

MACHINERY COST ESTIMATES: HARVESTING

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This publication show estimated costs for grain harvesting operations. Costs are estimated for combines, grain carts, and grain hauling. These estimates are useful for determining custom rates and for analyzing machinery costs on farms. Estimates include charges for overhead (depreciation, interest, insurance, housing and repairs), fuel and labor. Not included are allowances for profit. Charging custom rates at estimated costs should cover costs, but will not generate profits. Adding 5 to 15 percent to estimated costs is appropriate when determining custom rates. Table 1 shows costs of combining corn and soybeans, operating a grain cart, and hauling grain.

Cost Estimates

Formulas published by the American Society of Agricultural Engineers are used in calculating costs for combines and grain carts. All combine costs are based on buying a new combine and holding the machinery for 7 years. Table 2 lists other variables used in calculating costs.

Combine costs in Table 1 can be divided into four categories:

Combine overhead includes depreciation, interest, insurance, housing, and repair charges on the combine. Overhead costs are higher for corn than for soybeans because hours required to harvest an acre are higher for corn than for soybeans. Combine overhead for the combine in table 1 is \$17.00 for corn and \$16.10 for soybeans.

Table 1. Summary of Harvesting Costs.

Combining¹	
Corn	\$31.10 per acre
Soybean	\$26.30 per acre
Grain Cart²	
	\$6.00 per acre
Grain Hauling³	
	\$0.06 per bu.

¹ Based on a 265 HP combine used on 1,400 acres.

² Given a \$19,000 grain cart used on 1,600 acres.

³ Hauling costs from field to storage will vary depending on distance to storage, unloading time, and other factors

Table 2. Factors Used in Calculating Costs.

Purchase price	85%	of list price
Interest rate	7%	of remaining value
Insurance and housing	1%	of remaining value
Diesel fuel	\$1.50	per gallon
Lubrication cost	10%	of fuel costs
Years of life	7	years
Labor charge	\$13.50	per hour
Labor time	1.10	times combine hours

Platform overhead includes depreciation, interest, insurance, housing, and repair charges on the grain platform and corn head. Platform overhead for the combine shown in Table 1 is \$4.80 for a corn head and \$3.60 for soybean platform.

Fuel costs are based on diesel fuel priced at \$1.50 per gallon. Lubrication is 10 percent of fuel cost. Fuel costs for the combine shown in Table 1 are \$6.20 for corn and \$4.40 for soybeans.

Labor costs are based on a \$13.50 per hour labor charge. Labor time is 10 percent more than combine operating time.

Combine Size and Costs

Costs shown in Table 1 are for a 265 horsepower combine with a 20 ft. grain head and a 6-row corn head used to harvest 700 acres of corn and 700 acres of soybeans. Appendix Table 1 shows costs for different size combines. Generally, per acre costs decrease as combine size increases, given that acres harvested also increase.

Use and Costs

A major portion of total costs for combines is in overhead costs which include depreciation, interest, insurance, housing, and repair charges. On an annual basis, depreciation, interest, insurance, and housing costs remain relatively the same regardless of acres harvested. As acres increase, these overhead costs are spread over more acres. Therefore, for a given size combine, costs per acre decline as acres of use increase, as illustrated in Table 3.

Table 3. Per Acre Costs for Combines of Different Sizes and Acres Harvested.

Total Acres ¹	265 hp combine 6-row corn head 20' grain head		305 hp combine 8-row corn head 30' grain head		340 hp combine 12-row corn head 30' grain head	
	Corn ---- \$ per acre ----	Soybeans ---- \$ per acre ----	Corn ---- \$ per acre ----	Soybeans ---- \$ per acre ----	Corn ---- \$ per acre ----	Soybeans ---- \$ per acre ----
600	54.10	48.50	61.30	54.10	69.70	57.00
800	43.60	38.70	48.30	22.80	53.90	44.30
1,000	37.60	32.70	40.70	34.90	44.50	36.80
1,200	33.70	29.00	35.70	30.20	38.30	31.80
1,400	31.10	26.30	32.20	26.90	33.90	28.40
1,600	29.20	24.60	29.70	24.50	30.70	25.70
1,800			27.80	22.60	28.20	23.70
2,000			26.30	21.20	26.20	22.10
2,200			25.20	20.10	24.70	20.90
2,400			24.30	19.20	23.40	19.90
2,600					22.30	19.10
2,800					21.50	18.40
3,000					20.70	17.80

¹ Assumes half the acres are corn and half are soybeans.

Costs for the Grain Cart

Table 4 shows the costs for the grain cart divided into tractor overhead, grain cart overhead, fuel and lubrication, and labor categories. Costs are shown for a 600 bu. grain cart that is held for ten years and has a list price of \$19,000. The grain cart is assumed to be used on 800 acres of corn and 800 acres of soybeans each year. The grain cart will be use for 211 hours each year, the same hours that the combine will be operated.

Table 4. Per Acre Grain Cart Costs¹

Total	=	Tractor Overhead	+	Grain Cart Overhead	+	Fuel & Lube	+	Labor
\$6.00		\$1.20		\$1.90		\$0.90		\$2.00

¹Based on a grain cart with list price of \$19,000 and a ten-year life. The grain cart will be used on 1,600 acres.

Tractor overhead in Table 4 is charged on an hourly rate for an 190 horsepower tractor (see Machinery Cost Estimates: Tractors). Tractor overhead is charged on 105 hours which is one-half of the hours put on the combine. This reduction accounts for idle time on the grain cart. Labor is charged for all 211 hours.

Grain Cart Impacts on Combine Costs

Use of a grain cart should reduce per acre combine costs because the combine has to run fewer hours to harvest the same number of acres. Estimates of these cost reductions are shown in Table 5. Each row in this table gives per acre costs for different acres harvested. At 1,600 acres, costs when a grain cart is not used are \$27.10 per acre and 203 hours are required to complete the acres. Use of a grain cart is estimated to reduce hours to 178 and per acre costs to \$25.90. In Table 5, use of a grain cart reduces combine costs by about \$1.20 per acre. This decrease will offset some of the costs associated with grain cart use.

Table 5. Combining Costs, With and Without Grain Cart.¹

Acres	Without Grain Cart		With Grain Cart	
	Hours of Use	Per Acre Cost	Hours of Use	Per Acre Cost
1,400	178	\$29.55	156	\$28.40
1,600	203	27.10	178	25.90
1,800	229	25.60	201	24.00
2,000	254	23.75	223	22.45
2,200	280	22.65	245	21.13
2,400	305	21.75	267	20.30
2,600			290	19.55
2,800			312	18.85
3,000			334	16.10

¹ Based on a 305 HP combine with a \$217,000 list price given that half the acres are corn and half are soybeans.

Grain cart use may allow one combine to harvest more acres. In these cases, combine costs will be further reduced because increasing acres harvested generally decreases per acre costs.

Grain Hauling Costs

Grain hauling costs are estimated for a situation of hauling grain from a field to commercial storage. These costs will vary depending on the miles between the field and the storage. They will also vary depending on terrain, road conditions, and contracting time. The estimate in Table 1 is based on using a semi-truck having a charge of \$55 per hour to operate. Estimates in Table 1 assume about one trip per hour.

Appendix Table 1. Costs of Different Size Combines.

Machine description Head size	List Price ¹	Acres	Hours	----- Costs Per Acre -----				
		per Year	per Year	Total	Combine = Overhead	Platform + Overhead	Fuel + & Lube	Labor + Labor
	\$/head	ac/yr	hr/yr	----- \$ per acre -----				
265 Horsepower Combine (\$186,000 List Price)								
6-row (30" rows) corn head	\$30,000	700	145	31.10	17.00	4.80	6.20	3.10
20 ft. grain platform	\$23,000	700	104	26.30	16.10	3.60	4.40	2.20
305 Horsepower Combine (\$217,000 List Price)								
8-row (30" rows) corn head	\$41,000	1,000	155	26.30	14.10	4.60	5.30	2.30
30 ft. grain platform	\$29,000	1,000	99	21.20	13.10	3.20	3.40	1.50
340 Horsepower Combine (\$232,000 List Price)								
12-row (30" rows) corn head	\$64,000	1,250	129	22.80	11.60	5.70	4.00	1.50
30 ft. grain platform	\$29,000	1,250	124	19.40	11.50	2.60	3.80	1.50
375 Horsepower Combine, Rotary (\$256,000 List Price)								
12-row (30" rows) corn head	\$64,000	1,350	140	22.60	12.10	5.30	3.70	1.50
35 ft. grain platform	\$34,000	1,350	115	19.30	11.70	2.80	3.50	1.30

¹ List prices in this column are for the grain platform or corn head. List prices for the combine are listed next to the machine description.

Prepared by: Gary Schnitkey and Dale Lattz, Department of Agricultural and Consumer Economics, University of Illinois