

MACHINERY COST ESTIMATES: HARVESTING

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This publication shows estimated costs for combining, using grain carts, and hauling grain. These estimates are useful for determining custom rates and for analyzing machinery costs on farms. Costs include overhead (depreciation, interest, insurance, housing and repairs), fuel and labor. Allowances for profit are not included. 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. Combine overhead for the combine in Table 1 is \$18.00 for corn and \$19.80 for soybeans.

Table 2. Factors Used in Calculating Costs.

Purchase price	85%	of list price
Interest rate	7.0%	of remaining value
Insurance and housing	1.0%	of remaining value
Diesel fuel	\$3.75	per gallon
Lubrication cost	10%	of fuel costs
Years of life	7	years
Labor charge	\$14.50	per hour
Labor time	1.10	times combine hours

Labor costs are based on a \$14.50 per hour labor charge. Labor time is 10 percent more than combine operating time.

Table 1. Summary of Harvesting Costs.

Combining¹	
Corn	\$34.70 per acre
Soybean	\$30.10 per acre
Grain Cart²	
Corn	\$9.20 per acre
Soybean	\$5.60 per acre
Grain Hauling³	
	\$0.085 per bu.

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

² Based on a \$25,000 grain cart used on 1,400 acres.

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

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 \$8.40 for a corn head and \$5.00 for soybean platform.

Fuel costs are based on diesel fuel priced at \$3.75 per gallon. Lubrication is 10 percent of fuel cost. Fuel costs for the combine shown in Table 1 are \$5.00 for corn and \$2.90 for soybeans.

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 840 acres of corn and 560 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 are in overhead items (i.e., depreciation, interest, insurance, housing, and repairs). 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		385 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	62.10	58.10	69.70	65.50	78.90	68.50
800	49.50	45.50	54.60	50.40	60.90	52.70
1,000	42.60	38.20	45.70	41.40	50.10	43.40
1,200	37.80	33.40	39.90	35.60	43.00	37.20
1,400	34.70	30.10	35.80	31.40	38.00	32.80
1,600	32.50	27.80	32.90	28.40	34.30	29.60
1,800	31.00	26.00	31.70	26.10	31.40	27.10
2,000	29.90	24.50	29.00	24.30	29.20	25.20
2,200			27.90	22.80	27.40	23.60
2,400			26.80	21.70	26.00	22.40
2,600			26.00	20.70	24.80	21.30
2,800			25.40	20.00	23.80	20.50
3,000			24.90	19.30	23.00	19.80
3,200			24.50	18.80	22.60	19.20
3,400					21.70	18.60
3,600					21.30	18.20

¹ Assumes that 60% of the acres are corn and 40% are soybeans.

Costs for the Grain Cart

Table 4 shows estimates of owning three different sized grain carts. These costs are estimated assuming that the cart is purchased new at 85% of list price and that the machine is held for 10 years. For a 1,000 bushel grain cart, yearly costs of owning a grain cart with a \$42,000 list price are \$4,620.

Table 4. Yearly Costs of Grain Carts.

Grain Cart Size	List Price	Yearly Costs				Total
		Depreciation	Interest	Repairs	Housing Insurance	
750 bu.	\$26,000	\$1,450	\$960	\$700	\$200	\$3,310
1,000 bu.	42,000	2,350	1,550	220	500	4,620
1,325 bu.	56,000	3,130	2,050	260	750	6,190

Per acre costs will vary based on the amount of use of the grain cart. Table 5 shows estimates of per acres costs for the different sized grain carts. In Table 5, the 1,000 bushel grain cart is assumed to be used on 1,900 acres. This results in grain cart overhead of \$2.30 per acre (\$4,620 yearly costs from Table 4 divided by 1,900 acres). A tractor with 225 horsepower is used to pull the grain cart. Per hour estimates of tractor costs are \$88.55 per hour. Tractor costs were calculated assuming that tractor was used 550 hours per year. Given these estimates, the grain cart has \$9.70 of cost for corn harvest and \$5.60 costs per acre cost for soybean harvest.

Table 5. Per Acre Costs of Owning and Operating a Grain Cart.

Grain Cart Size	Crop	Grain Cart Overhead	Tractor + Overhead	Fuel & Lube +	Labor +	= Total
750 bu. ¹	Corn	1.90	2.50	2.80	2.00	9.20
	Soybeans	1.90	1.00	1.20	1.50	5.60
1,000 bu. ²	Corn	2.30	2.60	3.30	1.50	9.70
	Soybeans	2.30	1.00	1.30	1.00	5.60
1,325 bu. ³	Corn	2.40	2.60	4.30	1.00	10.30
	Soybeans	2.40	1.20	2.00	0.80	6.40

¹Based on costs in Table 4 and harvest of 1,400 acres. Tractor costs based on a 140 horsepower tractor used 550 hours per year with costs per hour of \$63.65. Tractor use based on harvesting 8 acres of corn and 11 acres of soybeans per hour. The tractor is used .9 of hours of combine use on corn and .5 hours on soybeans.

²Based on costs in Table 4 and harvest of 1,900 acres. Tractor costs based on a 225 horsepower tractor used 550 hours per year with costs per hour of \$88.55. Tractor use based on harvesting 11 acres of corn and 16 acres of soybeans per hour. The tractor is used .9 of hours of combine use on corn and .5 hours on soybeans.

³Based on costs in Table 4 and harvest of 2,400 acres. Tractor costs based on a 275 horsepower tractor used 550 hours per year with costs per hour of \$108.05. Tractor use based on harvesting 16 acres of corn and 19 acres of soybeans per hour. The tractor is used .9 of hours of combine use on corn and .5 hours on soybeans.

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 6. 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 \$31.10 per acre and 212 hours are required to complete the acres. Use of a grain cart is estimated to reduce hours to 193 and per acre costs to \$30.16. In Table 5, use of a grain cart reduces combine costs by about \$.94 per acre. This decrease will offset some of the costs associated with grain cart use.

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.

Table 6. 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	186	\$34.04	169	\$33.20
1,600	212	31.10	193	30.16
1,800	239	28.86	217	27.82
2,000	265	27.12	241	26.08
2,200	292	25.80	265	24.64
2,400	318	24.76	290	23.50
2,600	345	23.88	314	22.62
2,800	372	23.24	338	21.88
3,000			362	21.30
3,200			386	20.80

¹ Based on a 305 HP combine with a \$262,400 list price given that 60 percent of the acres harvested were corn and 40 percent soybeans.

Grain Hauling Costs

Hauling costs are estimated for moving grain from a field to commercial storage. Hauling 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 \$85 per hour to operate. Estimates in Table 1 assume about one trip per hour.

Stalk Chopping

Corn heads are now available that will chop stalks. For an 8-row corn head, corn harvesting costs without a head that stalks chops are estimated at \$29.80 per acre. With stalk chopping, corn harvesting costs are \$33.20 per acre (see Appendix Table 1). Stalk chopping adds \$3.40 per acre to harvesting costs.

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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 +
	\$/head	ac/yr	hr/yr	----- \$ per acre -----				
265 Horsepower Combine (\$226,900 List Price)								
6-row (30" rows) corn head	\$40,800	840	174	34.70	18.00	8.40	5.00	3.30
20 ft. grain platform	\$26,000	560	83	30.10	19.80	5.00	2.90	2.40
305 Horsepower Combine (\$262,400 List Price)²								
8-row (30" rows) corn head	\$52,500	1,140	179	29.80	15.00	8.00	4.30	2.50
8-row corn head, stalk chopping	\$71,900	1,140	179	33.20	15.00	10.90	4.80	2.50
30 ft. grain platform	\$33,000	760	75	25.10	16.60	4.70	2.20	1.60
385 Horsepower Combine (\$276,700 List Price)²								
12-row (30" rows) corn head	\$81,600	1,500	155	25.40	10.90	9.20	3.60	1.70
12-row corn hd, stalk chopping	\$105,000	1,500	155	28.40	10.90	11.90	3.90	1.70
30 ft. grain platform	\$33,000	1,000	99	21.80	13.80	3.60	2.80	1.60
440 Horsepower Combine, Rotary (\$304,400 List Price)²								
12-row (30" rows) corn head	\$81,600	1,620	167	26.00	11.60	8.60	4.10	1.70
12-row corn hd, stalk chopping	\$105,000	1,620	167	28.80	11.60	11.10	4.40	1.70
35 ft. grain platform	\$37,600	1,080	92	21.90	14.00	3.80	2.70	1.40

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.

² Costs assume that only one corn head is used when calculating costs.