



# Costs of Apple Production in Western Michigan: *Standard Orchard Planting*

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THIS COST EVALUATION of apple production in western Michigan was obtained through a small group discussion method with apple growers. These growers discussed current growing and harvesting practices and prices paid for inputs used by average apple growers of the area. They agreed upon the size of apple acreage, equipment and cultural practices generally used by an average apple grower.

These figures do not reflect the average cost of apple production for all growers in the area because higher than average yields have been assumed. A grower should not assume the figures reflect his cost of production because costs vary considerably from farm to farm.

The data can help growers develop costs and better evaluate their farm situations. Each of the appropriate tables in this report include a "Your Farm Cost" column for the grower to note the cost for a particular operation. For operations where individual costs cannot be determined, a grower may wish to adjust and substitute the study data.

The data were assembled assuming equipment and labor available for a hypothetical farm of 100 acres of diversified tree fruit, including 40 acres of apples. However, the data in Table 1 are presented for 10 acres of apples since it may be easier for a grower to visualize many of the resource inputs on this basis. Per-acre costs, as shown in Tables 2 through 6, can be determined from Table 1, by dividing by 10.

(See Table 1 on pages 2-3.)

The full-time labor classification includes the working time of the operator and regular hired help devoted to apples. Operator labor is not considered a cash expense by producers; but to allow for differences among farms in the proportion of work performed by regular hired help, which is a cash expense, or the operator, both have been included at the \$3.50 per hour rate. As a result, producers who do a major portion of the work may have a lower cash labor cost than the figures indicate.

Some major factors considered in the computation of equipment costs are initial cost, salvage value, years

of life, annual usage, repair cost, insurance, interest and operating expenses such as gas and oil. The operating costs for each piece of equipment are charged to the crop in Table 1 on the basis of direct use of the equipment.

Variable costs are those that change directly with increases or decreases in the acreage of apples or yields with harvesting costs. Examples of costs which vary with acreage are spray material, fertilizer, hired labor, and machinery operating costs. Costs of piece-work harvesting will be slightly lower or higher associated with higher or lower yields.

Variable costs incurred in apple production are categorized by labor, machinery and materials in Table 2. The details of hours and type of labor, machinery used and hours of use, and kinds and amounts of material used by operation are shown in Table 1. If a grower's costs for particular items are substantially higher than those shown, he may need to closely analyze those components to see if they can be reduced. A high cost for a particular component may be justified if it contributes to a sufficiently higher yield or improved quality.

The variable costs incurred in the harvesting of an acre with estimated total production of 400 bushels of apples are shown in Table 3. Labor is the major harvesting cost. Therefore, good labor management can potentially enhance the profit picture.

The overhead, or fixed cost, for apple production (Table 4) includes allocation of machinery overhead

Table 2. Variable cost per acre of growing apples, standard orchard, western Michigan, 1976

Operation	Labor	Machinery	Materials	Total	Your farm cost
Pruning & brush removal	\$ 52.94	\$12.22	\$ —	\$ 65.16	_____
Mowing	5.25	4.89	—	10.14	_____
Fertilization	4.38	1.21	17.52	23.11	_____
Weed spray	4.37	1.89	6.09	12.35	_____
Spraying	8.93	15.69	99.65	124.27	_____
Management & Misc. repairs	59.50	—	—	59.50	_____
Other	—	10.67	9.20	19.87	_____
Totals	\$135.37	\$46.57	\$132.46	\$314.40	_____

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Table 1  
 Growing operations and related variable costs for 10 acres apple production  
 Standard orchard 48 trees/acre in Western Michigan, 1976

Operation	Labor		Machinery		Materials		Total Cost Per 10 Acres	Your Farm Cost
	Labor Hr. Per 10 Acres	Wage Rate	Equipment Used	Hours of Use	Cost Per Hour of Use	Item		
Trimming (heavy one year, light next)	130	\$3.50	Power Pruners & Tower	130	\$.68		\$88.40	\$600.80
	20	2.48	Chain saw	15	.52		7.80	
Removing brush	10	2.48	New 60 hp tractor	10	2.37		23.70	50.80
			Brush rake or mower	10	.23		2.30	
Mowings (3)	15	3.50	60 hp tractor (used)	12.50	2.41		30.10	101.40
			Rotary mower	12.50	1.50		18.80	
Fertilizer	2.5	3.50	40 hp tractor (used)	2.5	1.46	4# /tree Ammonia Nitrate @ \$7.25/cwt.	3.70	\$139.20
			Fertilizer spreader	2.5	.25		.60	
Weed control (spray 1/4 area)	7.5	3.50	60 hp tractor (used)	2.5	2.41	Hand application	6.03	36.00
			Trailer	2.5	.16		.40	
	2.5	3.50	40 hp tractor (used)	.8	1.46	0-0-60 200#/A @ \$5.40/cwt. every third year	1.17	
			Fertilizer spreader	.8	.25		.20	
Bee Rental	7.5	3.50	40 hp tractor (used)	5.0	1.46	3#/A Simazin @ \$1.40/lb.	7.30	10.50
			Weed sprayer	5.0	.22	1 qt/A Paraquat @ \$9.13/qt.	1.10	
	5	3.50	60 hp tractor (used)	4	2.41	Amate-X60#/100 gal. @ \$27.60/80# bag	9.60	
			Weed sprayer	4	.22		.90	
Spray Program						1 hive/3A @ \$18.00	60.00	60.00
Dormant (Dilute @ 300 gal/A)	2.5	3.50	60 hp tractor (new)	2.5	2.37		5.92	10.10
			Air Bl. sprayer	2.5	4.04		4.18	
Green tip-prepink	2.0	3.50	60 hp tractor (new)	2.0	2.37		4.74	8.08
			Air blast sprayer	2.0	4.04		3.34	
Prepink-Pink	2.0	3.50	60 hp tractor (new)	2.0	2.37		4.74	4.74
			Air blast sprayer	2.0	4.04		8.08	8.08
Bloom	2.0	3.50	60 hp tractor (new)	2.0	2.37		4.74	8.08
			Air blast sprayer	2.0	4.04		3.34	
Petal fall	2.0	3.50	60 hp tractor (new)	2.0	2.37		4.74	8.08
			Air blast sprayer	2.0	4.04		3.34	

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Operation	Labor		Machinery		Materials			Your Farm Cost
	Labor Per 10 Acres	Hr Wage Rate	Equipment Used	Hours of Use	Cost Per Hour of Use	Item	Cost Per 10 Acres	
1st cover	2.0	3.50	7.00	60 hp. tractor (new) Air blast sprayer	2.0	2.37	4.74	
2nd cover	2.0	3.50	7.00	60 hp tractor (new) Air blast sprayer	2.0	4.04	8.08	
3rd cover	2.0	3.50	7.00	60 hp tractor (new) Air blast sprayer	2.0	2.37	4.74	
4th cover	2.0	3.50	7.00	60 hp tractor (new) Air blast sprayer	2.0	4.04	8.08	
5th cover	2.0	3.50	7.00	60 hp tractor (new) Air blast sprayer	2.0	2.37	4.74	
6th cover	2.0	3.50	7.00	60 hp tractor (new) Air blast sprayer	2.0	4.04	8.08	
Thinning spray 1 yr. in 4 (400 gal/A)	1.5	3.50	5.25	60 hp tractor (new) High pressure sprayer	1.0	2.37	2.37	
Drop control Spray 1/2 acreage Well & pump operation	1.5	3.50	5.25	60 hp tractor (new) Air blast sprayer Electricity and repairs 10 acres	1.5	2.37	3.56	
Mouse Baiting				Custom Airplane	750 mi.	.10/mi	75.00	
Management & Labor Supervision	100	3.50	350.00					
Pick-up Operation								
Misc. repairs	70	3.50	245.00					
Totals			\$1353.65				\$465.76	\$1324.62
								\$3144.08
								\$418.10
								148.70
								408.10
								21.60
								\$996.50
								\$1242.71
								32.00
								54.50
								350.00
								75.00
								245.00

<sup>1</sup> From MSU Entomology Department's Pest Management Project.  
If MSU recommended spray schedule used: Insecticides \$941.00, Fungicides \$632.50, Growth regulators \$2.50: Total \$1576.00.

on the basis of the proportion of total farm use in apples, interest on orchard investment and orchard depreciation, and property taxes. The fixed costs of machinery are allocated to apples on the basis of hours of use on apples relative to the total hours of use of the equipment on the farm. Fixed costs on machinery include depreciation, interest on investment, insurance and housing costs (interest, insurance and housing equal 9.7 percent).

A grower should evaluate his own farm situation and decide whether fixed costs should be considered as part of the total cost for his decision-making purposes. One example of this type of consideration is the fact that orchard overhead is a fixed cost to the owner, but if the orchard is rented, it is a variable cost for the operator.

Per-acre yields are very important factors in determining production costs per bushel of apples (Table 6). These figures are based on the fact that preharvest costs per acre, such as spraying, pruning, mowing, etc., do not vary greatly regardless of the yield obtained.

**Table 3. Variable harvest cost for 400 bushels of apples, standard orchard, western Michigan, 1976.**

	Total	Your farm cost
<b>Labor</b>		
Full time labor (8.00 hrs.)	\$ 28.00	_____
Part time labor (.75 hr.)	1.86	_____
Piecework labor (\$.52/bu.)	195.00	_____
Piecework drops (\$.35/bu.)	8.75	_____
Equipment use	30.08	_____
Total	\$263.69	_____
Cost per bushel	\$ .66	_____

**Table 4. Overhead costs for growing and harvesting one acre of apples, standard orchard, western Michigan, 1976.**

	Total	Your farm cost
Machinery	\$109.52	_____
Interest on land (\$400 × 8%)	32.00	_____
Interest on average orchard value (\$400 ÷ 2 × 8%)	16.00	_____
Orchard depreciation (\$400 ÷ 20 yrs.)	20.00	_____
Property taxes	10.00	_____
Total	\$187.52	_____

**Table 5. Total growing and harvesting costs for one acre of apples, standard orchard, western Michigan, 1976.**

	Total	Your farm cost
Variable growing cost	\$314.40	_____
Variable harvest cost	263.69	_____
Overhead cost	187.52	_____
Total	\$765.62	_____

**Table 6. Effect of varying yield on cost/bushel for apples, standard orchard, western Michigan, 1976.**

Yield per acre	Variable growing harvest	Variable harvest cost	Total variable cost	Your farm variable cost	Fixed cost	Total cost	Your farm total cost
Per bushel							
200	\$1.57	\$.74	\$2.31	_____	\$.94	\$3.25	_____
250	1.26	.70	1.96	_____	.75	2.71	_____
300	1.05	.66	1.71	_____	.63	2.34	_____
350	.90	.66	1.56	_____	.54	2.10	_____
400	.79	.66	1.45	_____	.47	1.92	_____
500	.63	.66	1.29	_____	.38	1.67	_____
600	.52	.59	1.11	_____	.31	1.42	_____
700	.45	.59	1.04	_____	.27	1.31	_____