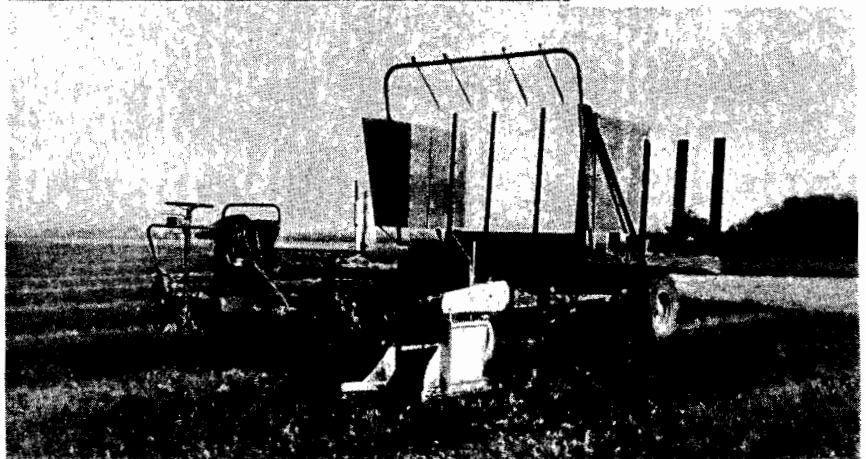
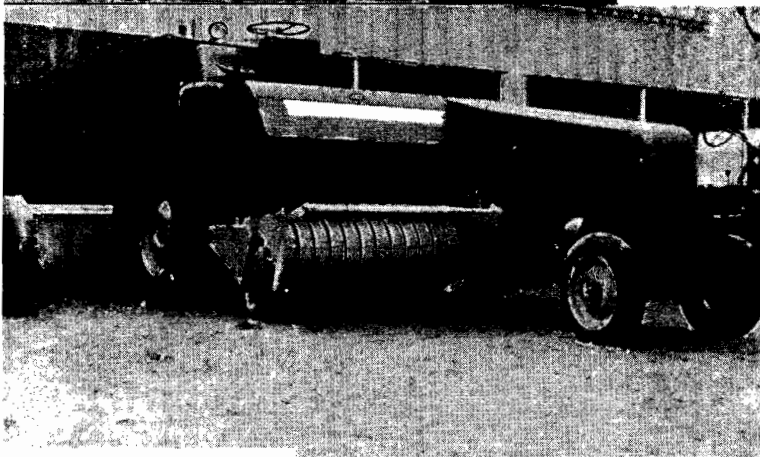
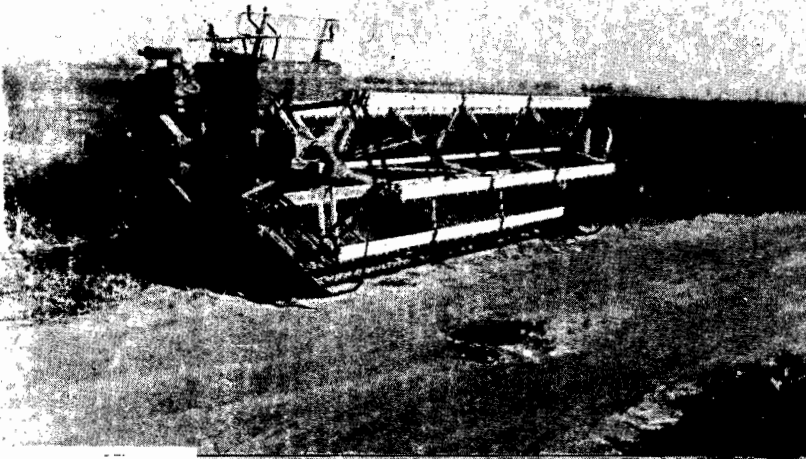


ALFALFA HARVESTING COSTS  
COMPARING DIFFERENT EQUIPMENT IN  
MONTEREY COUNTY



UNIVERSITY OF CALIFORNIA  
AGRICULTURAL EXTENSION SERVICE

*Monterey Co.*

FIGURING ALFALFA HARVESTING COST WITH DIFFERENT EQUIPMENT  
AND SIZE OF OPERATIONS

Hay harvesting methods are changing with new equipment, such as the self-propelled swather-conditioner, high capacity self-propelled balers, and the bale hauler and piler - both drawn and self-propelled. Now available are several combinations of equipment and methods. The usual combination of equipment, No. 1 in Table 3, involves cutting with a tractor and 7-foot mower, raking and turning windrows with a tractor and 10-foot side delivery rake, baling with an automatic baler pulled by a tractor and hauling out and piling bales with a truck and bale loader, usually with two men. A combination of the newer equipment involves swathing with a self-propelled baler, turning two windrows together with a tractor and side delivery rake, baling with a self-propelled baler, and hauling out with a self-propelled bale hauler and piler. This method combination No. 2, for which costs are shown in Table 3, involves one tractor, one rake, and three self-propelled machines. It harvests a yield of six cuttings or eight tons of hay with 4.8 hours of man labor per acre. Method 1 involves 8.9 hours of man labor per acre but has lower equipment and overhead costs. Total costs per acre for both combinations are about the same when 150 acres of alfalfa are served by the equipment. With larger acreages, however, lower equipment overhead results in lower costs for Method 2.

Selecting the most economical methods and equipment for any size of operation can improve economy and profit for the alfalfa grower. We have prepared this circular on hay equipment and operation costs to assist in decisions on alternative methods. Prices, operating costs, and performance rates shown are based on limited inquiry in the Salinas Valley. They are not averages of a large number of cases. They are sample costs within a range reported by the better commercial growers. These calculations and results are presented, mainly, to show how total costs may be calculated and to illustrate the principles involved rather than as actual costs. They are based on good commercial alfalfa production with six cuttings and a total yield of eight tons per acre. Other yields, or cuttings per acre or performance or operating costs per machine, would naturally result in different costs per operation and total harvest for the two method combinations for which costs are shown in Table 3.

In these calculations we have used \$1.50 per hour for man labor which would presumably cover the actual wage, the value of housing or other perquisites, compensation and social security insurance, and some additional time for servicing equipment when it is not working.

Table 1 shows approximate current original cost of haying equipment and the calculation of overhead costs of interest on investment and depreciation, plus an estimate of the cash costs per hour of use. Table 2 shows costs per hour, per acre, and per ton for each operation with overhead included as if equipment served 150 acres only. Performance rates are also shown. Table 3 shows built up total harvesting costs for a year, per acre, and per ton for two method combinations. With these tables as a guide, you can calculate your costs for any set of equipment using your prices, costs, and performance rates.

TABLE 1.

COSTS OF OWNING AND OPERATING HAY HARVESTING EQUIPMENT FOR  
SEVERAL ACREAGES OF ALFALFA WITH 6 CUTTINGS PER YEAR

	Original Cost	6% Interest $\frac{1}{2}$ Cost	Depreci- ation Year	Total Deprec. & Int.	Deprec. and Int. Per Acre of Alfalfa					Cash Costs Per Hr.
					100A.	150A.	200A.	250A.	300A.	
20 hp wheel tractor	\$3000	\$ 90	\$300	\$390	\$3.90	\$2.60	\$1.95	\$1.56	\$1.30	\$0.90
7' tractor mower	600	18	60	78	.78	.52	.39	.31	.26	.40
10' side delivery rake	800	24	80	104	1.04	.76	.52	.42	.35	.40
Baler, pull type	4000	120	400	520	5.20	3.46	2.60	2.08	1.74	1.50
Baler, self-propelled	6500	195	650	845	8.45	5.63	4.23	3.38	2.81	2.00
Swather - conditioner s.p.	5600	168	560	728	7.28	4.85	3.64	2.92	2.43	2.00
Bale hauler & piler s. p.	7900	237	790	1027	10.27	6.85	5.14	4.11	3.43	1.75
2-ton flat bed truck	3600	108	360	468	4.68	3.12	2.34	1.87	1.56	2.00
Bale loader for above truck	600	18	60	78	.78	.52	.39	.31	.26	.15

Interest on investment is figured at 6% on one-half of the original cost which is approximately the average value over its useful life. Depreciation is spread over 10 years of life with no salvage value assumed.

Cash costs shown in the last column above are the out-of-pocket current cash costs of operation covering fuel, oil, repairs, taxes, and insurance and license in case of the truck. These cash costs may vary considerably with different operators and new or used equipment. These are estimates within the range reported. Some of the equipment is too new yet to furnish an average lifetime repair cost per hour of use.

Depreciation and interest per acre are shown for a single machine across the entire scale of crop acres. At some point additional tractors, mowers, and rakes would be needed. For 200 acres - 2 tractors, 2 mowers, and a rake might be needed, and for 300 acres - 4 tractors, 2 mowers, and 2 rakes. Other machines could serve any of the acreages shown.

TABLE 2.

OPERATION COSTS PER HOUR AND PER ACRE AND PER TON  
WITH OVERHEAD COSTS ON THE BASIS OF 150 ACRES OF CROP OR 900 CUT ACRES  
AND WITH A YIELD OF 8 TONS PER ACRE

	Rate Per Hour	Mowing 7' Mower	Rake 10'	Swather With s.p. S.-Conditioner	Bale Pull Baler	Bale s.p. Baler	Haul s.p. Bale Hauler	Haul 2 Men Truck & Loader
Cash cost per hour								
Man labor	1.50	1.50	1.50	1.50	1.50	1.50	1.50	3.00
Tractor (or truck \$2.00 Hr.)	.90	.90	.90	-	.90	-	-	2.00
Machine - See Table 1	-	.40	.40	2.00	1.50	2.00	1.75	.15
Baling wire at \$1.00 a ton	-	-	-	-	6.00	10.00	-	-
<b>Total cash costs</b>		<b>2.80</b>	<b>2.80</b>	<b>3.50</b>	<b>9.90</b>	<b>13.50</b>	<b>3.25</b>	<b>5.15</b>
Depreciation & Interest (150A)								
Tractor or truck	.47	.47	.47	-	.47	-	-	2.08
Machine**	-	.26	.29	3.23	2.60	7.05	5.27	.35
<b>Total cost per hour</b>		<b>3.53</b>	<b>3.56</b>	<b>6.73</b>	<b>12.97</b>	<b>20.55</b>	<b>8.52</b>	<b>7.58</b>
Acres per hour, once over (average)		3.0	4.0	4.0	4.5	7.5	6.0	3.8
Hours per crop acre, year, six cuttings		2.0	2.4*	1.5	1.3	.8	1.0	1.6
Tons per hour, average for the year		4.0	3.3	5.3	6.0	10.0	8.0	5.0
Cash costs per acre, once over		\$0.93	\$0.70	.88	2.21	1.80	.54	1.38
Total cost per acre, once over		1.18	.89	1.68	2.88	2.74	1.42	2.02
Season total cash cost per acre		5.60	6.72*	5.25	13.17	10.80	3.25	8.25
Season total cost per A, 6 cuttings		7.06	8.50	10.10	17.25	16.44	8.52	12.13
Cash costs per ton		.70	.84	.66	1.65	1.35	.41	1.03
Total costs per ton		.88	1.06	1.26	2.16	2.06	1.07	1.52

Here are typical single operation costs on a per hour, per acre, per cutting, per acre for the season of 6 cuttings, and per ton. Total harvest costs will be composed of a combination of some of the above. The conventional method would be a combination of mowing, raking, and baling with a pull type baler and hauling to pile by two men, a truck, and a bale loader. The fastest would be swathing with a self-propelled swather-conditioner, baling with a high capacity self-propelled baler, and hauling in bales with a self-propelled bale hauler and piler.

\* Raking per acre is assumed to require additional turning of some cuttings during the season.

\*\* Interest and depreciation per hour for each machine are figured from the total in Table 1, divided by the hours of that machine's use, if it served 150 acres.

TABLE 3.

TOTAL HARVEST COSTS BY TWO COMBINATIONS OF METHOD AND SEVERAL ACREAGES  
WITH TRACTORS, TRUCK, AND HAYING EQUIPMENT USED ONLY FOR THE ACRES SHOWN

	(1) Mower, Rake, Pull Baler, Haul With Truck						(2) Swather, s.p. baler, Bale Hauler					
	Acres Alf.	100	150	200	250	300	Acres Alf.	150	200	250	300	
	Acres Cut	600	900	1200	1500	1800	Acres Cut	900	1200	1500	1800	
	Tons	800	1200	1600	2000	2400	Tons	1200	1600	2000	2400	
	Hours per acre						Hours per acre					
Cash cost per acre, year												
Mowing or swathing	2.00	5.60	5.60	5.60	5.60	5.60	1.5	5.25	5.25	5.25	5.25	
Raking	2.33	6.72	6.72	6.72	6.72	6.72	1.5	4.20	4.20	4.20	4.20	
Baling	1.33	5.19	5.19	5.19	5.19	5.19	.8	2.80	2.80	2.80	2.80	
Baling wire	-	8.00	8.00	8.00	8.00	8.00	-	8.00	8.00	8.00	8.00	
Hauling in	1.60	8.25	8.25	8.25	8.25	8.25	1.0	3.25	3.25	3.25	3.25	
Total cash costs per acre		33.76	33.76	33.76	33.76	33.76		23.50	23.50	23.50	23.50	
Depreciation & Int. per acre												
Tractor		a 3.90	a 2.60	b 3.90	b 3.12	c 3.90		2.60	1.95	1.56	1.30	
Mower		a .78	a .52	b .78	b .62	b .78						
Rake		a 1.04	a .76	a .52	b .82	b .68		.52	.39	.31	.26	
Swather								4.85	3.64	2.92	2.43	
Baler		5.20	3.46	2.60	2.08	1.74		5.63	4.23	3.38	2.81	
Truck & Loader or s.p. hauler		5.46	3.64	2.73	2.18	1.82		6.85	5.14	4.11	3.43	
Total deprec. & Int. per A.		16.38	10.98	10.53	8.82	8.92		20.45	15.35	12.28	10.23	
Total cost per acre		50.14	44.74	44.29	42.58	42.68		43.95	38.85	35.78	33.73	
Cash costs per ton		4.22	4.22	4.22	4.22	4.22		2.94	2.94	2.94	2.94	
Deprec. & Int. per ton		2.04	1.37	1.32	1.10	1.12		2.56	1.92	1.54	1.28	
Total cost per ton		6.26	5.59	5.54	5.32	5.34		5.50	4.86	4.48	4.22	

(a) one (b) two (c) three - are usually required for the acres of alfalfa shown. Other equipment than tractors, mowers, and rakes will serve any of the acreages.

Cash operating costs per acre are based on the costs per hour shown in Table 2. For either method combination, the cash costs per acre would be the same regardless of acreage served by the equipment. Depreciation and interest, however, are the same in total per year for each piece of equipment, so the more acreage of use the lower the overhead cost per acre. The convenient capacity of a mower is so limited, however, that with greater acreage an additional mower and tractor must be added. So with Method 1, overhead does not decline as much with increasing acreage as with Method 2 where each piece of equipment will serve 300 acres and more.