Estimating Hay Harvesting Costs

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Introduction

The substitution of financial capital for labor has been a longstanding trend in agriculture resulting in large amounts of capital being used annually to acquire and operate farm machinery. Consequently, substantial components of both capital investment and annual production costs are machinery related on present-day commercial farms. Since costs are the one factor that farmers have the most control, it's important that they carefully evaluate their machinery decisions. Machinery purchases should be based on sound economic principles.

While there are many hay harvesting alternatives, there will be only one that fits best within the resource constraints of a particular farm. Evaluating the economics of retaining used equipment, purchasing new harvesting equipment, or hiring a custom operator can be done with a pencil and paper or it can involve a more sophisticated analysis. The actual cost of harvesting hay would depend on having detailed machinery records over several years. Information based on actual records is superior for making good decisions, but farmers who are faced with machinery decisions often lack detailed machinery records. The following budgeting procedure will provide hay growers with a useful framework for estimating their machinery costs in the absence of detailed records. The analysis makes use of standard engineering equations developed by agricultural engineers.

Costs Defined

Machine performance is economical only when it adds value to the farm beyond its costs of operation. Machinery costs include the cost of ownership and the costs of operating the equipment. Ownership costs normally do not vary and are fixed as long as changes in the size of the farm enterprises are minor. These costs include depreciation, interest, taxes and insurance and license fees. Operating costs, also known as "variable costs" are directly related to machine use. These costs include repairs, labor, fuel, and lubrication. Labor may be a cash cost when hired labor is used, or it may be an opportunity cost of the owner/operators time.

Assumptions

The large rectangular baler in this example has a value of $93,000. This baler produces a 4 by 4 by 8 foot bale that weighs approximately one ton. It is pulled and powered by a 165 horsepower tractor that has a new purchase price of $113,000. The farm size is 800 acres and irrigated alfalfa hay is grown on 500 acres. The hay is cut, baled, and stacked three times each year. Total annual farm use is 400 hours on the tractor and 100 hours on the baler. The baler hours are based on three passes over the 500 acres of hay while the tractor hours are spread over all crops grown on the farm.

Annual Ownership Costs

Depreciation allocates the cost of capital asses over their useful lives. Regardless of which method of depreciation is used, they are only estimates. The actual depreciation will only be known when a machine is sold. Depreciation costs in this example are estimated using the straight-line method of depreciation. The value of the baler at the end of its useful life (salvage value) is subtracted from the purchase price. This estimated loss in value is allocated in equal amounts by dividing by the baler's expected useful or economic life. This is not the tax life as defined by the IRS. The baler and tractor are assumed to have economic lives of 10 and 12 years respectively. Annual depreciation cost is $6,696 for the baler and $6,780 for

Table 1. The remaining on-farm value (RFV), expressed as a percentage of new cost for tillage, various harvest machines, and other miscellaneous equipment.

Machinery life (years)	Mowers	Balers	Swathers and other Harvest equipment	Plows	Disks and other tillage equipment	Planters	Manure spreaders and other misc. equip.
1	47.47	56.40	49.00	47.20	61.00	64.80	69.22
2	43.72	50.29	43.86	44.34	54.09	59.71	61.78
3	40.95	45.84	40.12	42.21	49.07	55.94	56.36
4	38.69	42.25	37.09	40.45	45.02	52.85	51.98
5	36.75	39.21	34.52	38.93	41.61	50.21	48.27
6	35.03	36.55	32.27	37.59	38.63	47.88	45.04
7	33.49	34.20	30.28	36.37	36.00	45.78	42.16
8	32.09	32.07	28.47	35.25	33.63	43.88	39.57
9	30.80	30.14	26.83	34.22	31.47	42.12	37.21
10	29.61	28.37	25.32	33.26	29.50	40.49	35.04
11	28.49	26.73	23.93	32.36	27.69	38.98	33.05
12	27.45	25.21	22.64	31.51	26.00	37.55	31.19
13	26.46	23.80	21.43	30.70	24.44	36.21	29.46
14	25.53	22.48	20.30	29.94	22.98	34.95	27.84
15	24.65	21.24	19.23	29.21	21.62	33.75	26.33

Source: American Society of Agricultural Engineers, ASAE Standards, 2004

Table 2. The remaining on-farm value (RFV) of large tractors (>150hp), expressed as a percentage of new cost for various ages and levels of annual use.

Machinery life (years)	Annual use (hours)							
	100	200	400	600	800	1000	1200	1400
1	70.22	68.91	67.08	65.68	64.52	63.51	62.60	61.77
2	65.24	60.97	59.25	57.94	56.85	55.89	55.04	54.26
3	56.85	55.21	53.57	52.32	51.29	50.38	49.57	48.83
4	52.22	50.57	49.00	47.81	46.82	45.96	45.18	44.48
5	48.38	46.65	45.15	44.01	43.06	42.23	41.49	40.81
6	45.06	43.25	41.80	40.70	39.79	38.99	38.28	37.63
7	43.71	40.23	38.83	37.78	36.90	36.13	35.44	34.82
8	39.27	37.52	36.17	35.15	34.30	33.56	32.90	32.30
9	36.78	35.06	33.76	32.77	31.95	31.24	30.60	30.02
10	34.55	32.81	31.55	30.60	29.81	29.12	28.50	27.94
11	32.51	30.74	29.52	28.60	27.83	27.17	26.57	26.03
12	31.78	28.83	27.64	26.75	26.01	25.37	24.80	24.27
13	28.74	27.05	25.90	25.04	24.32	23.70	23.15	22.64
14	27.04	25.39	24.28	23.45	22.75	22.15	21.62	21.13
15	25.50	23.84	22.76	21.96	21.29	20.71	20.19	19.72

Source: ASAE standards, 2004

the tractor. Salvage value estimates for the baler and tractor were obtained from Tables 1 and 2 respectively and rounded to the nearest percent. Salvage value for both machine items were 28 percent of list price ($93,000 x 28% = $26,040) for the baler and ($113,000 x 28% = $31,640) for the tractor.

Annual depreciation = (purchase price-salvage value) ÷ useful life

Baler annual depreciation calculation: ($93,000-$26,040) ÷10 yrs = $6,696

Interest measures the cost of having capital tied up in machinery. This cost can be the interest on a machinery loan if capital is borrowed from a bank or the interest rate on forgone investments if the capital is owner supplied. The rate that is used to value capital should reflect the source of the capital. If capital is borrowed from a variety of sources to finance machinery, then the interest rate should reflect a blend of those sources. Interest based solely on a loan may underestimate the true cost of capital if only a portion of the machines value is financed.

Two methods can be used to determine interest cost. The first method is to estimate total interest paid over the term of a machinery loan, and then prorate this amount over the economic life of the machine. The second method is to calculate annual interest based on the machine's average value over its useful life. This method will be used in this example. The average value of the machine (value of the machine at mid-life) is the sum of the beginning value (purchase price) and the ending value (salvage value) of the machine divided by 2. Annual interest is computed by multiplying the machine's average value by the appropriate interest rate. Average values for the tractor and baler are $72,320 and $59,520, respectively. This results in an annual interest charge for the tractor and baler of $5,786 and $4,762 respectively using an interest rate of 8 percent.

Average value = (purchase price + salvage value) ÷ 2

Baler average value calculation: ($93000 + $26,040) ÷ 2 = $59,520

Baler annual interest cost calculation: $59,520 x 8% = $4,762

Annual insurance, housing, and taxes are estimated as a percentage of average value similar to the previous example on interest. Insurance is an annual cost on equipment as protection from fire, theft, weather damage, and liability. The proper charge depends on the level of coverage and the type of machine. In general, insurance ranges from .6 to 2.6 percent of the average value for various types of farm equipment (Table 3). The percent is higher for pickups and trucks given that insurance premium's are higher to cover property damage, collision, and liability. Annual insurance cost for the tractor and baler are .9 and .6 percent of average investment, or $651 and $357, respectively.

Baler insurance calculation: $59,520 x .6% = $357

Many types of machinery in Idaho are commonly housed to provide protection against the weather. Such protection yields benefits in the form of longer machine life, reduced repairs, better appearance, higher salvage value, and greater convenience in working on machinery. The costs associated with the ownership and use of a machine shed should, of course, be charged against the housed machinery. Housing costs, as a percentage of average machine investment in Table 3, were based on a 50-by-150-by-18 foot steel, open front structure. Annual housing costs

for the tractor and baler are .3 and 1.9 percent of average investment, or $217 and $1,131, respectively. Property tax is another ownership cost in many states. But since Idaho no longer charges property tax on farm equipment, no tax cost is included in this example.

Table 3. Percentage of average machine investment charged for housing, and insurance.

Machinery	Housing %	Insurance %	Total %
Wheel tractor	0.3	0.9	1.2
Crawler tractor	0.2	0.9	1.1
Combine	0.5	2.1	2.6
Potato harvester	1.4	0.6	2.0
Bean cutter	1.1	0.6	1.7
Self-propelled forage harvester	1.3	2.1	3.4
Pull-type forage harvester	1.3	2.6	3.9
Self-propelled windrower	1.1	2.1	3.2
Bean windrower	1.1	0.6	1.7
Hay rake	-----	0.6	0.6
Hay baler	1.9	0.6	2.5
Self-propelled automatic bale wagon	1.0	2.1	
Pull-type automatic bale wagon	1.0	0.6	1.6
Self-unloading forage wagon	----	0.6	0.6
Drills, planters	2.4	0.6	3.0
Tillage equipment	----	0.6	0.6
Sprayer	----	0.6	0.6

Source: Smathers, Robert L. "The Costs of Owning and Operating Farm Machinery in the Pacific Northwest 2005" PNW 346. University of Idaho – September, 2006.

Total ownership cost is computed by summing the three cost items listed above for depreciation, interest, insurance and housing. Total annual costs of owning the tractor and baler are $13,434 and $12,946 respectively.

Equipment item	Depreciation	Interest	Insurance and housing	Total
Tractor	$6,780	$5,786	$868	$13,434
Baler	$6,696	$4,762	$1,488	$12,946

Operating Costs per Hour

The costs of operating machinery increase with use and include fuel, lube, labor and repairs. Some repair costs can be classified as ownership costs as they are required periodically, even if the machine is not used. However, all repairs in this example are classified as operating costs for simplicity and because most repair costs result from use.

Fuel use by the tractor pulling the baler is 8.0 gallons per hour for a cost of $16.64 for fuel. This cost assumes the price of diesel is $2.08 per gallon. Information on fuel consumption can be easily estimated for these types of operations.

Oil and lubrication costs are estimated at 15 percent of fuel costs and amount to $2.50 per hour for the baling operation. This cost will vary depending on cost of lubricants and how often lubrication takes place.

Annual repair and maintenance costs are variable and dependent upon how well machinery is maintained, amount of use, type and age of machine, and type of enterprise. Because operating conditions vary from farm-to-farm, any method of estimating machinery costs becomes problematic. Mathematical equations have been developed by the American Society of Agricultural Engineers (ASAE Standards) to estimate average annual machinery repair coefficients for various types of farm machinery (see Table 4). These coefficients will provide reasonable repair cost estimates for farm machinery, but given the variability in farms, caution is recommended. Nevertheless, the best source of information is detailed farm records of actual machine repair costs under existing levels of use and farm conditions.

Annual repair costs for the tractor and hay baler in the example are based on the information in Table 4. Annual repair and maintenance costs are estimated at 3.3 percent of new list price for the tractor and 2.5 percent for the baler. These numbers were computed by multiplying the percentages for these machines in the last column of Table 4 by the number of 100-hour increments they are used each year (400÷100 = 4 for the tractor and 100÷100 = 1 for the baler). The estimated annual repair costs are $3,729 (3.3% × $113,000) for the tractor and $2,325 (2.5% × $93,000) for the one ton baler. These costs are converted to a cost per hour of use simply by dividing by the number of hours the machines are used each year. Since annual use may not be recorded for the baler, annual acres harvested will have to be divided by the average number of acres covered per hour to obtain annual use. The method for computing acres per hour or field capacity will be covered later. For the tractor, repair cost per hour is $3,729 ÷ 400 hours = $9.32. Annual repair cost per hour for the baler is $2,325 ÷ 100 hours = $23.25

Labor costs to operate machinery will be underestimated if only the time spent operating the machinery in the field is considered. Machinery operating labor should also include the time spent servicing machinery and the time spent moving it between fields and farms. These activities add as much as 10 to 20 percent to machinery field time and this should be added to the machine hours to obtain a more accurate estimate of total labor. The skill factor should also be reflected in the labor rate, as some operations require a much higher level of skill to accomplish. The base labor rate in this example is $13.00 per hour for the tractor operator and this includes a base wage plus a percentage for Social Security, Medicare, unemployment insurance, and other labor overhead expenses. An additional 10 percent was added for non-field time expenses resulting in a total labor cost of $14.30 per hour.

Total operating costs per hour for the baling operation are determined by adding the operating cost items discussed thus far for fuel, lubrication, repairs, and labor for both the tractor and baler. This amounts to an operating cost per hour of $66.01.

Table 4. Field efficiency, field speed, useful life, and repair and maintenance cost parameters. *

	Field efficiency		Field speed		Estimated life	Total life repairs	Avg. repair ** cost per 100 hrs use
	Range (%)	Typical (%)	Range mph	Typical mph	Hours	% of list price	% of list price
2-wheel drive & stationary					12,000	100	0.83
4 wheel drive & crawler					16,000	80	0.50
Moldboard plow	70-90	85	3.0-6.0	4.5	2,000	100	5.00
Heavy-duty disk	70-90	85	3.5-6.0	4.5	2,000	60	3.00
Tandem disk harrow	70-90	80	4.0-7.0	6.0	2,000	60	3.00
(Coulter) chisel plow	70-90	85	4.0-6.5	5.0	2,000	75	3.75
Field cultivator	70-90	85	5.0-8.0	7.0	2,000	70	3.50
Spring tooth harrow	70-90	85	5.0-8.0	7.0	2,000	70	3.50
Roller-packer	70-90	85	4.5-7.5	6.0	2,000	40	2.00
Mulcher-packer	70-90	80	4.0-7.0	5.0	2,000	40	2.00
Rotary hoe	70-85	80	8.0-14.0	12.0	2,000	60	3.00
Row crop cultivator	70-90	80	3.0-7.0	5.0	2,000	80	4.00
Rotary tiller	70-90	85	1.0-4.5	3.0	1,500	80	5.33
Row crop planter	50-75	65	4.0-7.0	5.5	1,500	75	5.00
Grain drill	55-80	70	4.0-7.0	5.0	1,500	75	5.00
Corn picker sheller	60-75	65	2.0-4.0	2.5	2,000	70	3.50
Combine	60-75	65	2.0-5.0	3.0	2,000	60	3.00
Combine (self-propelled)	65-80	70	2.0-5.0	3.0	3,000	40	1.33
Mower	75-85	80	3.0-6.0	5.0	2,000	150	7.50
Mower (rotary)	75-90	80	5.0-12.0	7.0	2,000	175	8.75
Mower-conditioner	75-85	80	3.0-6.0	5.0	2,500	80	3.20
Mower-conditioner (rotary)	75-90	80	5.0-12.0	7.0	2,500	100	4.00
Windrower (self-propelled)	70-85	80	3.0-8.0	5.0	3,000	55	1.83
Side delivery rake	70-90	80	4.0-8.0	6.0	2,500	60	2.40
Rectangular baler	60-85	75	2.5-6.0	4.0	2,000	80	4.00
Large rectangular baler	70-90	80	4.0-8.0	5.0	3,000	75	2.50
Large round baler	55-75	65	3.0-8.0	5.0	1,500	90	6.00
Forage harvester	60-85	70	1.5-5.0	3.0	2,500	65	2.60
Forage harvester (SP)	60-85	70	1.5-6.0	3.5	4,000	50	1.25
Sugar beet harvester	50-70	60	4.0-6.0	5.0	1,500	100	6.67
Potato harvester	55-70	60	1.5-4.0	2.5	2,500	70	2.80
Cotton picker (SP)	60-75	70	2.0-4.0	3.0	3,000	80	2.67
Fertilizer spreader	60-80	70	5.0-10.0	7.0	1,200	80	6.67
Boom-type sprayer	50-80	65	3.0-7.0	6.5	1,500	70	4.67
Air-carrier sprayer	55-70	60	2.0-5.0	3.0	2,000	60	3.00
Bean puller-windrower	70-90	80	4.0-7.0	5.0	2,000	60	3.00
Beet topper/stock chopper	70-90	80	4.0-7.0	5.0	1,200	35	2.92
Forage blower					1,500	45	3.00
Forage wagon					2,000	50	2.50
Wagon					3,000	80	2.67

* Source: ASAE standards, 2004

** Average repair cost per 100 hours of use (Column 7) was computed by dividing estimated machine life in column 5 by 100 to get the number of 100 hour increments, then dividing this into total estimated life repairs in column 6.

Total Cost Estimation

Total cost is defined as the cost of owning and operating the tractor and baling equipment over the specified acreage. In a previous section, the costs of owning the tractor and baler were estimated on an annual basis whereas the operating costs were estimated on a cost per hour basis. To get these costs to a common denominator requires that either the ownership costs be converted to a cost per hour or the operating costs are converted to an annual basis. Either

method is acceptable. In this example, the cost per hour is calculated simply by dividing total annual ownership costs by the number of hours the tractor and baler are operated each year. This gives an ownership cost per hour of $33.59 for the tractor ($13,434 ÷ 400 hours) and $129.46 for the baler ($12,946 ÷ 100 hours). Total ownership cost per hour for the baling operation is $163.05 ($33.59 + $129.46).

Total cost per hour is the sum of ownership and operating costs and equals $229.06 ($66.01 + $163.05). If the number of acres harvested per hour by the tractor and baler are known, then this rate can be divided into the estimated cost per hour to determine total cost per acre. If it is not known how many acres the baling operation covers in one hour (field capacity), then this can be estimated using the equation below.

Calculating field capacity

The formula for estimating capacity in acres per hour is:

Field capacity = [swath width (feet) x speed (mph) x field efficiency] ÷ 825

A 1-ton baler with a 30 foot swath (two 15 foot swaths of hay raked together) operated at 5 mph, with a field efficiency of 80 percent would have an effective field capacity of

[30 feet x 5.00 mph x 80%] ÷ 825 = 14.55 acres per hour (rounded to 15)

Field efficiency in the equation (found in Table 4) accounts for the fact that machines are not always used at 100 percent of their maximum capacity because of work overlap and time spent turning, adjusting, lubricating, and handling materials. Efficiencies on planting equipment are typically very low (60%) due to the handling of materials. On the other hand, field efficiencies on some tillage equipment can be as high as 90 percent, especially where there is no handling of materials and where fields are large.

The estimation of acres covered per hour for a farm operation as shown above can be used to determine the annual use (hours) on machinery simply by dividing the number of acres a machine covers in a year by the field capacity or acres per hour. In this example, there are three alfalfa hay harvests per year on 500 acres for a total of 1500 acres covered by the baler. This amounts to 100 hours of use for the baler (1500 acres ÷ 15 acres per hour). The tractor is spread over several crops and multiple operations on the farm, so its hourly use in each crop enterprise needs to be summed to determine total annual tractor use.

In this example, the baling operation covers 15 acres per hour, so total cost per acre equals $229.06 per hour ÷15 acres per hour = $15.27. This figure is easily converted to a cost per ton by dividing by the average number of tons baled per acre. In the example, it is assumed that 1.5 tons per acre are harvested with each baling operation, so total cost per ton equals $10.18 ($15.27 ÷ 1.5 tons). This can be compared with the cost per ton of other harvesting options. The option costing the least per acre should determine the most that a farmer is willing to pay, unless timeliness or other intangible factors dictate otherwise. In a survey conducted in 2005 (Patterson and Smathers), Southern Idaho custom operators reportedly charged $10 to $16 per ton to bale

hay with one ton balers. The average charge for the three Southern Idaho regions was $13.00 per ton.

Sensitivity Analysis

A sensitivity analysis provides insight regarding the effects of various factors on total cost. The most influential factors are 1) changes in ownership and operating costs and 2) changes in acreage harvested. In this example, acreage was allowed to vary as shown in Table 5 below. Costs per acre are based on annual ownership costs of $16,300 for the tractor and baler combined. This includes total ownership cost on the baler, and partial ownership cost on the tractor since part of the tractor's cost is charged to other operations on the farm as well. The base operating cost for this analysis is $66.01 per hour at 1,500 acres harvested, but increases as acreage increases due to higher repair costs.

Annual acreage harvested in Table 5 is varied from 500 acres per year to 4,000 acres per year. Note that total costs increase as acreage increases, but the cost per acre (or ton) declines. This is because annual ownership costs are being spread over more units of production. Total baling cost per ton varies from $24.67 at 500 acres to $5.65 at 4,000 acres harvested.

Table 5. Total baling costs at alternative annual acreage.

Annual Acreage Harvested	Estimated Tons Harvested	Annual Ownership Costs	Annual Operating Costs	Total Costs	Total Baling Cost Per Acre	Total Baling Cost Per Ton
500	750	16,300	2,202	18,502	$37.00	$24.67
1,000	1,500	16,300	4,405	20,705	$20.70	$13.80
1,500	2,250	16,300	6,607	22,907	$15.27	$10.18
2,000	3,000	16,300	8,809	25,109	$12.55	$8.37
2,500	3,750	16,300	11,012	27,312	$10.92	$7.28
3,000	4,500	16,300	13,214	29,514	$9.84	$6.56
3,500	5,250	16,300	15,516	31,716	$9.06	$6.04
4,000	6,000	16,300	17,618	33,918	$8.48	$5.65

Swathing, Raking, and Stacking Costs

Costs were also estimated for swathing, raking, and stacking as shown in Table 6. These cost estimates were generated using the same procedures as demonstrated in the baling example. The cost per ton for swathing, raking, and stacking came in at $8.36, $3.98, and $7.64 per ton respectively (see Table 6). The stacking cost was based on .15 hours per acre for a 165 horsepower tractor and operator, but this will vary depending on field size and placement of the hay stack. The hourly cost for the tractor plus operator is $62.05 for the tractor and $14.30 for the operator or $76.34. This was multiplied by .15 hours per acre then divided by the number of tons harvested per acre to obtain the stacking cost per ton. Summing the above costs and the baling cost of $10.18, results in a total estimated cost of $30.16 per ton to swath, rake, bale, and stack hay with owned equipment. The average custom rate charge reported by Southern Idaho custom operators in 2005 for swathing, raking, baling, and stacking was $30.25 per ton (Smathers and Patterson).

Table 6. Input and cost assumptions for swathing, raking, and stacking hay (three cuttings on 500 acres).

Cost Items	Swather	Rake*	Tractor**
Annual Ownership Costs			
Purchase price of equipment	$74,000	$15,900	$113,000
Estimated life of equipment (years)	10	10	12
Salvage value (Tables 1&2, 28% tract, 25% swath and rake)	$18,500	$3,975	$31,640
Interest cost			
Annual interest rate	8%	8%	8%
Average annual investment	$46,250	$9,938	$72,320
Annual interest cost	$3,700	$795	$5,786
Annual depreciation cost	$5,550	$1,193	$6,780
Housing and insurance cost (see Table 3)	$1,480	$60	$868
Operating Costs			
Fuel cost			
Fuel consumption per hour	6.0		8.0
Fuel price per gallon	$2.08		$2.08
Fuel cost per hour	$12.48		$16.64
Annual fuel cost	$2,434		$6,656
Oil and lubrication costs			
Percent of fuel cost	15%		15%
Oil and lubrication cost per hour	$1.87		$2.50
Annual oil and lubrication cost	$365		$1,000
Maintenance and repair costs			
Annual machine hours (500 acres hay)	195	85	400
Percent of purchase price (see Table 4)	3.57%	2.04%	3.30%
Annual maintenance and repair cost	$2,642	$324	$3,729
Labor cost			
Base labor cost per hour	$13.00	$13.00	
Labor multiplier	1.1	1.1	
Adjusted labor cost per hour	$14.30	$14.30	
Annual labor cost	2,789	$1,216	
Total Costs			
Annual total costs and costs per unit			
Total annual costs	$18,959	$3,588	$24,819
Total annual costs per hour	$97.23	$42.21	$62.05
Total annual costs per acre	$12.53	$2.42	-------
Total annual costs per ton of hay harvested	$8.36	$1.61	-------
Other Inputs			
Field information			
Width of swath	16 feet	30 feet	-------
Average field speed (see Table 4)	5 mph	6 mph	-------
Efficiency of coverage (see Table 4)	80%	80%	-------
Acres covered per hour	7.76	17.45	-------
Tons of hay harvested per acre	1.5	1.5	-------

* The raking cost increases to $3.98 per ton after adding in the tractor, $1.61 per ton for the rake plus $2.37 per ton for the tractor.

** The tractor cost of $62.05 per hour does not include labor. Labor is usually figured in with the implement unless the tractor is being used without an implement as in the stacking operation.

Summary and Conclusions

The costs of owning and operating a tractor and baler in relation to other harvesting options should be evaluated carefully by hay growers. The availability of alternatives makes it imperative that hay growers determine the least cost harvesting method. Other important factors are labor, capital availability and timeliness.

Budgeting is a valuable tool that can be used to look at the costs of owning and operating farm machinery. Good records from previous years also bring a wealth of information to the budgeting process, but are not essential. The budget analysis presented in this paper can be accomplished in the absence of detailed farm records and still provide reasonable information for making a management decision with regard to purchasing farm equipment. Accuracy will be improved when farm records are available.

Assumptions used to estimate machinery costs should be reasonable and accurate. Machinery ownership period or useful life should reflect the economic life of the machine in question as this greatly impacts depreciation estimates. Those who are careful to make reasonable assumptions are more likely to think through the budgeting process and make informed decisions. They are also more likely to be in business next year.

References

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