

Analyzing the Ownership versus Custom Harvesting Decision

Gary Frank and Tom Kriegl¹

Introduction

The number of acres of forages (hay, haylage, and corn silage) being custom harvested is increasing. This has led to inquiries concerning the amount that farmers can afford to pay and the amount that custom operators should charge to cover all their costs.

In the past the authors have worked with custom operators throughout Wisconsin to help determine their costs. Those costs were calculated by obtaining from them the cost of the various implements and power units, the time required to traverse an acre with each operation, and many other aspects of forage harvesting operations. These pieces of information were entered into the Agricultural Budget Calculation Software (ABCS) and/or an Excel program especially designed to calculate forage-harvesting costs.

The ABCS software program provides the most detail about forage harvesting costs but it also requires a large number of inputs. The Excel program is quite straightforward and provides a nearly identical “bottom line”, but with less detail. The basis for this paper is an Excel program called “OwnvsCus.xls” and may be downloaded from the Center for Dairy Profitability’s Internet site at: www.wisc.edu/dairy-profit under “Decision Making Tools”, click on “OwnvsCus.xls”. You must have Excel 5.0 or better to run this program. ABCS is a stand-alone program that can be purchased from the Center for Dairy Profitability.

Tractors, Trucks, and Other Power Units

Most tractors and trucks are used by more components of the farm business than just forage harvesting. The calculation of their ownership costs is difficult because it must be prorated based on the percentage of time it is used in each component of the farm business. This becomes doubly difficult if you wish to look at a range of use and/or take into account the change in the ending value of a tractor or truck when it is used more intensively.

These problems led to the use of a per-hour “rental” value to replace the ownership cost for tractor and trucks. It is realized that most farm managers will not be renting the tractors and trucks they are using in their forage harvesting from others. They will, in effect, be renting from themselves. It was felt however that this was the most efficient way of handling tractor and truck ownership costs.

The ownership costs of the “dedicated” power units, the motors on self-propelled equipment, is calculated using the Capital Recovery Charge (CRC) method. That method uses initial value, salvage value, years of useful life, and interest to determine ownership costs.

¹ Center for Dairy Profitability, College of Agricultural and Life Sciences, University of Wisconsin-Extension

The ownership costs of all the other equipment is also calculated using the CRC method.

Information Required

The Excel program has an input form that can be printed and used by the farm manager to gather the necessary information to evaluate the ownership versus custom harvesting decision. That form is shown in Figure 1. Both a person investigating starting a custom harvesting business and a farm manager analyzing the ownership versus custom harvesting decision can use this form and program.

FIGURE 1

Labor and Management				Haylage		Corn Silage	
	Salary	Number					
Managers	<input type="text"/>	<input type="text"/>		Number of	Chopping	<input type="text"/>	<input type="text"/>
Office Help	<input type="text"/>	<input type="text"/>		Additional	Cutting	<input type="text"/>	<input type="text"/>
				Employees	Hauling	<input type="text"/>	<input type="text"/>
				Needed for:	Merging	<input type="text"/>	<input type="text"/>
Wage \$/H for Additional Employees	<input type="text"/>				Blowing/Packing	<input type="text"/>	<input type="text"/>
					Total	<input type="text"/>	<input type="text"/>
				Haylage		Corn Silage	
Investment Costs				Rental Info:			
	Cost per Unit	Units	SV %	At End of			
				__ Years	Number of	Chopping	<input type="text"/>
Chopper Base	<input type="text"/>	<input type="text"/>	<input type="text"/>		Rented	Cutting	<input type="text"/>
Hay Head	<input type="text"/>	<input type="text"/>	<input type="text"/>		Tractors	Hauling	<input type="text"/>
Corn Head	<input type="text"/>	<input type="text"/>	<input type="text"/>		Needed for:	Merging	<input type="text"/>
Haybine	<input type="text"/>	<input type="text"/>	<input type="text"/>			Blowing/Packing	<input type="text"/>
Merger	<input type="text"/>	<input type="text"/>	<input type="text"/>			Total	<input type="text"/>
Blower/Blade	<input type="text"/>	<input type="text"/>	<input type="text"/>		Tractor Rental Rate \$/H	<input type="text"/>	<input type="text"/>
Hauling*	<input type="text"/>	<input type="text"/>	<input type="text"/>		Trucks Rented	<input type="text"/>	<input type="text"/>
					Truck Rental Rate \$/H	<input type="text"/>	<input type="text"/>
* Investment in Trucks or Wagons				SV = Salvage Value			
Harvested Acres & Rates				Repair Costs, Etc.			
		Haylage	Corn	<input type="text"/>	Per Acre in Corn Silage		
			Silage	<input type="text"/>	Per Acre in Haylage		
Acres	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	OR		
Harvest. Rate Acres/H	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Percent of Machinery Investment		
				<input type="text"/>	Insurance & Misc Costs (%)		
Loan Terms*				Fuel Costs			
Loan Length	<input type="text"/>	Years	<input type="text"/>	<input type="text"/>	Per Acre in Corn Silage		
Interest Rate	<input type="text"/>	(%)	<input type="text"/>	<input type="text"/>	Per Acre in Haylage		
Down Payment:	<input type="text"/>	or equity in harvesting equip					
* Required for the cash flow analysis.							

In the “Labor and Management” boxes be careful not to double count. If the “manager” is also the person who does the “cutting” don’t enter both. Decimal numbers such as 1.5 or 0.3333 can also be entered.

In the “Investment Costs” box enter the cost of each item, the number of units of each item, and the salvage value percentage (SV %) after a certain number of years (At End of __ Years). Be careful not to enter a “tractor rented” in the “Rental Info” box if you have entered the cost of a

Example Results

The results in Figure 3 show that in the long run it would be more profitable to custom hire the forage harvesting done on the example farm. The economic cost of ownership and operation is \$53,454, given the information above. The custom harvesting charges are \$52,400, using \$43 per acre for haylage and \$90 per acre for corn silage.

FIGURE 3

Ownership & Operating Costs		
Item	Profit	Cash Flow
Management	\$0	\$0
Labor	\$10,234	\$10,234
Fuel	\$3,400	\$3,400
Repairs	\$3,675	\$3,675
Ins & Misc	\$1,470	\$1,470
CRC Interest	\$4,749	Loan
Depreciation	\$5,250	\$5,886 Payment
T & T Rental	\$24,677	\$24,677
Total	\$53,454	\$49,341
Custom Harvesting Charges		\$52,400
Return above Costs (Profits from ownership)	(\$1,054)	<-----\$\$\$
Short Term Cash Advantage		\$3,059

The cash flow shows somewhat different results. The cash flow is calculated by removing the economic interest and depreciation costs and replacing them with a loan payment. The amount of the loan is determined by subtracting the down payment (or equity in the harvesting equipment) from the value of the harvesting equipment. The loan payment is calculated using this value and the loan interest rate and length. They are in the input section.

The short-term cash flow advantage to ownership is \$3,059. This increases to \$13,293 if labor costs are not considered a cash cost. The difference between the economic costs and the short-term cash cost may explain why many farm managers continue to do their own forage harvesting.

Note: If the program returns an answer of "#VALUE!" instead of a number it means you have used the "space bar" to enter a zero value. To correct, enter the number zero (0).

FIGURE 4

Economic Profits from Ownership at Various Acres of Haylage and Corn Silage					
Acres of Haylage (sum of all crops)					
	700	750	800	850	900
150	(\$2,976)	(\$2,626)	(\$2,276)	(\$1,926)	(\$1,576)
175	(\$2,365)	(\$2,015)	(\$1,665)	(\$1,315)	(\$965)
200	(\$1,754)	(\$1,404)	(\$1,054)	(\$704)	(\$354)
225	(\$1,143)	(\$793)	(\$443)	(\$93)	\$257
250	(\$532)	(\$182)	\$168	\$518	\$868

Values inside the ()'s are negative.

Point estimates of costs are very valuable. However those point estimates are sensitive to a number of factors. Sensitivity analysis is necessary to gain a better understanding of the

data used to calculate the information shown in Figure 3. Figure 4 shows how sensitive the economic profits from ownership are to the number of acres of haylage and corn silage

harvested. If only 700 acres of haylage and 150 of corn silage are harvested, the economic profit is almost \$2,000 less than initially calculated. It falls to -\$2,976 versus the original -\$1,054.

FIGURE 5

		Acres of Haylage (sum of all crops)				
		700	750	800	850	900
Acres of	150	\$1,137	\$1,487	\$1,837	\$2,187	\$2,537
	175	\$1,748	\$2,098	\$2,448	\$2,798	\$3,148
Corn	200	\$2,359	\$2,709	\$3,059	\$3,409	\$3,759
Silage	225	\$2,970	\$3,320	\$3,670	\$4,020	\$4,370
	250	\$3,581	\$3,931	\$4,281	\$4,631	\$4,981

Values inside the ()'s are negative.

Figure 5 shows the same sensitivity information for the short-term cash flow result.

FIGURE 6

		Acres of Haylage (sum of all crops)				
		400	600	800	1000	1200
Acres of	100	\$8,048	\$9,448	\$10,849	\$12,249	\$13,649
	150	\$9,270	\$10,670	\$12,071	\$13,471	\$14,871
Corn	200	\$10,492	\$11,892	\$13,293	\$14,693	\$16,093
Silage	250	\$11,714	\$13,114	\$14,515	\$15,915	\$17,315
	300	\$12,936	\$14,336	\$15,737	\$17,137	\$18,537

Values inside the ()'s are negative.

Figure 6 shows results of the cash flow sensitivity analysis when labor cost is not considered a cash cost. Also, the range in acres harvested was expanded. It still shows a short-term

cash flow advantage (\$8,048) at 400 acres of haylage and 100 acres of corn silage. However, the economic profit has decreased to a -\$6,299 (this figure is not shown).

Sensitivity analysis can also be performed using graphs. See Figure 7.

Summary

The actual costs of ownership will vary from those presented here due to the prices farm managers have paid for the various pieces of equipment. The total forage harvesting costs will also vary based on operator efficiency and other factors.

These calculations are for demonstration only. The actual costs you have are very site-specific and the charge for custom harvesting will depend on the supply and demand for custom operators in your area. To calculate your costs down load from the Center for Dairy Profitability's Internet site at: www.wisc.edu/dairy-profit under "Decision Making Tools" and the file "OwnvsCus.xls".

The amount you can "afford to pay" depends on both your estimated costs and the opportunity cost of your labor and capital. If you are a great cow person, the opportunity cost of your time could be much more than the \$11 per hour used in these calculations. Therefore, the amount you could "afford to pay" for custom harvesting, so you can concentrate on your cows, could far exceed local custom rates.

There are other difficult issues in the ownership versus custom hire debate. The first of these is “dependability.” The dependability of your equipment versus the custom operators; who’s is more likely to break down and who can get theirs fixed the fastest. Also, of course, will the come when they say they will – Are they dependable?

Another issue is quality. You will get more consistent quality feed with faster harvesting. However the question farm managers want answered is; do I get better average quality feed? A custom harvester is likely to harvest faster, but can not start to harvest at the ideal time for every customer. Although, starting harvest later but finishing faster may result in better average quality feed.

FIGURE 7

