

October 2008

MACHINERY COST ESTIMATES

The tables in this publication contain estimates of farm machinery operation costs calculated via an economic engineering approach. The data are intended to show a representative farming industry cost for specified machines and operations.

Machine costs are separated into time-related and use-related categories. Use-related costs are incurred only when a machine is used. They include fuel, lubrication, use-related repairs and labor. Time-related costs, also often referred to as overhead costs, accrue to the owner whether or not a machine is used. Overhead includes time-related economic costs: interest, insurance, personal property taxes, and housing. There are no personal property taxes in Minnesota. Depreciation is both a use- and a time-related cost. Depreciation will be related to use to the extent that increased annual usage shortens years of life and/or reduces salvage value. While not entirely use-related, depreciation is included along with operating expenses and labor costs in the columns labeled "use-related cost/acre".

OVERHEAD COSTS: Time-related costs are prorated over a 12 year economic life except where otherwise indicated. Trade-in values are estimated based on American Society of Agricultural Engineers formulas. Income tax implications are ignored. A housing charge of 67 cents per square foot of shelter space needed per year is made.

A six percent "real" (inflation-adjusted) interest rate is used in the cost estimates. This real rate is calculated by taking a nominal rate charged by lenders, minus a measure of the inflation rate per year expected over the years of ownership. Insurance is charged at 0.85 percent of the undepreciated value. The interest and insurance cost formulas are slightly different from those used in previous years. Adding one year's depreciation to the numerator in effect bases the costs on the value at the beginning of each year owned. This gives a slightly more accurate calculation of the actual costs over the years owned. In states where farm machinery is taxed as personal property, property tax could be calculated in a similar manner, depending on how taxes are assessed.

Formulas used to compute machinery overhead costs:

$$\text{Interest, \$/year} = \frac{\text{purchase cost} + \text{salvage value} + \text{depreciation (\$/year)}}{2} \times \text{"real" interest rate}$$

$$\text{Insurance, \$/year} = \frac{\text{purchase cost} + \text{salvage value} + \text{depreciation (\$/year)}}{2} \times \text{insurance rate}$$

$$\text{Housing, \$/year} = \text{price per sq. foot} \times \text{sq. feet shelter space required}$$

$$\text{Taxes per year} = 0 \text{ (no taxes on personal property in Minnesota)}$$

USE-RELATED COSTS: Fuel cost is calculated by multiplying the fuel consumption by the price of fuel, with fuel consumption assumed to be 0.044 gallons of diesel fuel per PTO horsepower-hour on average for each implement type. Fuel consumption per acre is averaged across sizes within a given implement type. The price of farm diesel fuel is projected at \$3.50 per gallon. All power units, tractors, combines, trucks, etc., use diesel fuel. Lubrication cost is assumed to be 10 percent of fuel cost.

A related spreadsheet, MACHDATA.XLS, is available at:
<http://www.apec.umn.edu/faculty/wlazarus/interests-farmmachinery.html>.

The formulas for repair and maintenance costs estimate total accumulated repair costs based on accumulated hours of lifetime use. Repair and maintenance calculations are based on American Society of Agricultural Engineers formulas. The total cost is then divided by accumulated hours to arrive at an average per hour cost estimate. The amount of annual use of a machine is an estimate of the number of hours a commercial farmer would use that particular machine in one year.

Labor is charged at an hourly wage rate, which includes 30 percent benefits. Charge rates are \$13.50 per hour for unskilled labor and \$17.00 per hour for skilled labor. The skilled labor rate is generally used with the planting and harvesting equipment and sprayers. Labor per acre for an operation such as plowing or disking is calculated by using the work rate on the implement. Less labor per acre is used in a disking operation that covers more acres per hour than in a plowing operation. A small amount of extra labor is added over and above machine time to allow for downtime for tasks such as making adjustments and filling sprayers and planters. The labor adjustment ranges from 2 percent additional time for tillage to 33 percent for spraying.

Economic depreciation is included in use-related costs, calculated using the straight-line formula:

$$\text{Depreciation, \$/year} = \frac{\text{purchase cost - salvage value}}{\text{years you will use machine}}$$

These estimates will not represent any given individual's cost. Differences in buying power, repair programs, average annual use, and overall replacement programs should be considered when making adjustments. It may be useful to record actual expenses for at least a few of your implements and compare your costs to these estimates. These estimates will differ from records because they are estimates, but also because they are averaged over the use period and are expressed in today's dollars. If these estimates are compared to recorded costs that include repairs or depreciation based on historical costs, one adjustment that would be required for comparability would be to index the historical cost to current prices.

THE BOTTOM LINE: Machinery costs are substantial; control of them is important. Custom charges are often based upon them. No one should do custom work unless the charge will cover operating costs and use-related depreciation plus a return for one's risk and time. Ideally, all allocated per acre or hour overhead costs should also be covered by anyone offering to do custom work. The market for custom work usually does not cover all costs. The market is usually somewhere in between the Use-related costs and total costs.

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Summary of Per Acre Use-Related Costs and Total Cost for Implements with Associated Power Units, Averaged Over All Sizes by Implement Type

	Use-Related Cost/Acre ¹	Total Cost/Acre		Use-Related Cost/Acre ¹	Total Cost/Acre
Chisel Plow	\$6.86	\$9.21	Mower-Conditioner	\$9.63	\$12.73
Chisel Plow, Front Dsk	\$9.62	\$12.71	Rotary Mow/Cond	\$6.75	\$9.04
Moldboard Plow	\$16.08	\$20.22	Hay Rake (Hyd)	\$4.57	\$5.47
Field Cultivator	\$3.99	\$5.34	Hay Swather-Cond	\$8.03	\$11.06
Tandem Disk	\$6.56	\$8.61	Swather-Cond, Self-Prop	\$12.75	\$21.10
Tandem Disk H.D.	\$7.92	\$10.44	Grain Swather, Self-Prop	\$8.17	\$13.54
Offset Disk	\$9.63	\$12.52	Hay Baler PTO Twine	\$10.06	\$11.78
V-Ripper	\$9.18	\$11.77	Round Baler	\$6.19	\$7.06
Comb Disk & V-Ripper	\$14.07	\$18.69	Rd Baler/Wrap	\$8.14	\$9.62
Row Crop Planter	\$7.09	\$10.17	Large Rectangular Baler 3x3	\$11.02	\$15.22
Min-Til Planter	\$9.58	\$13.05	Large Rectangular Baler 4x3	\$12.31	\$17.20
Potato Planter	\$25.86	\$37.22	Forage Harvester (Corn Head)	\$45.17	\$56.18
Beet Planter	\$18.79	\$27.53	Corn Head for SP Harvstr Base	\$38.61	\$54.19
Beet Planter, Vacuum	\$8.48	\$14.07	Pickup Head for SP Harvstr Base (2X Windrows)	\$22.18	\$31.42
Presswheel Drill	\$8.77	\$11.80	Combine Corn Hd	\$32.26	\$40.46
Air Seeder Drill w/Cart	\$10.55	\$15.99	Combine Grain Head	\$19.15	\$23.70
No-Till Drill	\$11.94	\$16.40	Combine Soybean Hd	\$26.04	\$31.98
Prairie Grass Drill	\$10.81	\$15.94	Combine Belt Pickup Hd	\$23.53	\$29.51
Row Cultivator	\$4.66	\$5.91	Potato harvester	\$69.88	\$83.52
Cultivator High Residue	\$8.59	\$11.17	Bean Cutter	\$7.83	\$9.86
Cultivator High Residue, Guidance System, Higher Speed	\$6.64	\$9.12	Bean Rod	\$7.06	\$8.63
Rotary Hoe	\$1.97	\$2.52	Bean Windrower	\$9.90	\$13.20
Potato Cultivator	\$6.30	\$7.86	Sugar Beet Lifter	\$51.58	\$65.73
Sugar Beet Cult	\$9.92	\$13.75	Sugar Beet Topper	\$10.35	\$14.04
Boom Sprayer, Self-Prop	\$4.05	\$6.07	Sugar Beet Wagon	\$22.84	\$31.16
Boom Sprayer	\$2.11	\$2.66			
Stalk Shredder	\$9.36	\$12.07			

¹ Use-related cost/acre includes fuel, lubricants, repairs and maintenance, labor, and power and implement depreciation (depreciation is both time-related and use-related). The difference between use-related cost and total cost is that total cost also includes overhead costs (interest, insurance, and housing).

Tractor or Combine HP ¹	Net Cost of a New Power Unit ²	Annual Hours of Use	Fuel & Oil Cost Per Hour	Maintenance & Repair Cost/Hr	Depreciation Cost Per Hour	--Overhead ³ -- Cost Per Year Cost Per Hour		--Total Cost-- Per Year Of Use Per Hour Of Use		Diesel Use/Hr Gallons
Tractors and Combines (Without Heads)										
40	\$19,000	400	\$6.78	\$0.64	\$2.52	\$983	\$2.46	\$4,958	\$12.39	1.76
60	25,000	400	10.16	0.84	3.32	1,282	3.20	7,011	17.53	2.64
75	29,000	400	12.71	1.03	3.73	1,501	3.75	8,487	21.22	3.30
105 MFWD	71,000	450	17.79	2.13	7.65	3,652	8.12	16,056	35.68	4.62
130 MFWD	91,000	450	22.02	2.73	12.28	4,239	9.42	20,903	46.45	5.72
160 MFWD	111,000	500	27.10	3.70	13.56	5,184	10.37	27,364	54.73	7.04
200 MFWD	138,000	500	33.88	4.60	16.85	6,419	12.84	34,085	68.17	8.80
225 MFWD	158,000	400	38.12	4.21	23.84	7,397	18.49	33,865	84.66	9.90
260 4WD (226 PTO)	163,000	400	38.32	2.61	24.60	7,626	19.06	33,835	84.59	9.95
310 4WD (270 PTO)	172,000	400	45.69	2.75	25.95	8,038	20.09	37,795	94.49	11.87
360 4WD (313 PTO)	190,000	400	53.06	3.04	28.67	8,861	22.15	42,768	106.92	13.78
425 4WD (370 PTO)	222,000	400	62.64	3.55	33.50	10,326	25.81	50,201	125.50	16.27
225 Tracked Tractor	147,000	400	38.12	2.35	22.18	6,894	17.23	31,954	79.88	9.90
275 HP Combine	206,000	300	46.59	34.37	45.06	9,285	30.95	47,089	156.96	12.10
340 HP Combine	233,000	300	57.60	38.87	50.97	10,534	35.11	54,765	182.55	14.96
315 HP SP Forage Harvester Base Unit	175,000	200	29.11	13.26	50.94	8,484	42.42	27,145	135.73	7.56
570 HP SP Forage Harvester Base Unit	265,000	200	52.67	20.08	77.14	12,675	63.37	42,652	213.26	13.68

¹HP shown for the smaller tractors is PTO horsepower. Engine HP is shown for the larger tractors. PTO HP for the larger tractors runs about 87% of engine HP, and is shown in parentheses. Fuel use is estimated at 0.044 gallons of diesel fuel per hour per PTO HP.

²Net cost of a new unit assumes no trade-in. Farm machinery is exempt from sales tax in Minnesota so no sales tax is included.

³Overhead costs include interest, insurance, and housing but not depreciation, which is shown separately because it varies to some extent with use. Overhead per hour will vary with annual use.

	Tractor	Net Cost	--Estimated--		-Power Cost/Acre ² -		Labor	--Implement Cost/Acre--			Total	Use-related	Diesel
	Size	of a New	Work-Performed		Fuel	Other	Cost	Repairs	Depreciation	Overhead ³	Cost	Cost	Fuel
	(HP)	Implement ¹	Acres/hr	Acres/yr			Per Acre				Per Acre ⁴	Per Acre ⁵	Gal/Acre
<u>Tillage Equipment</u>													
Chisel Plow 15 Ft	130 MFWD	\$17,000	8.50	680	\$2.33	\$2.87	\$1.62	\$0.61	\$1.42	\$1.40	\$10.25	\$ 7.74	0.60
Chisel Plow 23 Ft	200 MFWD	\$30,000	13.03	1,043	\$2.33	\$2.63	\$1.06	\$0.70	\$1.63	\$1.52	\$9.87	\$ 7.37	0.60
Chisel Plow 37 Ft	310 4WD (270 PTO)	\$41,000	20.97	1,677	\$2.33	\$2.33	\$0.66	\$0.60	\$1.39	\$1.30	\$8.60	\$ 6.34	0.60
Chisel Plow 57 Ft	425 4WD (370 PTO)	\$67,000	32.30	2,584	\$2.33	\$1.95	\$0.43	\$0.63	\$1.47	\$1.32	\$8.12	\$ 6.01	0.60
Chisel Plow, Front Dsk 16.3 Ft	200 MFWD	\$20,000	9.21	737	\$3.74	\$3.72	\$1.50	\$0.42	\$1.60	\$1.46	\$12.44	\$ 9.59	0.97
Chisel Plow, Front Dsk 21.3 Ft Fold	310 4WD (270 PTO)	\$31,000	12.04	963	\$3.74	\$4.05	\$1.14	\$0.50	\$1.90	\$1.65	\$12.98	\$ 9.66	0.97
Moldboard Plow 4 Bottom-18, 6 Ft	75	\$16,000	2.78	334	\$4.96	\$3.06	\$4.95	\$2.48	\$2.72	\$2.41	\$20.58	\$ 16.82	1.29
Moldboard Plow 5 Bottom-18, 7.5 Ft	105 MFWD	\$18,000	3.48	417	\$4.96	\$5.15	\$3.96	\$2.23	\$2.45	\$2.20	\$20.94	\$ 16.41	1.29
Moldboard Plow 6 Bottom-18, 9 Ft	130 MFWD	\$20,000	4.17	501	\$4.96	\$5.85	\$3.30	\$2.07	\$2.26	\$2.06	\$20.50	\$ 16.19	1.29
Moldboard Plow 8 Bottom-18, 12 Ft	160 MFWD	\$27,000	5.56	668	\$4.96	\$4.96	\$2.48	\$2.09	\$2.29	\$2.06	\$18.84	\$ 14.92	1.29
Field Cultivator 18 Ft	105 MFWD	\$19,000	12.98	1,298	\$1.22	\$1.38	\$1.06	\$0.47	\$0.83	\$0.79	\$5.76	\$ 4.34	0.32
Field Cultivator 23 Ft	130 MFWD	\$23,000	16.59	1,659	\$1.22	\$1.47	\$0.83	\$0.45	\$0.79	\$0.73	\$5.49	\$ 4.19	0.32
Field Cultivator 47 Ft	260 4WD (226 PTO)	\$57,000	33.90	3,390	\$1.22	\$1.37	\$0.41	\$0.54	\$0.95	\$0.87	\$5.36	\$ 3.93	0.32
Field Cultivator 60 Ft	310 4WD (270 PTO)	\$64,000	43.27	4,327	\$1.22	\$1.13	\$0.32	\$0.48	\$0.84	\$0.76	\$4.74	\$ 3.52	0.32
Tandem Disk 21 Ft Rigid	160 MFWD	\$28,000	12.22	1,222	\$1.90	\$2.26	\$1.13	\$0.77	\$1.35	\$1.20	\$8.61	\$ 6.56	0.49
Tandem Disk H.D. 30 Ft Fold	360 4WD (313 PTO)	\$43,000	17.45	1,745	\$3.04	\$3.09	\$0.79	\$0.82	\$1.45	\$1.25	\$10.44	\$ 7.92	0.79
Offset Disk 12 Ft	105 MFWD	\$15,000	5.56	556	\$3.20	\$3.22	\$2.48	\$0.61	\$1.59	\$1.43	\$12.52	\$ 9.63	0.83
V-Ripper 25 " O.C., 10 Ft	160 MFWD	\$11,000	6.18	618	\$3.82	\$4.47	\$2.23	\$0.57	\$1.01	\$1.00	\$13.10	\$ 10.42	0.99
V-Ripper 25 " O.C., 18 Ft	260 4WD (226 PTO)	\$18,000	11.13	1,113	\$3.82	\$4.16	\$1.24	\$0.52	\$0.92	\$0.91	\$11.57	\$ 8.94	0.99
V-Ripper 30 " O.C., 17 Ft	260 4WD (226 PTO)	\$15,000	10.51	1,051	\$3.82	\$4.40	\$1.31	\$0.46	\$0.81	\$0.83	\$11.63	\$ 8.99	0.99
V-Ripper 30 " O.C., 22.5 Ft	360 4WD (313 PTO)	\$20,000	13.91	1,391	\$3.82	\$3.87	\$0.99	\$0.46	\$0.82	\$0.79	\$10.76	\$ 8.37	0.99
Comb Disk & V-Ripper 17.5 Ft	360 4WD (313 PTO)	\$36,000	9.02	902	\$5.64	\$5.97	\$1.53	\$0.91	\$2.36	\$2.04	\$18.45	\$ 13.95	1.47
Comb Disk & V-Ripper 22.5 Ft	425 4WD (370 PTO)	\$59,000	11.59	1,159	\$5.64	\$5.42	\$1.19	\$1.16	\$3.00	\$2.51	\$18.92	\$ 14.19	1.47
Rotary Harrow 30 Ft	75	\$21,000	30.91	1,731	\$0.41	\$0.28	\$0.45	\$0.10	\$0.72	\$0.64	\$2.59	\$ 1.83	0.11

	Tractor	Net Cost	--Estimated--		-Power Cost/Acre ² -		Labor	--Implement Cost/Acre--			Total	Use-related	Diesel
	Size	of a New	Work-Performed		Fuel	Other	Cost	Repairs	Depreciation	Overhead ³	Cost	Cost	Fuel
	(HP)	Implement ¹	Acres/hr	Acres/yr			Per Acre				Per Acre ⁴	Per Acre ⁵	Gal/Acre
<i>Planting Equipment</i>													
Row Crop Planter 6 Row-30, 15 Ft	60	\$20,000	7.00	490	\$1.32	\$1.05	\$2.82	\$0.84	\$1.98	\$2.28	\$10.28	\$ 7.54	0.34
Row Crop Planter 8 Row-30, 20 Ft	75	\$28,000	9.33	653	\$1.32	\$0.91	\$2.11	\$0.88	\$2.08	\$2.36	\$9.66	\$ 6.89	0.34
Row Crop Planter 12 Row-30, 30 Ft	105 MFWD	\$48,000	14.00	980	\$1.32	\$1.28	\$1.41	\$1.01	\$2.37	\$2.67	\$10.05	\$ 6.80	0.34
Row Crop Planter 16 Row-30, 40 Ft	130 MFWD	\$75,000	18.67	1,307	\$1.32	\$1.31	\$1.06	\$1.18	\$2.78	\$3.04	\$10.68	\$ 7.14	0.34
Min-Til Planter 6 Row-30, 15 Ft	75	\$27,000	6.36	509	\$2.05	\$1.34	\$3.10	\$1.44	\$2.57	\$2.89	\$13.39	\$ 9.91	0.53
Min-Til Planter 8 Row-30, 20 Ft	105 MFWD	\$34,000	8.48	594	\$2.05	\$2.11	\$2.32	\$1.18	\$2.77	\$3.10	\$13.54	\$ 9.48	0.53
Min-Til Planter 12 Row-30, 30 Ft	160 MFWD	\$66,000	12.73	1,273	\$2.05	\$2.17	\$1.55	\$2.25	\$2.51	\$2.73	\$13.27	\$ 9.72	0.53
Min-Til Planter 16 Row-30, 40 Ft	200 MFWD	\$84,000	16.97	2,206	\$2.05	\$2.02	\$1.16	\$2.87	\$1.84	\$2.03	\$11.98	\$ 9.19	0.53
Potato Planter 4 Row, 12.6 Ft	130 MFWD	\$40,000	3.83	214	\$4.37	\$6.38	\$9.87	\$2.40	\$9.03	\$9.54	\$41.59	\$ 29.59	1.14
Potato Planter 6 Row, 19 Ft	130 MFWD	\$60,000	5.75	322	\$4.37	\$4.25	\$6.58	\$2.40	\$9.03	\$9.55	\$36.18	\$ 25.00	1.14
Potato Planter 8 Row, 25.3 Ft	160 MFWD	\$80,000	7.67	429	\$4.37	\$3.60	\$4.93	\$2.40	\$9.02	\$9.56	\$33.89	\$ 22.98	1.14
Beet Planter 12 Row, 22 Ft	105 MFWD	\$37,000	4.67	280	\$3.81	\$3.83	\$4.52	\$1.96	\$6.40	\$7.00	\$27.53	\$ 18.79	0.99
Beet Planter, Vacuum 24 Row, 44 Ft	160 MFWD	\$99,000	22.40	1,008	\$1.21	\$1.23	\$0.94	\$0.80	\$4.76	\$5.13	\$14.07	\$ 8.48	0.31
Presswheel Drill 16 Ft	105 MFWD	\$16,000	6.79	509	\$2.45	\$2.64	\$2.78	\$0.75	\$1.52	\$1.78	\$11.91	\$ 8.94	0.64
Presswheel Drill 20 Ft	130 MFWD	\$21,000	8.48	636	\$2.45	\$2.88	\$2.22	\$0.78	\$1.60	\$1.85	\$11.79	\$ 8.82	0.64
Presswheel Drill 25 Ft	130 MFWD	\$35,000	10.61	795	\$2.08	\$2.30	\$1.78	\$1.04	\$2.13	\$2.40	\$11.74	\$ 8.45	0.54
Presswheel Drill 30 Ft	160 MFWD	\$44,000	12.73	1,018	\$2.45	\$2.17	\$1.48	\$1.18	\$2.09	\$2.33	\$11.70	\$ 8.56	0.64
Air Seeder Drill w/Cart 52 Ft	260 4WD (226 PTO)	\$157,000	22.06	1,765	\$1.74	\$2.10	\$0.86	\$2.42	\$4.31	\$4.57	\$15.99	\$ 10.55	0.45
No-Till Drill 15 Ft	130 MFWD	\$34,000	6.36	509	\$3.11	\$3.84	\$2.97	\$1.82	\$3.23	\$3.57	\$18.53	\$ 13.48	0.81
No-Till Drill 20 Ft	160 MFWD	\$36,000	8.48	679	\$3.11	\$3.26	\$2.22	\$1.44	\$2.57	\$2.86	\$15.46	\$ 11.37	0.81
No-Till Drill 30 Ft	200 MFWD	\$63,000	12.73	1,018	\$3.11	\$2.69	\$1.48	\$1.68	\$3.00	\$3.27	\$15.23	\$ 10.95	0.81
Prairie Grass Drill 10 Ft	60	\$22,000	5.15	258	\$1.81	\$1.43	\$3.43	\$0.87	\$4.58	\$4.38	\$16.50	\$ 11.50	0.47
Prairie Grass Drill (Twinned) , 21 Ft	105 MFWD	\$49,000	10.82	541	\$1.81	\$1.65	\$1.63	\$0.92	\$4.86	\$4.50	\$15.37	\$ 10.13	0.47

	Tractor	Net Cost	--Estimated--		-Power Cost/Acre ² -		Labor	--Implement Cost/Acre--			Total	Use-related	Diesel
	Size	of a New	Work-Performed				Cost	Repairs	Depreciation	Overhead ³	Cost	Cost	Fuel
	(HP)	Implement ¹	Acres/hr	Acres/yr	Fuel	Other	Per Acre				Per Acre ⁴	Per Acre ⁵	Gal/Acre
<u>Crop Maintenance Equipment</u>											\$99.00		
Row Cultivator 8 Row-30, 20 Ft	130 MFWD	\$9,000	10.30	1,030	\$1.71	\$2.37	\$1.36	\$0.21	\$0.50	\$0.50	\$6.65	\$ 5.23	0.44
Row Cultivator 16 Row-30, 40 Ft	200 MFWD	\$17,000	20.61	2,061	\$1.71	\$1.66	\$0.68	\$0.19	\$0.47	\$0.45	\$5.17	\$ 4.10	0.44
Cultivator High Residue 6 Row-30, 15 Ft	130 MFWD	\$21,000	7.73	773	\$2.65	\$3.16	\$1.82	\$0.64	\$1.54	\$1.37	\$11.17	\$ 8.59	0.69
Cultivator High Residue, Guidance System, Higher Speed 6 Row-30, 15 Ft	130 MFWD	\$26,000	11.59	773	\$1.90	\$2.11	\$1.21	\$0.32	\$1.91	\$1.67	\$9.12	\$ 6.64	0.49
Rotary Hoe 21 Ft	105 MFWD	\$11,000	25.96	2,596	\$0.69	\$0.69	\$0.54	\$0.12	\$0.25	\$0.23	\$2.52	\$ 1.97	0.18
Potato Cultivator 6 Row, 19 Ft	105 MFWD	\$12,000	8.04	1,126	\$2.21	\$2.22	\$1.75	\$0.53	\$0.60	\$0.55	\$7.86	\$ 6.30	0.57
Sugar Beet Cult 12 Row, 22 Ft	105 MFWD	\$15,000	5.60	336	\$3.10	\$3.19	\$2.51	\$0.34	\$2.53	\$2.40	\$14.08	\$ 10.23	0.81
Sugar Beet Cult 24 Row, 44 Ft	200 MFWD	\$35,000	11.20	672	\$3.10	\$3.06	\$1.25	\$0.40	\$2.95	\$2.65	\$13.42	\$ 9.62	0.81
Boom Sprayer, Self-Prop 60 Ft	None	\$103,000	33.09	3,309	\$0.81	-\$0.41	\$0.64	\$1.50	\$1.51	\$1.60	\$6.07	\$ 4.05	0.11
Boom Sprayer 50 Ft	60	\$19,000	25.61	2,561	\$0.40	\$0.29	\$0.83	\$0.36	\$0.36	\$0.43	\$2.66	\$ 2.11	0.10
Stalk Shredder 20 Ft	130 MFWD	\$22,000	7.76	776	\$2.84	\$3.15	\$1.91	\$0.95	\$1.73	\$1.49	\$12.07	\$ 9.36	0.74
<u>Harvesting Equipment</u>											\$99.00		
Mower-Conditioner 9 Ft	40	\$18,000	4.36	349	\$1.55	\$1.29	\$3.40	\$0.81	\$3.14	\$2.54	\$12.73	\$ 9.63	0.40
Rotary Hay Mower 6 Ft	40	\$3,000	2.91	291	\$2.33	\$1.93	\$4.64	\$0.61	\$0.63	\$0.60	\$10.73	\$ 9.29	0.61
Rotary Mow/Cond 12 Ft	75	\$27,000	8.73	698	\$1.70	\$0.98	\$1.62	\$0.53	\$2.36	\$1.86	\$9.04	\$ 6.75	0.44
Hay Rake (Hyd) 9 Ft	40	\$6,000	6.11	698	\$1.11	\$0.92	\$2.21	\$0.21	\$0.52	\$0.50	\$5.47	\$ 4.57	0.29
Hay Rake (Wheel, 2-16') 30 Ft	40	\$40,000	26.18	2,095	\$0.26	\$0.21	\$0.52	\$0.28	\$1.16	\$0.95	\$3.39	\$ 2.34	0.07
Hay Swather-Cond 14 Ft	60	\$27,000	6.79	543	\$1.62	\$1.08	\$1.99	\$0.78	\$3.03	\$2.56	\$11.06	\$ 8.03	0.42
Swather-Cond, Self-Prop 16 Ft	None	\$89,000	7.76	621	\$3.08	-\$1.54	\$1.74	\$0.73	\$8.73	\$6.81	\$21.10	\$ 12.75	0.40
Grain Swather, Self-Prop 21 Ft	None	\$70,000	10.18	815	\$2.34	-\$1.17	\$1.33	\$0.44	\$5.23	\$4.20	\$13.54	\$ 8.17	0.30
Hay Baler PTO Twine 12 Ft	40	\$19,000	4.36	873	\$1.55	\$1.29	\$4.32	\$2.20	\$1.26	\$1.16	\$11.78	\$ 10.06	0.40
Round Baler 1000 Lb, 20 Ft	75	\$19,000	9.45	2,364	\$1.34	\$0.90	\$1.58	\$1.86	\$0.47	\$0.40	\$6.56	\$ 5.76	0.35
Round Baler 1500 Lb, 20 Ft	75	\$26,000	9.45	2,364	\$1.34	\$0.90	\$1.58	\$2.54	\$0.64	\$0.55	\$7.56	\$ 6.61	0.35
Rd Baler/Wrap 1500 Lb, 20 Ft	105 MFWD	\$31,000	9.45	2,364	\$1.88	\$1.89	\$1.43	\$3.03	\$0.76	\$0.63	\$9.62	\$ 8.14	0.49
Large Rectangular Baler 3x3 20 Ft	130 MFWD	\$72,000	11.64	1,164	\$1.89	\$2.10	\$1.62	\$0.46	\$5.76	\$3.40	\$15.22	\$ 11.02	0.49
Large Rectangular Baler 4x3 20 Ft	130 MFWD	\$87,000	11.64	1,164	\$1.89	\$2.10	\$1.62	\$0.55	\$6.96	\$4.07	\$17.20	\$ 12.31	0.49
Forage Harvester (Corn Head) 2 Row, 5 Ft	105 MFWD	\$28,000	1.38	276	\$12.90	\$12.98	\$13.69	\$5.72	\$5.77	\$5.12	\$56.18	\$ 45.17	3.35
Corn Head for SP Harvstr Base 3 Row, 7.5 Ft	315 HP SP Forage Harvester	\$8,000	2.55	509	\$10.12	\$41.89	\$7.41	\$0.25	\$0.89	\$1.13	\$61.70	\$ 43.90	2.63

	Tractor	Net Cost	--Estimated--		-Power Cost/Acre ² -		Labor	--Implement Cost/Acre--			Total	Use-related	Diesel
	Size	of a New	Work-Performed				Cost				Cost	Cost	Fuel
	(HP)	Implement ¹	Acres/hr	Acres/yr	Fuel	Other	Per Acre	Repairs	Depreciation	Overhead ³	Per Acre ⁴	Per Acre ⁵	Gal/Acre
Corn Head for SP Harvstr Base 4 Row, 10 Ft	315 HP SP Forage Harvester	\$16,000	3.39	509	\$10.12	\$31.41	\$5.56	\$0.28	\$1.79	\$1.87	\$51.04	\$ 36.66	2.63
Corn Head for SP Harvstr Base 6 Row, 15 Ft	570 HP SP Forage Harvester	\$23,000	5.09	611	\$10.12	\$31.55	\$3.71	\$0.22	\$2.14	\$2.10	\$49.83	\$ 35.28	2.63
Pickup Head for SP Harvstr Base (2X Windows) 24 Ft	570 HP SP Forage Harvester	\$16,000	8.15	652	\$6.47	\$19.72	\$2.32	\$0.06	\$1.40	\$1.46	\$31.42	\$ 22.18	1.68
Combine Grain Head 20 Ft	275 HP Combine	\$23,000	6.79	1,358	\$5.72	\$16.26	\$2.78	\$0.39	\$1.07	\$0.80	\$27.02	\$ 21.66	1.49
Combine Grain Head 30 Ft	275 HP Combine	\$30,000	10.18	2,036	\$5.72	\$10.84	\$1.85	\$0.34	\$0.93	\$0.69	\$20.37	\$ 16.64	1.49
Combine Soybean Hd 18 Ft	275 HP Combine	\$23,000	5.35	1,069	\$8.48	\$20.65	\$3.53	\$0.50	\$1.35	\$1.03	\$35.55	\$ 28.73	2.20
Combine Soybean Hd 25 Ft	275 HP Combine	\$28,000	7.42	1,485	\$8.48	\$14.87	\$2.54	\$0.44	\$1.19	\$0.89	\$28.41	\$ 23.35	2.20
Combine Corn Hd 6 Row-30, 15 Ft	275 HP Combine	\$38,000	4.20	840	\$9.26	\$26.28	\$4.49	\$1.05	\$2.85	\$2.12	\$46.06	\$ 36.56	2.41
Combine Corn Hd 8 Row-30, 20 Ft	275 HP Combine	\$51,000	5.09	1,018	\$9.26	\$21.68	\$3.71	\$1.17	\$3.15	\$2.35	\$41.32	\$ 32.89	2.41
Combine Corn Hd 12 Row-30, 30 Ft	340 HP Combine	\$68,000	7.64	1,527	\$9.26	\$16.36	\$2.47	\$1.04	\$2.80	\$2.06	\$34.00	\$ 27.33	2.41
Combine Belt Pickup Hd 23 Ft	275 HP Combine	\$20,000	6.69	713	\$6.96	\$16.50	\$2.82	\$0.17	\$1.70	\$1.35	\$29.51	\$ 23.53	1.81
Potato Harvester 2 Row, 6.3 Ft	75	\$68,000	1.38	295	\$7.83	\$6.17	\$39.89	\$15.18	\$13.35	\$10.77	\$93.19	\$ 79.70	2.03
Potato Harvester 4 Row, 12.6 Ft	105 MFWD	\$137,000	2.76	590	\$7.83	\$6.49	\$19.94	\$15.29	\$13.45	\$10.85	\$73.85	\$ 60.06	2.03
Bean Cutter 6 Row-30, 15 Ft	130 MFWD	\$13,000	8.73	698	\$2.52	\$2.80	\$2.16	\$0.32	\$1.10	\$0.95	\$9.86	\$ 7.83	0.66
Bean Cutter 6 Row-30, 15 Ft	130 MFWD	\$13,000	8.73	698	\$2.52	\$2.80	\$2.16	\$0.32	\$1.10	\$0.95	\$9.86	\$ 7.83	0.66
Bean Rod 6 Row-30, 15 Ft	130 MFWD	\$6,000	8.73	698	\$2.52	\$2.80	\$2.16	\$0.15	\$0.51	\$0.49	\$8.63	\$ 7.06	0.66
Bean Windrower 6 Row-30, 15 Ft	130 MFWD	\$32,000	8.73	698	\$2.52	\$2.80	\$2.16	\$0.80	\$2.70	\$2.21	\$13.20	\$ 9.90	0.66
Sugar Beet Lifter 6 Row, 11 Ft	160 MFWD	\$76,000	3.03	243	\$8.61	\$9.11	\$6.22	\$16.22	\$18.48	\$14.88	\$73.52	\$ 55.22	2.24
Sugar Beet Lifter 8 Row, 14.7 Ft ⁶	200 MFWD	\$89,000	4.05	324	\$8.61	\$8.46	\$4.66	\$14.22	\$16.19	\$12.99	\$65.12	\$ 48.97	2.24
Sugar Beet Lifter (Higher Usage) 8 Row, 14.7 Ft ⁶	200 MFWD	\$89,000	4.05	1,013	\$8.61	\$8.46	\$4.66	\$13.20	\$18.79	\$4.82	\$58.54	\$ 50.55	2.24
Sugar Beet Topper 8 Row, 14.7 Ft	75	\$38,000	7.13	570	\$2.24	\$1.19	\$2.39	\$1.63	\$3.93	\$3.25	\$14.63	\$ 10.85	0.58
Sugar Beet Topper 12 Row, 22 Ft	160 MFWD	\$45,000	10.67	853	\$2.24	\$2.59	\$1.59	\$1.29	\$3.11	\$2.63	\$13.45	\$ 9.85	0.58
Sugar Beet Wagon 20 Ton, 11 Ft	200 MFWD	\$52,000	5.20	520	\$6.92	\$6.59	\$2.60	\$2.23	\$5.79	\$4.99	\$29.13	\$ 21.67	1.80
Sugar Beet Wagon 24 Ton, 11 Ft	225 MFWD	\$59,000	5.20	520	\$6.92	\$8.95	\$2.60	\$2.53	\$6.58	\$5.62	\$33.19	\$ 24.02	1.80

Implement	Tractor Size (HP)	Net Cost of A New Implement ¹	-- Estimated Work Performed Acres/hr	-- Acres/yr	Power Cost Per Acre ²	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Depreciation	Over-Head ³	Total Cost /Acre ⁴	Use-related Cost /Acre ⁵	Diesel Fuel Gal/Acre
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¹Net cost of a new unit assumes no trade-in. Farm machinery is exempt from sales tax in Minnesota so no sales tax is included.

²Power cost per acre for the power unit assigned to each implement multiplied times that implement's acres/hour equals that power unit's total cost per hour shown in the "Tractors and Combines (Without Heads)" table above.

³Overhead per acre will vary with annual use.

⁴Total cost/acre is total cost per hour divided by acres per hour. Includes fuel, lubricants, power and equipment repairs and maintenance, labor, and overhead costs including depreciation. Fuel is included in power cost.

⁵Use-related cost/acre is included in the total cost/acre amount. Use-related cost/acre includes everything in total cost/acre EXCEPT that non-depreciation overhead costs (interest, insurance, and housing) are omitted. Depreciation is included in use-related cost under the assumption that extra use reduces trade-in value which increases annual depreciation. In other words, depreciation is considered here to be at least partially use-related even though it is commonly thought of as being mainly time-related.

⁶Cost data for the 8 row sugar beet lifter is calculated for two levels of annual usage, 80 and 250 hours. The 250 hours/year is intended to reflect a custom work situation. At the higher usage, the machine is traded after 3 years with a trade-in value of 32% of list price. At the lower 80-hour usage level, it is traded at 12 years with a trade-in value 26% of list.