Costs of Strawberry Production in Southwestern Michigan

Michigan State University
Cooperative Extension Service
Myron P. Kelsey, Extension Specialist, Department of Agricultural Economics
Archie Johnson, Specialist, Department of Agricultural Economics

June 1979
6 pages

FILE
26.18

COSTS OF STRAWBERRY PRODUCTION IN SOUTHWESTERN MICHIGAN

Extension Bulletin E-1114 June 1979

By Myron Kelsey and Archie Johnson[1]

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

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

The data can help a grower to develop his costs and better evaluate his farm situation. Each of the appropriate tables in this report includes a "Your Farm Cost" column for him to note his own cost for particular operations for the total strawberry enterprise. For operations where his costs cannot be determined, he 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 fruit and vegetables, including 20 acres of strawberries. However, the data in Table 1 are presented for 10 acres of strawberries 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 to 6, can be determined from Table 1, by dividing by 10.

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, or the operator, both have been included at the $4.27 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 is $3.50 per hour plus Social Security at 6.13% and Workers Compensation insurance at the proposed rate of 16%. Hourly labor was paid the minimum wage of $2.90 which equals $3.54 with Social Security and Workers Compensation.

Some major factors considered in the computation of equipment costs are initial costs, salvage value, years of life, annual usage, repair costs, insurance, interest, and operating expenses such as gas and oil. The operating 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.

Variable costs are those that change directly with increases or decreases in acreage of strawberries. Examples of such 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 type of labor, machinery used and hours of use, and kinds and amounts of material used by operation are shown in Table 1. If an individual grower's costs for particular items are substantially higher than those shown, he 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 a sufficiently higher yield or improved quality.

The variable costs incurred in the harvesting of an acre with estimated total production of 400 crates of strawberries are shown in Table 3.

The overhead, or fixed cost, for strawberry production (Table 4) 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 (interest, insurance and housing equal 9.7 percent of average value).

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 interest and taxes on land is a fixed cost to the owner, but if the land is rented, it is a variable cost for the operator.

The yield obtained per acre is a very important factor in determining production costs per crate (Table 6). In computing per crate costs, it was assumed that preharvest costs per acre, such as spraying, planting, cultivation, etc., do not vary greatly regardless of the yield obtained.

[1]Extension specialist, and specialist, Dept. of Agricultural Economics.

Table 1. Growing operations and related variable costs for 10 acres of strawberry production, southwestern Michigan, 1979

Operation	Labor			Machinery				Materials		Total Cost Per 10 Acres
	Labor Hr. Per 10 Acres	Wage Rate	Cost	Equipment Used	Hours of Use	Cost Per Hour of Use	Cost	Item	Cost Per 10 Acres	
Fall (Soil Building)										
Plow	6	$4.27	$25.62	60 hp tractor	6	$ 2.95	$ 17.70			$ 46.62
				Plow	6	.55	3.30			
Disc (Twice)	6	4.27	25.62	60 hp tractor	6	2.95	17.70			46.62
				Disc	6	.55	3.30			
Drag	2	4.27	8.54	60 hp tractor	2	2.95	5.90			14.68
				Drag	2	.12	.24			
Seeding Rye	3	4.27	12.81	40 hp tractor	3	2.21	6.63	Rye, 2 bu/A @3.00/bu	60.00	80.64
				Fert. spreader	3	.40	1.20			
Fumigation				Custom Applic.		15.00/A	150.00	30 Gal DD/A @4.37/gal	1,311.00	1,461.00
Culti-mulch	3	4.27	12.81	60 hp tractor	3	2.95	8.85			23.76
				Culti-mulcher	3	.70	2.10			
Growing Year										
Plow-down Fertilizer	3	4.27	12.81	40 hp tractor	3	2.21	6.63	400# 11-48-0 @$169/T.	338.00	358.64
				Fert. spreader	3	.40	1.20			
Plow	6	4.27	25.62	60 hp tractor	6	2.95	17.70			46.62
				Plow	6	.55	3.30			
Disc (Twice)	6	4.27	25.62	60 hp tractor	6	2.95	17.70			46.62
				Disc	6	.55	3.30			
Drag	2	4.27	8.54	60 hp tractor	2	2.95	5.90			14.68
				Drag	2	.12	.24			
Planting (3/4 A/Hr)	14	4.27	59.78	60 hp tractor	14	2.95	41.30	4500 plants/A, 2-1/2" x 4" @ $45/1000	2,025.00	2,133.78
				Transplanter	14	.55	7.70			
	14	4.27	59.78	40 hp tractor	7	2.21	15.47			82.21
				Trailer	7	.18	1.26			
				Truck	30 mi	.19	5.70			
	56	3.54	198.24							198.24
Weed Spray	8	4.27	34.16	40 hp tractor	8	2.21	17.68	12# Dacthal/A sprayed $2.50/lb. Spray .4 of area/spray	120.00	173.60
				Weed sprayer	8	.38	1.76			
Wiggle Hoe	60	3.54	212.40	40 hp tractor	30	2.21	66.30			282.30
				Wiggle hoe	30	.12	3.60			
Cultivation (6 times)	84	$4.27	$358.68	40 HP Tractor	84	$2.21	$185.64	600# 11-48-0 @ $169/T in 2 side dressings	$507.20	$1075.04
				Cultivator	84	.28	23.52			
Hoeing (3 times)	300	3.54	1,062.00							1062.00
Pinch Blossoms (2 times)	320	3.54	1132.80							1132.80
Spraying (4 times) 50 gal/acre	5	4.27	21.35	60 HP Tractor	5	2.95	14.75	2 pts. Guthion/A @ 1.92/pt	80.50	138.80
	5	3.54	17.70	High Pressure Sprayer	5	.90	4.50	1 # Cyprex/A @ 4.21/lb.		
50 gal/acre	5	4.27	21.35	60 HP Tractor	5	2.95	14.75	Same as above	80.50	138.80
	5	3.54	17.70	High Pressure Sprayer	5	.90	4.50			
200 gal/acre	5	4.27	21.35	60 HP Tractor	5	2.95	14.75	Kelthane 2½ #A @ 2.45/lb.	141.75	180.60
				Row Crop Sprayer	5	.55	2.75	Guthion 2 pt/A @ 1.92/pt. Cyprex 1#/A @ 4.21/lb.		
200 gal/acre	5	4.27	21.35	60 HP Tractor	5	2.95	14.75	2 pts. Guthion/A @ 1.92/pt	80.50	119.35
				Row Crop Sprayer	5	.55	2.75	1# Cyprex/A @ 4.21/lb.		
Irrigation - Set up equipment	20	3.54	70.80	40 HP Tractor	10	2.21	22.40			96.70
				Trailer	10	.35	3.50			
Application One half acre inch (6 times)	3 1/10 acre	4.27	12.81	Irrigation Equipment	30 AI	4.17	125.10			183.51
				60 HP Tractor	30 AI	1.52	45.60			
Cutting Runners in the Fall	10	4.27	42.70	40 HP Tractor	10	2.21	22.10			67.60
				Cultivator	10	.28	2.80			
Herbicide Spray	8	4.27	34.16	40 HP Tractor	8	2.21	17.68	8# 50% WP Tenoran/A sprayed @ 3.58/lb. Spray .4 area	114.60	351.29
				Weed Sprayer	8	.38	3.04			
								12# Diphinamid/acre sprayed @ 3.80/lb. Spray .4 area	181.81	
Labor Cabins for 219 man days of labor				Labor Cabins	219	.93	203.67			203.67
Cost up to First Fruiting Year	Labor-$3,557.10			Machinery-$1,162.21				Materials- $5,040.86		$9,760.17

Table 1 (Continued) - Strawberries

Operation	Labor			Machinery				Materials		Total Cost Per 10 Acres
	Labor Hr. Per 10 Acres	Wage Rate	Cost	Equipment Used	Hours of Use	Cost Per Hour of Use	Cost	Item	Cost Per 10 Acres	
First Fruiting Year										
Set up of Irrigation Equipment	20	3.54	70.80	40 HP Tractor Trailer	10 10	2.21 35	22.10 3.50			96.40
Broadcast Fertilizer	3	4.27	12.81	40 HP Tractor Fert. Spreader	3 3	2.21 .40	6.63 1.20	200# 12-12-12/A @ $133/ton	133.00	153.64
Mulching: 1 man 2 men	16 32	4.27 3.54	68.32 113.28	40 HP Tractor Trailer Straw Spreader (rent at $7/A)	16 16 10A	2.21 .35 7.00	35.36 5.60 70.00	2 Tons Straw @ $30/ton	600.00	892.56
Setting Straw off Rows	80	3.54	283.20							283.20
Frost Control 7 hrs/night (5 times)	35	4.27	149.45	Irrigation Equipment 60 HP Tractor	40 AI 40 AI	4.17 1.52	166.80 60.30			377.05
First Cover Spray 200 gal/acre	7	4.27	29.89	40 HP Tractor Weed Sprayer	8 8	2.21 .38	17.68 3.04	6# Captan/A @ 1.13/lb.	67.80	118.41
Second Cover Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	2# Thiodan/A @ 3.93/lb. ½# Benlate/A @ 9.55/lb. 1# Captan/A @ .86/lb.	78.60 47.75 8.60	176.73
Third Cover Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 9.55/lb. 1# Captan/A @ .86/lb.	47.75 8.60	98.13
Pre-Harvest Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 9.55/lb. 1# Thiodan/A @ 3.93/lb.	47.75 39.30	128.83
Pre-Harvest Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 9.55/lb.	47.75	89.53
Hoeing (1 time)	160	3.54	566.40							566.40
Irrigation One half acre inch (six times)	1/10 Hr/ acre in.	4.27	12.81	Irrigation Equipment 60 HP Tractor	30 AI 30 AI	4.17 1.52	125.10 45.60	1# Captan/A @ .86/lb. ½# Benlate/A on 3 irrigations @ 9.55/lb. 2 qts. Guthion/A @ 4.25/qt on 3 irrigations	502.35	685.86
Broadcast Fertilizer	3	4.27	12.81	40 HP Tractor Fert. Spreader	3 3	2.21 .40	6.63 1.20	50# 46% Urea/A @ 2.00/ton	50.00	70.64
Labor Cabins for 73 man days of labor					73	.93				67.89
Variable Cost to Harvest First Fruiting Year		Labor-$1405.17			Machinery-$720.85			Materials-$1679.25		$3805.27
Variable Cost for Growing and First Fruiting Year		Labor-$4962.27			Machinery-$1883.06			Materials-$6720.11		$13,565.44

Table 1 (Continued) - Strawberries

Operation	Labor			Machinery				Materials		Total Cost Per 10 Acres
	Labor Hr. Per 10 Acres	Wage Rate	Cost	Equipment Used	Hours of Use	Cost Per Hour of Use	Cost	Item	Cost Per 10 Acres	
Second Fruiting Year										
Mowing	3.5	4.27	14.95	60 HP Tractor Rotary Mower	3.5 3.5	2.95 1.70	10.33 5.95			31.23
Fertilizer	3	4.27	12.81	40 HP Tractor Fert. Spreader	3 3	2.21 .40	6.61 1.20	500# 12-12-12 @ $82/ton	205.00	225.62
1st Rototillage	20	$4.27	$85.40	60 HP Tractor Rototiller	20 (Rent @ $8.63/A)	$2.95	$59.00 86.30			$230.70
2nd Rototillage	10	4.27	42.70	60 HP Tractor Rototiller	10 (Rented above)	2.75	27.50			70.20
1st Weed Spraying	8	4.27	34.16	40 HP Tractor Weed Sprayer	8 8	2.21 .38	17.68 3.04	Tenoran 8#/A sprayed @ $3.58/lb. Spray .4 area	$114.60	351.29
								12# Diphinamid/A sprayed @ 3.80/lb. Spray .4 area	181.81	
Summer Spray (twice)	10	4.27	42.70	60 HP Tractor Row Crop Sprayer	10 10	2.95 .55	29.50 5.50	½# Benlate/A @ 9.55/lb 1 qt. Guthion/A @ 4.25/qt. 1 # Captan/A @ .86/qt.	235.80	313.50
Hand Hoeing @ ⅛ acre/man day-3 times	480	3.54	1699.20							1699.20
Fall Irrigation One acre inch (4 times)	4 1/10 Hr. acre in.	4.27	17.08	Irrigation Equipment 60 HP Tractor	40 AI 40 AI	4.17 2.95	166.80 118.00			301.88
Cultivation (14 Hrs.ea.-twice)	28	4.27	119.56	40 HP Tractor Cultivator	28 28	2.21 .28	61.88 7.84			189.28
Spring, Second Fruiting Year										
Set Up of Irrigation Equipment	20	3.54	70.80	40 HP Tractor Trailer	10 10	2.21 .35	22.10 3.50			96.40
Irrigation for Frost Control (5 times) 7 Hrs/Night	35	4.27	149.45	Irrigation Equipment 60 HP Tractor	40 AI 40 AI	4.17 2.95	166.80 118.00			434.25
Fertilizer (Top Dressing)	3	4.27	12.81	40 HP Tractor Fert. Spreader	3 3	2.21 .40	6.63 1.20	200# 11-48-0 @ $169/ton	169.00	189.63
Hoeing (1 time)	160	3.54	566.40							566.40
Irrigation (3 times) 1 AI/application	3 1/10 Hr/ acre in.	4.27	12.81	Irrigation Equipment 60 HP Tractor	30 AI 30 AI	4.17 1.52	125.10 45.60	1# Benlate/A @ 9.55/lb. 2 qts. Guthion/A @ 4.25/qt. 3 Irrigations	541.50	725.01
Mulching - 3 men	16 32	4.27 3.54	68.32 113.28	40 HP Tractor Trailer Straw Spreader	16 16 (Rent @ 7.70/A)	2.21 .35	35.36 5.60 77.00	2 Tons Straw/A @ $30/ton	600.00	899.56
Setting Straw off Rows	80	3.54	283.20							283.20
Spray										
First Cover 200/Gal/Acre	7	$4.27	$29.89	40 HP Tractor Weed Sprayer	8 8	$2.21 .38	$17.68 3.04	6# Captan/A @ .86/lb.	$51.80	$102.41
Herbicide Spray	8	$4.27	$34.16	40 HP Tractor Weed Sprayer	8 8	$2.21 .38	$17.68 3.04	8# 50% WP Tenoran/A sprayed @ $ 3.58/lb.Spray .4 area	$114.60	$169.48
Herbicide Spray	8	4.27	34.16	40 HP Tractor Weed Sprayer	8 8	2.21 .38	17.68 3.04	12# Diphinamid/A @ 3.80/lb Spray .4 area	181.81	236.69
Second Cover	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	2# Thiodan/A @ 3.93/lb. ½# Benlate/A @ 9.55/lb. 1# Captan/A @ .86/lb.	78.70 47.75 8.60	176.83
Third Cover	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 9.55/lb. 1# Captan/A @ .86/lb.	47.75 8.60	98.13
Pre-Harvest Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 9.55/lb. 1# Thiodan/A @ 3.93/lb.	47.75 39.50	129.03
Pre-Harvest Spray	5	4.27	21.35	60 HP Tractor Row Crop Sprayer	5 5	2.95 .55	17.68 2.75	½# Benlate/A @ 3.93/lb.	47.75	89.53
Labor Cabins for 185 man days of Labor					185	.93	172.05			172.05
Variable Cost Second Fruiting Year	Labor- $3529.24			Machinery- $1529.95				Materials- $2722.32		$7781.51

Table 2--Variable cost per acre of growing strawberries, southwestern Michigan, 1979

	Labor	Machinery	Materials	Total	Your farm cost
Fall (soil building)					
Plow, disc, drag	$ 5.98	$ 4.81	$ .00	$ 10.79	
Seed rye	1.28	.78	6.00	8.06	
Fumigation	.00	15.00	131.10	146.10	
Cultimulch	1.28	1.10	.00	2.38	
Growing Year					
Plow down fertilizer	1.28	.78	33.80	35.86	
Plow, disc, drag	5.98	4.81	.00	10.79	
Plant	31.78	7.14	202.50	241.42	
Weed spray	3.42	1.94	12.00	17.36	
Wigglehoe and cultivate	57.11	27.91	50.72	135.74	
Hand hoe and pinch blossoms	219.40	.00	.00	219.40	
Spraying (4 times)	12.08	7.35	38.32	57.75	
Irrigation, set up and use	8.36	19.67	.00	28.03	
Cut runners	4.27	2.49	.00	6.66	
Herbicide Spray	3.41	2.07	29.64	35.13	
Labor cabin use	.00	20.37	.00	20.37	
Total--1st Growing Year	355.71	116.22	504.09	976.02	
First Fruiting Year					
Irrigation, set up and use	8.36	19.63	54.15	82.14	
Broadcast fertilizer (2x)	2.56	1.57	18.30	22.43	
Frost control	14.95	22.76	.00	37.71	
Mulching & straw placement	46.48	11.80	60.00	113.28	
Cover spray (3x)	7.26	6.16	25.91	39.33	
Pre-harvest sprays (2)	4.27	4.08	13.50	21.85	
Hoeing	56.64	.00	.00	56.64	
Labor cabin use	.00	6.79	.00	6.79	
Total--1st Fruiting Year	140.52	72.08	167.92	380.52	
Total--1st Growing and Fruiting Years	496.23	188.30	672.11	1356.54	
2nd Fruiting Year					
Mowing	1.49	1.63	.00	3.12	
Fertilizer	1.28	.78	20.50	22.56	
Rototillage (2x)	12.81	17.28	.00	30.09	
Weed spraying	3.41	2.07	29.64	35.13	
Summer spray (2x)	4.27	3.50	23.58	31.35	
Hand hoeing	169.62	.00	.00	169.92	
Fall irrigation (4x)	1.71	28.48	.00	30.19	
Cultivation (2x)	11.96	6.97	.00	18.93	
Spring, 2nd Fruiting Year					
Irrigation, set up and use	8.36	19.63	54.15	82.14	
Frost control	14.95	28.48	.00	43.43	
Fertilizer, top dress	1.28	.78	16.90	18.96	
Hoeing	56.64	.00	.00	56.64	
Mulching and Straw placement	46.48	11.80	60.00	118.28	
Herbicide spray (2x)	6.33	4.14	29.64	40.61	
Cover spray (3x)	7.26	6.16	24.32	37.74	
Pre-harvest spray (2x)	4.27	4.09	13.50	21.86	
Labor cabin use	.00	17.20	.00	17.20	
Total--2nd Fruiting Year	$352.92	$152.99	$272.23	$778.14	

Table 3 — Costs of harvesting 1 acre (400 crates) strawberries, southwestern Michigan, 1979.

	Harvest cost	Your farm cost
Labor		
Seasonal		
Picking (400 crates @ $2.52)	$1,008.00	
Packing (52.5 hrs. @ $3.54)	185.85	
Supervision (21 hours @ $4.27)	89.67	
Hauling (21 hrs. @ $4.27)	89.67	
Total	$1,373.19	
Equipment		
Labor cabins (68 days @ $.81)	55.08	
Two ton truck (100 mi. @ $.15)	15.00	
40 HP tractor (4.5 hr. @ $1.46)	6.57	
Trailer (4.5 hrs. @ $.16)	.72	
Crates, baskets (400 @ $1.50)	600.00	
Total	$ 677.37	
Total Annual Harvest	$2,095.03	

Table 4 — Overhead costs per acre, strawberries, southwestern Michigan, 1979.

	1st growing year	1st fruiting year	2nd fruiting year
Equipment	$129.25	$121.25	$229.89
Interest on land ($1,500 × 5%)	75.00	75.00	75.00
Taxes	20.00	20.00	20.00
	$224.25	$216.25	$324.89

Table 5 — Total costs per acre, strawberries, southwestern Michigan, 1979 (400 crates per acre).

	1st growing year	1st fruiting year	2nd fruiting year
Growing costs	$976.02	$380.53	$778.15
Harvest costs	.00	2,095.03	2,095.03
Overhead costs	224.25	216.25	324.89
Total costs	$1,200.27	$2,691.81	$3,198.07

Table 6 — Effect of varying yields on strawberry costs for the growing and first fruiting year, southwestern Michigan, 1979.

Harvest yield per acre	Variable growing cost	Variable harvest cost	Total variable cost	Your farm cost	Overhead cost	Total cost	Your farm cost
200	$6.78	$5.24	$12.02		$2.20	$14.22	
300	4.52	5.24	9.76		1.47	11.23	
400	3.39	5.24	8.63		1.10	9.73	
500	2.71	5.24	7.95		.88	8.83	
600	2.26	5.24	7.50		.73	8.23	

IP-IR-4M-6:79-WP