and/or interest paid on borrowed money to finance capital purchases.

Positioning and Pruning Equipment.

Final cost for the irrigation system included in orchard investment cost.

Electricity and lube cost.

TABLE 5: NET RETURN PER ACRE

		PRICE OR UNIT COST/UNIT	QUANTITY	VALUE OR COST
<hr/>				
REVENUE				
APPLES	BIN	\$120.00	30.00	\$3600.00
				<hr/>
TOTAL REVENUE				\$3600.00
<hr/>				
VARIABLE COSTS				
PREHARVEST COSTS				
NITROGEN	LB.	\$.30	109.00	\$32.70
ZINC SULFATE	GAL.	1.42	8.00	11.36
SUPERIOR OIL	GAL.	2.48	6.00	14.88
PARATHION	PT.	2.84	1.00	2.84
SOLUBOR	LB.	.60	4.00	2.40
PROMALIN	PT.	45.30	2.00	90.60
REGULAD	QT.	5.54	1.00	5.54
SORBA-SPRAY MG	QT.	3.20	1.50	4.80
ELGETOL	PT.	3.52	1.50	5.28
AMID-THIN	LB.	12.68	1.25	15.85
SEVIN	LB.	2.30	4.25	9.77
GUTHION	LB.	6.00	2.00	12.00
PHOSPHAMIDON	PT.	8.67	.50	4.33
FOLIAR NUTRIENT	LB.	1.00	4.00	4.00
CALCIUM CHLORIDE	LB.	.27	16.00	4.32
ROUND-UP	GAL.	85.86	.17	14.60
2,4D	QT.	3.73	.33	1.23
GUTHION	LB.	6.00	2.50	15.00
AERIAL	ACRE	10.00	1.00	10.00
ZIRAM	GAL.	6.67	1.00	6.67
NAA	OZ.	.13	2.00	.26
LABOR	ACRE	857.34	1.00	857.34
IRRIGATION ELECTRICITY	ACRE	40.00	1.00	40.00
IRRIGATION CHARGE	ACRE	45.00	1.00	45.00
IRRIGATION REPAIRS	ACRE	15.00	1.00	15.00
TRACTORS	ACRE	16.61	1.00	16.61
MACHINERY	ACRE	221.32	1.00	221.32
OVERHEAD	ACRE	107.57	1.00	107.57
INTEREST ON OP. CAP.	DOL.	.10	918.96	91.90
				<hr/>
SUBTOTAL, PREHARVEST				\$1663.17
<hr/>				
HARVEST COSTS				
PICKERS	BIN	\$11.00	30.00	\$330.00
LABOR	ACRE	39.60	1.00	39.60
HAULING	BIN	3.00	30.00	90.00
TRACTORS	ACRE	12.61	1.00	12.61
MACHINERY	ACRE	9.25	1.00	9.25
				<hr/>
SUBTOTAL, HARVEST				\$481.46

TABLE 5: CONTINUED

		PRICE OR		VALUE OR
		UNIT COST/UNIT	QUANTITY	COST
POSTHARVEST COSTS				
PRINCEP	LB.	\$ 3.50	.67	\$ 2.34
ROUND-UP	GAL.	85.86	.17	14.60
SINBAR	LB.	18.91	.67	12.67
NITROGEN	LB.	.30	109.00	32.70
STRYCHNINE MILD	LB.	1.03	3.00	3.09
Z-P PELLETS	LB.	1.05	3.00	3.15
LABOR	ACRE	33.00	1.00	33.00
TRACTORS	ACRE	9.46	1.00	9.46
MACHINERY	ACRE	3.42	1.00	3.42
SUBTOTAL, POSTHARVEST				\$114.43
TOTAL VARIABLE COST				\$2259.06
INCOME AFTER VARIABLE COSTS				\$2240.94
FIXED COSTS				
ORCHARD DEPREC.	ACRE	\$ 150.00	1.00	\$ 150.00
INTEREST ON INVESTMENT	ACRE	1050.00	1.00	1050.00
LAND TAXES	ACRE	60.00	1.00	60.00
TRACTORS	ACRE	140.39	1.00	140.39
MACHINERY	ACRE	337.97	1.00	337.97
BUILDINGS	ACRE	111.23	1.00	111.23
TOTAL FIXED COSTS				\$1849.59
TOTAL COST				\$4108.65
RETURNS TO MANAGEMENT				-\$ 508.65
#IRRIGATION INTEREST AND DEPRECIATION INCLUDED IN INVESTMENT COST.				
##INTEREST ON AVERAGE ORCHARD VALUE.				

Table 6: Break-Even Returns per Bin to the Apple Grower.

	Cost per Acre *	Your Farm	Break-Even Return/Bin **	Your Farm
	\$	\$	\$	\$
1. Total Variable Costs	2,259.06	_____	75.30	_____
Plus: Ins. & Taxes on Mach. & Bldg.	62.98	_____		
Land Taxes	60.00	_____		
	_____	_____		
	_____	_____		
2. Total Cash Costs	2,382.04	_____	79.40	_____
Plus: Depr. on Mach. & Bldg.	264.20	_____		
Depr. on Orchard	150.00	_____		
3. Total Cash Costs + Depr.	2,796.24	_____	93.21	_____
Plus: Int. on Mach. & Bldg.	262.41	_____		
Int. on Invest.	1,050.00	_____		
4. Total Cost	4,108.65	_____	136.95	_____

* Excluding management, marketing, and packaging costs.

** Assumes 30 bins per acre.

Table 7: Per-Acre Returns to Land and Management for Varying Apple Yields and Per-Bin Returns to the Fruit Grower.

Bins	\$110 * per Bin \$	\$120 * per Bin \$	\$130 * per Bin \$	\$140 * per Bin \$	\$150 * per Bin \$
26	-1,185	-925	-665	-405	- 145
28	- 997	-717	-437	-157	123
30	- 809	-509	-209	91	391
32	- 621	-301	19	339	659
34	- 433	- 93	247	587	927
36	- 245	115	475	835	1,195

* Returns received by the producer after paying marketing and packaging costs.

Table 8: Prices for Selected Inputs.

Item	Unit	Price \$
Fertilizers:		
Nitrogen	Lb.	.30
Calcium Chloride	Lb.	.27
Zinc Sulfate	Gal.	1.42
Foliar Nutrient	Lb.	1.00
Herbicides:		
2,4-D	Qt.	3.73
Sinbar	Lb.	18.91
Round-up	Gal.	85.86
Princep	Lb.	3.50
Insecticides:		
Superior Oil	Gal.	2.48
NAA	Oz.	.13
Parathion	Pt.	2.84
Solubor	Lb.	.60
Guthion	Lb.	6.00
Phosphamidon	Pt.	8.67
Growth Regulators:		
Sevin	Lb.	2.30
Ziram	Gal.	6.67
Amid-Thin	Lb.	12.68
Elgetol	Pt.	3.52
Regulaid	Qt.	5.54
Promalin	Pt.	45.30
Sorba-Spray mg.	Qt.	3.20
Rodenticide:		
Strychnine Mills	Lb.	1.03
Z-P Pellets	Lb.	1.05
Other:		
Aerial Spraying	Acre	10.00
Diesel	Gal.	.65
Gasoline	Gal.	.85
Custom Hauling	Bin	3.00
Labor	Hour	5.50
Pickers	Bin	13.00

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