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Costs of Strawberry Production in Northwestern Michigan

Michigan State University

Cooperative Extension Service

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COSTS OF STRAWBERRY PRODUCTION IN NORTHWESTERN MICHIGAN



By Myron Kelsey and Larry Bradford¹

This cost evaluation of strawberry production in northwestern Michigan is a projection of costs developed from small-group discussions with strawberry growers. Growers described common growing and harvesting practices used in the area and agreed on the average size of strawberry acreage, equipment and cultural practices generally used by an average apple grower.

These figures do not reflect the average cost of strawberry production for all growers in the state. Costs vary considerably from area to area in the state and from farm to farm.

The data can help you develop your costs and better evaluate your farm situation. Each of the appropriate tables in this report includes a "Your Farm Cost" column for you to note your own costs for particular operations within the total strawberry enterprise. For operations where those costs cannot be determined, you may wish to adjust and substitute the study data.

The data were assembled assuming equipment and labor available for a hypothetical farm of 200 acres of diversified fruit and vegetables, including 40 acres of strawberries. However, the data in Table 1 are presented for 10 acres of strawberries to make it easier for you to visualize many of the resource inputs.

Labor Costs

The full-time labor classification includes the working time of the operator and regular hired help

devoted to strawberries. Operator labor is not considered a cash expense by producers. But to allow for differences in the proportion of work performed by regular hired help, which is a cash expense, and the operator, both have been included at the \$8 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.

The labor rate used includes the operator's share of Social Security, Workers' Compensation and other fringe benefits. A \$6 per hour rate was used for part-time help and \$4.80 for manual labor.

Equipment Costs

Some major factors considered in the computation of equipment costs are initial cost, salvage value, years of life, annual usage, repair costs, insurance, interest and operating expenses, such as gas and oil. The variable costs, which include only gas and oil and repairs for each piece of equipment, are charged to the crop in Table 1 on the basis of hours of use of the equipment. The fixed costs are also shown. The totals are shown in Table 3.

Variable Costs

Variable costs are those that change directly with increases or decreases in the acreage of strawberries. Examples of costs are spray material, fertilizer, hired labor and machinery operating costs. An interest charge on variable costs has not been included in these figures.

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

The variable costs incurred in harvesting 10 acres, with estimated total production of 10,000 pounds of strawberries, are shown in Table 2.

Overhead Costs

The overhead, or fixed cost, for strawberry production (Table 3) includes allocation of machinery overhead on the basis of the proportion of total farm use in strawberries, interest on land investment and taxes. The fixed costs of machinery are allocated to strawberries on the basis of hours of use 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.

You should evaluate your own farm situation and decide whether fixed costs should be considered as part of the total cost for your decision-making purposes. Interest and taxes on land are a fixed cost to the owner, for example, but a variable cost for the operator who is renting the land.

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Table 1. Growing Operations and Related Variable Costs for 10 Acres of Strawberry Production, Northwestern Michigan, 1984

Operation	Labor			Machinery						Materials		Total Variable Cost
	Labor per hr.	Wage Rate	Cost	Equipment	Hours of Use	Variable Cost/Unit	Total Variable Cost	Fixed Cost/Unit	Fixed Cost	Item	Cost Per 10 Acres	
Fall (Soil Building)												
Plow	6	\$8.00	\$48.00	60 h.p. tractor	6	\$6.79	\$40.74	\$5.93	\$35.58			\$97.74
				Plow	6	1.50	9.00	2.69	16.14			
Disc (twice)	6	8.00	48.00	60 h.p. tractor	6	6.79	40.74	5.93	35.58			99.60
				Disc	6	1.81	10.86	3.23	19.38			
Drag	2	8.00	16.00	60 h.p. tractor	2	6.79	13.58	5.93	11.86			32.58
				Drag	2	1.50	3.00	2.69	5.38			
Soil test	2	8.00	16.00	Pickup	20mi.	.16	3.20	.38	7.60	2 tests@4.50	9.00	28.20
Seeding sorghum	3	8.00	24.00	40 h.p. tractor	3	5.08	15.24	4.45	13.35	25 lbs sorghum	120.00	163.05
				Small fertilizer	3	1.27	3.81	8.92	26.76	seed/acre@48		
				spreader						cents/lb.		
Broadcast fertilizer	4	8.00	32.00	60 h.p. tractor	4	6.79	27.16	5.93	23.72	300 lbs. 16-16-	297.00	501.20
				Large fertilizer	4					16/acre@		
				spreader	4	3.76	15.04	10.71	42.84	\$198/ton		
										200 lbs.		
										0-0-60/ acre@		
										\$130/ton	130.00	
Fumigation				Custom application@			500.00			30 gal. Vorlex/	3,900.00	4,400.00
				@\$50/acre						acre@\$13/gal.		
Management	30	8.00	240.00									240.00
TOTAL			\$424.00				\$682.37		[\$238.19]		\$4,456.00	\$5,562.37
Planting Year												
Plow	6	8.00	48.00	60 h.p. tractor	6	6.79	40.74	5.93	35.58			\$97.74
				Plow	6	1.50	9.00	2.69	16.14			
Disc (twice)	6	8.00	48.00	60 h.p. tractor	6	6.79	40.74	5.93	35.58			99.60
				Disc	6	1.81	10.86	3.23	19.38			
Drag	2	8.00	16.00	60 h.p. tractor	2	6.79	13.58	5.93	11.86			32.58
				Drag	2	1.50	3.00	2.69	5.38			
Planting (1/2 acre/hr.)	20	8.00	160.00	60 h.p. tractor	20	6.79	135.80	5.93	118.60	6,000 plants/	3,900.00	4,778.85
	20	6.00	120.00	Transplanter	20	2.05	41.00	4.85	97.00	acre@\$65/		
				40 h.p. tractor	5	5.08	25.40	4.45	22.25	1,000		
				Trailer	.5	.19	.95	4.10	20.50			
	80	4.80	384.00	Truck	30mi.	.39	11.70	.58	17.40			
Cultipacker	2	8.00	16.00	40 h.p. tractor	2	5.08	10.16	4.45	8.90			29.16
				cultipacker	2	1.50	3.00	2.69	5.38			
Weed spray	8	8.00	64.00	40 h.p. tractor	8	5.08	40.64	4.45	35.60	12 lbs. Dac-	522.00	642.08
				Weed sprayer	8	1.93	15.44	7.11	56.88	thal/acre@		
										\$4.35/lb.		
Broadcast fertilizer	4	8.00	32.00	60 h.p. tractor	4	6.79	27.16	5.93	23.72	300 lbs. 16-16	268.50	342.70
				Fertilizer	4	3.76	15.04	10.71	42.84	-16@\$179/ton		
				spreader								
Cultivation (4 times)	48	8.00	384.00	40 h.p. tractor	48	5.08	243.84	4.45	213.60			726.24
				Cultivator	48	2.05	98.40	2.70	129.60			
Broadcast nitrogen	3	8.00	24.00	60 h.p. tractor	3	6.79	20.37	5.93	17.79	150 lbs. 33-0-0	124.50	180.15
				Fertilizer	3	3.76	11.28	10.71	32.13	@\$166/ton		
				spreader								
Hoeing	200	4.80	960.00									960.00
Pinch blossoms (twice)	100	4.80	480.00									480.00
Weed spray	8	8.00	64.00	40 h.p. tractor	8	5.08	40.64	4.45	35.60	8 lbs 50% w.p.	534.40	654.48
				Weed sprayer	8	1.93	15.44	7.11	56.88	Tenoran/acre		
										@\$6.68		

Table 1. (Continued)

Operation	Labor			Machinery						Materials		Total Variable Cost
	Labor per hr.	Wage Rate	Cost	Equipment	Hours of Use	Variable Cost/Unit	Total Variable Cost	Fixed Cost/Unit	Fixed Cost	Item	Cost Per 10 Acres	
Spray (3 times)	15	8.00	120.00	60 h.p. tractor PTO sprayer	15 15	6.79 4.98	101.85 74.70	5.93 12.15	88.95 182.25	1 lb. Guthion/ acre@ \$4.95/lb. 1 lb. Cyprex/ acre@ \$4.50/lb.	148.50 135.00	580.05
Irrigation—set up equipment	20	4.80	96.00	40 h.p. tractor Trailer	10 10	5.08 .19	50.80 1.90	4.45 4.10	44.50 41.00			148.70
Irrigation application 1/2 inch 6 times	3	8.00	24.00	Irrigation Equipment 60 h.p. tractor	30 AI 30 AI	9.59 3.40	287.70 102.00	13.80 2.97	414.00 89.10			413.70
Weed spray	8	8.00	64.00	40 h.p. tractor Weed sprayer	8 8	5.08 1.93	40.64 15.44	4.45 7.11	35.60 56.88	4 lbs. Devernol /acre@ \$6.85 /lb.	274.00	394.08
Management fee	80	8.00	640.00									640.00
TOTAL			\$3,744.00				\$1,549.21	[\$2,010.87]			\$5,906.90	\$11,200.11
First Fruiting Year Checkout irrigation equipment	8	4.80	38.40									38.40
Broadcast fertilizer	3	8.00	24.00	60 h.p. tractor Fertilizer spreader	3 3	6.79 3.76	20.37 11.28	5.93 10.71	17.79 32.13	200 lbs 45-0-0 @ \$230/ton	230.00	285.65
Mulching	16 32	6.00 4.80	96.00 153.60	40 h.p. tractor Trailer Straw spreader	16 16 16	5.08 .19 .20	81.28 3.04 3.20	4.45 4.10 4.10	71.20 65.60 65.60	2 tons straw/acre @ \$40 ton	800.00	1,137.12
Frost control 7 hrs. per night (5 nights)	35	8.00	280.00	Irrigation equip- ment 60 h.p. tractor	40AI 40AI	9.59 3.40	383.60 136.00	13.80 2.97	552.00 118.80			799.60
First cover spray	7	8.00	56.00	40 h.p. tractor Weed sprayer	7 7	5.08 1.93	35.56 13.51	4.45 7.11	31.15 49.77	6 lb. Captan/acre @ \$1.30 lb. 1 qt. Lorsban/acre @ \$9.40 qt.	78.00 94.00	277.07
Second cover spray	5	8.00	40.00	60 h.p. tractor PTO sprayer	5 5	6.79 4.98	33.95 24.90	5.93 12.15	29.65 60.75	2 lbs. Thiodan/ acre@ \$4.08 1/2 lb. Benlate/ acre@ \$11.50; 6 lbs. Captan/acre @ \$1.30	81.60 57.50 78.00	315.95
Third cover spray	5	8.00	40.00	60 h.p. tractor PTO sprayer	5 5	6.79 4.98	33.95 24.90	5.93 12.15	29.65 60.75	1/2 lb. Benlate/ acre@ \$11.50; 6 lb. Captan/acre @ \$1.30	57.50 78.00	234.35
Fourth cover spray	5	8.00	40.00	60 h.p. tractor PTO sprayer	5 5	6.79 4.98	33.95 24.90	5.93 12.15	29.65 60.75	1 1/2 lb. Ronalin /acre@ \$17.30; 6 lb. Captan/acre @ \$1.30	259.50 78.00	436.35
Hoeing	100	4.80	480.00									480.00
Irrigation 3/4 acre inch per application	6	8.00	48.00	Irrigation equip- ment	60AI	9.59	575.40	13.80	828.00	Spray 1 1/2 lb. Benlate/ acre@ \$11.50	57.50	1,376.20

Table 1. (Continued)

Operation	Labor			Machinery						Materials		Total Variable Cost
	Labor per hr.	Wage Rate	Cost	Equipment	Hours of Use	Variable Cost/Unit	Total Variable Cost	Fixed Cost/Unit	Fixed Cost	Item	Cost Per 10 Acres	
(8 times)				60 h.p. tractor	60AI	3.40	204.00	2.97	178.20	1 lb Theodan/acre@\$.08	40.80	
										6 lb. Captan/acre @\$.1.30	78.00	
										Spray 2		
										1/2 lb Benlate/acre@\$11.50	57.50	
										2 lb. Guthion/acre @\$4.05	99.00	
										Spray 3		
										2 lb. Guthion/acre @\$4.95	99.00	
										3 applications nitrogen	117.00	
										45 lb. N total/acre 26 cents/lb.		
Broadcast fertilizer	3	8.00	24.00	60 h.p. tractor	3	6.79	20.37	5.93	17.79	100 lb. calcium nitrate/acre@ \$199 ton	99.50	155.15
				Fertilizer spreader	3	3.76	11.28	10.71	32.13			
Management	100	8.00	800.00									800.00
Total—First Fruiting Year			\$2,120.00				\$1,675.44		[\$2,331.36]		\$2,540.40	\$6,335.84
Post-Harvest												
1st weed spray	8	8.00	64.00	40 h.p. tractor	8	5.08	40.64	4.45	35.60	2,4-D 1 qt/A@ \$3	12.00	132.08
				Weed sprayer	8	1.93	15.44	7.11	56.88	Spray .4 area		
2nd weed spray	8	8.00	64.00	40 h.p. tractor	8	5.08	40.64	4.45	35.60	6 lbs Diphinamid per acre@ \$6.60	396.00	516.08
				Weed sprayer	8	1.93	15.44	7.11	56.88			
Mow	3.5	8.00	28.00	60 h.p. tractor	3.5	6.79	23.77	5.93	20.76			57.76
				Rotary mower	3.5	1.71	5.99	4.02	14.07			
Fertilize	3	8.00	24.00	60 h.p. tractor	3	6.79	20.37	5.93	17.79	500 lb. 16-16-16 per acre@\$198 ton	495.00	550.65
				Fertilizer spreader	3	3.76	11.28	10.71	32.13			
Rototillage	10	8.00	80.00	60 h.p. tractor	10	6.79	67.90	5.93	59.30			168.90
				Rototiller	10	2.10	21.00	3.35	33.50			
Post-renovation sprays (twice)	10	8.00	80.00	60 h.p. tractor	10	6.79	67.90	5.93	59.30	1/2 lb. Benlate/A@\$11.50	57.50	666.70
				PTO sprayer	10	4.98	49.80	12.15	121.50	1 qt. Guthion/A @\$9.	99.00	
										6 lb Captan/A@ \$1.30	78.00	
										2nd spray	234.50	
Hand hoeing	400	4.80	1,920.00									1,920.00
Post-harvest irrigation (4 inches)	4	8.00	32.00	Irrigation Equipment 60 h.p. tractor	40AI	9.59	383.60	13.80	552.00			551.60
					40AI	3.40	136.00	2.97	118.80			
Fertilize	3	8.00	24.00	60 h.p. tractor	3	6.79	20.37	5.93	17.79	100 lb 48-0-0/A@\$230/ton	230.00	285.65
				Fertilizer spreader	3	3.76	11.28	10.71	32.13			
Total Post-Harvest Cost			\$2,316.00				\$931.42		[\$1,264.03]		\$1,602.00	\$4,849.42
Second Fruiting Year												
Totals are same as first fruiting year with the addition of 50 additional hours for hoeing.												
Extra hoeing	40	4.80	240.00									240.00
Total from first fruiting year			\$2,120.00				\$1,675.44		[\$2,331.36]		\$2,540.40	\$6,335.84
Total from second fruiting year			2,360.00				1,675.44		[2,331.36]		2,540.40	6,575.84

**Table 2. Variable Cost of Harvesting 10 Acres of Strawberries
Northwestern Michigan, 1984
10,000 lbs. Per Acre**

<u>Labor</u>	
Harvest piece rate @ 14.4 cents/lb.	\$14,400.00
Fringe benefits [S.S. (7%), W.C. (2.04%) Unemployment (6.5%) = .1554]	2,237.76
Crew leader supervision and hauling @ 4 cents/lbs.	4,000.00
	<u>\$20,637.76</u>
<u>Equipment</u>	
Forklift (45 hrs. @ 75 cents/hr.)	33.75
Trailer (45 hrs. @ 19 cents/hr.)	8.55
40 h.p. tractor (45 hrs. & \$5.08/hr.)	228.60
Labor cabins (3,330 hrs. & \$1.20/hr.)	3,996.00
	<u>\$4,266.90</u>
Total harvest cost for 10 acres	24,904.66
Harvest cost per pound	24.9 cents

**Table 3. Overhead Cost Per 10 Acres of Strawberries
Northwestern Michigan, 1984**

Fall Soil Preparation—Machinery fixed cost	\$ 238.19
Planting year—Real estate taxes (\$12/acre)	120.00
Interest on land (\$800/acre × 10%)	800.00
Machinery fixed cost	2,010.87
Interest on fall soil preparation cost [(\$5,562.37 + 238.19) × .125]	725.07
Labor housing (400 hours @ \$1.20)	480.00
First fruiting year—Real estate taxes (\$12/acre)	120.00
Interest on land (800/acre × 10%)	800.00
Harvest machinery fixed cost	603.00
Machinery fixed cost	2,331.36
Labor housing (140 hours @ \$1.20)	168.00
Interest on total to first fruiting year (\$4,374.13 overhead to date + soil preparation \$5,562.37 + planting year cost \$11,200.11 = \$21,136.61 × .125)	2,642.08
	<u>\$11,038.57</u>
Second fruiting year	
Post-harvest labor housing (400 hrs. @ \$1.20)	480.00
Post-harvest fixed cost	1,264.03
Interest on post-harvest cost [(\$4,849.42 + 1,264.03) × \$.125] + 480]	824.18
Machinery fixed cost	2,331.36
Harvest machinery fixed cost	603.00
Interest on land (\$800/acre × 10%)	800.00
Real estate taxes (\$12/acre)	120.00
Labor housing (190 hrs. @ \$1.20)	228.00
	<u>\$6,650.57</u>

Production Costs Per Pound

The yield obtained per acre is very important in determining production costs per pound (Tables 4 and 5). In computing per pound costs, it was assumed that preharvest costs per acre—such as spraying, planting, cultivation, etc.—do not vary greatly, regardless of the yield obtained.

A comparison of Tables 4 and 5 indicates a substantial reduction in per pound costs when a bed can be renovated for a second fruiting year and yields maintained.

Table 4. Effect of Varying Yields on Strawberry Costs for the Soil Building, Planting and First Fruiting Year, Northwestern Michigan, 1984

Harvest Yield/Acre	Variable Growing Cost to Harvest ¹	Harvest Cost	Total Variable Cost Per Cwt.	Your Farm Cost	Overhead Cost ²	Total Cost	Your Farm Cost
----- Per Cwt. -----							
60	\$38.50	25.90	64.40	_____	\$18.40	\$82.80	_____
80	28.87	25.90	54.70	_____	13.80	68.57	_____
100	23.10	25.90	49.00	_____	11.04	60.04	_____
120	19.25	25.90	45.15	_____	9.20	54.35	_____
140	16.50	25.90	42.40	_____	7.88	50.28	_____
160	14.44	25.90	40.34	_____	6.90	47.24	_____
180	12.83	25.90	38.73	_____	6.13	44.86	_____

¹Total of soil buildup (\$5,562.37), planting year (\$11,200.11) and first fruiting year (\$6,335.84) = \$23,098.32.

²Overhead cost = \$11,038.57.

Table 5. Effect of Varying Yields on Strawberry Costs for the Second Fruiting Year, Northwestern Michigan, 1984

Harvest Yield/Acre	Variable Growing Cost to Harvest ¹	Harvest Cost	Total Variable Cost	Your Farm Cost	Overhead Cost ²	Total Cost	Your Farm Cost
----- Per Cwt. -----							
60	\$19.04	\$25.90	\$44.94	_____	\$11.08	\$56.02	_____
80	14.28	25.90	40.18	_____	8.31	48.49	_____
100	11.43	25.90	37.33	_____	6.65	43.98	_____
120	9.52	25.90	35.42	_____	5.54	40.96	_____
140	8.16	25.90	34.06	_____	4.75	38.81	_____
160	7.14	25.90	33.04	_____	4.16	37.20	_____
180	6.35	25.90	32.25	_____	3.69	35.94	_____

¹Variable growing cost equals post-harvest cost (\$4,849.42) plus second fruiting year cost (\$6,575.84) equals \$11,425.26.

²Overhead cost equals \$6,750.57.

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