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MINNESOTA FARM MACHINERY ECONOMIC COST ESTIMATES FOR 2000

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The tables in this publication contain estimates of farm machinery operation costs for 2000. The estimates use 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. Time-related costs occur only when a machine is used. They include fuel, lubrication, use related repairs and labor. 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 labelled "use-related cost/acre".

OVERHEAD COSTS: Time-related costs are prorated over a 12 year economic life. Trade-in values are estimated based on American Society of Agricultural Engineers formulas. Purchase prices are discounted from manufacturers' list prices. A ten percent discount off list price appears "normal." Income tax implications are ignored. A housing charge of 33 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 costs:

OVERHEAD COSTS:

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

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

Housing, $/year = price per sq. foot x sq. feet shelter space required

Taxes per year = 0 (no taxes on personal property in Minnesota)

$$\text{DEPRECIATION, \$/hour (or \$/acre)} = \frac{\text{purchase cost - salvage value}}{\text{total hours used (or total acres) before trade-in}}$$

$$\text{\$/year} = \text{\$/hour x annual hours of use (or \$/acre x annual acres of use)}$$

OPERATING 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. The price of farm diesel fuel is projected at $1.00 per gallon. All power units, tractors, combines, trucks, etc., use diesel fuel. Lubrication cost is assumed to be 15 percent of fuel cost.

The formulas for repair and maintenance costs estimate total accumulated repair costs according to the 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 $9.50 per hour for unskilled labor and $12.00 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.

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.

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.

The following tables provide the year 2000 machinery operation costs broken down into several categories. Some relevant supporting data also are included. A spreadsheet template is also available for downloading from the Department of Applied Economics web site, for use in analyzing specific situations or just to better understand the methods used to calculate the numbers. The address is: http://apecon.agri.umn.edu/crop.html

ACCESS TO EDUCATIONAL PROGRAMS AND MATERIALS:

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
Chisel Plow	3.79	5.35
Chisel Plow, Front Dsk	5.78	8.25
Moldboard Plow	9.54	12.73
Reversible Plow	11.30	14.54
Field Cultivator	2.11	2.88
Tandem Disk	3.75	4.97
Tandem Disk H.D.	4.66	6.47
Offset Disk	5.55	7.49
V-Ripper	4.89	6.77
Comb Fld Cult Incorp	3.63	5.09
Comb Disk & V-Ripper	8.08	11.54
Disk,Fld Cult Finish	4.48	6.39
Roller Harrow	3.25	4.44
Springtooth Drag	1.18	1.75
Row Crop Planter	5.03	7.23
Min-Til Planter	6.30	8.88
Potato Row Marker	6.49	10.18
Potato Planter	17.99	27.63
Beet Planter	11.92	18.16
Grain Drill	5.02	7.45
Presswheel Drill	6.67	9.80
Air Seeder Drill	6.63	10.11
No-Till Drill	8.52	12.71
Cultivator	2.82	3.73
Cultivator Hi Res	3.80	5.19
Rotary Hoe	1.11	1.45
Potato Cultivator	3.81	4.83
Sugar Beet Cult	5.97	8.71
Boom Sprayer, Self-Prop	2.77	3.89
Boom Sprayer	1.38	1.70
Sprayer High Pressure	1.97	2.66
Hooded Sprayer	2.68	3.37

	Use-Related Cost/Acre[1]	Total Cost/Acre
Anhydrous Applicator	5.23	7.86
Fert Spreader	1.72	2.57
Corn Stalk Chopper	5.63	7.15
Potato Shredder	5.61	7.67
Stalk Shredder	5.32	7.32
Rock Picker	29.16	39.00
Mower-Conditioner	6.58	8.89
Rotary Hay Mower	7.98	9.89
Rotary Mow/Cond	5.14	7.07
Hay Rake (Hyd)	5.01	6.00
Hay Swather-Cond	5.89	8.25
Swather-Cond, Self-Prop	8.64	13.42
Grain Swather, Pull Type	3.12	4.41
Grain Swather, Self-Prop	5.74	8.85
Hay Baler PTO Twine	7.43	8.90
Round Baler	9.59	11.28
Rd Baler/Wrap	15.13	17.81
Large Rectangular Baler	6.15	9.99
Forage Harvester	33.69	47.10
Forage SP Harvstr	41.33	61.87
Combine w/Grain Head	10.51	13.36
Soybean Combine w/Hd	16.08	20.47
Corn Combine w/Hd	21.06	27.09
Potato Windrower	29.55	42.27
Potato Harvester Seed	56.02	70.03
Potato Harvester	49.67	62.94
Disk Bean Top Cutter	6.08	8.31
Sugar Beet Lifter	24.71	33.95
Sugar Beet Topper	7.19	10.06
Sugar Beet Wagon	11.99	17.14
Hay Stacker	11.25	13.63

[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).

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	19,200	400	2.02	0.65	2.82	920	2.30	3,117	7.79	1.76
60	24,200	400	3.04	0.81	3.56	1,156	2.89	4,118	10.30	2.64
75	29,300	400	3.80	1.04	4.21	1,410	3.53	5,027	12.57	3.30
105 MFWD	56,200	450	5.31	1.01	6.54	2,784	6.19	8,571	19.05	4.62
130 MFWD	73,300	450	6.58	1.32	8.52	3,619	8.04	11,009	24.46	5.72
160 MFWD	89,000	500	8.10	1.78	10.35	4,212	8.42	14,327	28.65	7.04
200 MFWD	112,100	500	10.12	2.24	13.04	5,291	10.58	17,993	35.99	8.80
225 MFWD	120,400	400	11.39	1.93	17.38	5,711	14.28	17,987	44.97	9.90
225 Tracked Tractor	139,200	400	11.39	2.23	20.09	6,590	16.47	20,072	50.18	9.90
260 (226 PTO) 4WD	104,700	400	11.45	1.68	15.11	4,977	12.44	16,270	40.68	9.95
310 (270 PTO) 4WD	116,300	400	13.65	1.86	16.79	5,519	13.80	18,437	46.09	11.87
360 (313 PTO) 4WD	130,000	400	15.85	2.08	18.76	6,160	15.40	20,837	52.09	13.78
425 (370 PTO) 4WD	150,800	400	18.71	2.41	21.77	7,132	17.83	24,288	60.72	16.27
190 HP Combine	124,000	300	9.61	21.36	27.94	5,435	18.12	23,110	77.03	8.36
220 HP Combine	129,000	300	11.13	22.23	29.07	5,683	18.94	24,410	81.37	9.68
275 HP Combine	146,600	300	13.92	25.26	33.03	6,474	21.58	28,135	93.78	12.10

[1]HP 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.

[2]Net cost of a new unit assumes no trade-in. As of 7/1/2000, farm machinery is exempt from sales tax in Minnesota so no sales tax is included.

[3]Overhead 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.

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost Per Acre[3]	Use-related Cost Per Acre[4]	Diesel Fuel Gal/Acre
Tillage Equipment												
Chisel Plow 11 Ft	75	5,700	5.87	469	2.14	1.65	0.30	0.66	0.72	5.47	4.15	0.56
Chisel Plow 15 Ft	130 MFWD	7,300	8.00	640	3.06	1.21	0.28	0.62	0.66	5.83	4.16	0.72
Chisel Plow 19 Ft	160 MFWD	12,800	10.13	811	2.83	0.96	0.39	0.86	0.85	5.88	4.19	0.69
Chisel Plow 23 Ft	200 MFWD	16,000	12.27	981	2.93	0.79	0.40	0.88	0.87	5.87	4.14	0.72
Chisel Plow 31 Ft	225 MFWD	20,300	16.53	1,323	2.72	0.59	0.38	0.83	0.81	5.33	3.65	0.60
Chisel Plow 37 Ft	310 4WD	23,100	19.73	1,579	2.34	0.49	0.36	0.79	0.78	4.76	3.28	0.60

[1] See footnotes at end of table.

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost /Acre[3]	Use-related Cost /Acre[4]	Diesel Fuel Gal/Acre
Tillage Equipment (continued)												
Chisel Plow 57 Ft	425 4WD	37,400	30.40	2,432	2.00	0.32	0.38	0.83	0.79	4.32	2.94	0.54
Chisel Plow, Front Dsk 8.8 Ft	105 MFWD	9,800	4.96	397	3.84	1.95	0.38	1.46	1.29	8.93	6.40	0.93
Chisel Plow, Front Dsk 16.3 Ft	200 MFWD	17,500	9.21	737	3.91	1.05	0.37	1.41	1.20	7.94	5.59	0.96
Chisel Plow, Front Dsk 18.8 Ft Fold	260 4WD	23,000	10.63	850	3.83	0.91	0.42	1.60	1.34	8.10	5.59	0.94
Chisel Plow, Front Dsk 21.3 Ft Fold	310 4WD	26,500	12.04	963	3.83	0.80	0.43	1.63	1.35	8.04	5.54	0.99
Moldboard Plow 4 -18, 6 Ft	75	11,000	2.78	334	4.52	3.48	1.71	1.78	1.66	13.15	10.22	1.19
Moldboard Plow 5 -18, 7.5 Ft	105 MFWD	13,600	3.48	417	5.48	2.79	1.69	1.77	1.65	13.37	9.94	1.33
Moldboard Plow 6 -18, 9 Ft	130 MFWD	16,100	4.17	542	5.86	2.32	1.77	1.61	1.51	13.07	9.64	1.37
Moldboard Plow 8 -18, 12 Ft	160 MFWD	21,600	5.56	723	5.15	1.74	1.79	1.62	1.50	11.80	8.78	1.27
Moldboard Plow 10 -18, 15 Ft	260 4WD	28,900	6.95	1,043	5.85	1.39	2.14	1.50	1.39	12.27	9.10	1.43
Reversible Plow 2 -18, 3 Ft	60	2,500	1.39	209	7.40	6.97	0.93	0.65	0.70	16.65	13.87	1.90
Reversible Plow 5 -18, 7.5 Ft	160 MFWD	7,500	3.48	522	8.24	2.79	1.11	0.78	0.76	13.68	10.50	2.02
Reversible Plow 5 -18, 7.5 Ft HD	160 MFWD	10,500	3.48	522	8.24	2.79	1.56	1.09	1.06	14.74	11.25	2.02
Reversible Plow 8 -18, 12 Ft	225 MFWD	14,800	5.56	835	8.08	1.74	1.37	0.96	0.94	13.09	9.59	1.78
Field Cultivator 12.5 Ft	75	5,800	9.02	1,082	1.39	1.07	0.22	0.29	0.31	3.29	2.59	0.37
Field Cultivator 18 Ft	105 MFWD	9,400	12.98	1,558	1.47	0.75	0.25	0.33	0.33	3.12	2.32	0.36
Field Cultivator 28 Ft	160 MFWD	14,800	20.19	2,423	1.42	0.48	0.25	0.33	0.33	2.82	2.07	0.35
Field Cultivator 37 Ft	225 MFWD	21,000	26.68	3,202	1.69	0.36	0.27	0.36	0.35	3.03	2.14	0.37
Field Cultivator 47 Ft	260 4WD	31,400	33.90	4,068	1.20	0.29	0.32	0.42	0.40	2.63	1.86	0.29
Field Cultivator 60 Ft	310 4WD	38,900	43.27	5,193	1.07	0.22	0.31	0.41	0.39	2.39	1.69	0.27
Tandem Disk 8.8 Ft Rigid	40	5,700	5.41	541	1.44	1.79	0.24	0.62	0.55	4.64	3.67	0.33
Tandem Disk 11 Ft Rigid	60	6,400	6.40	640	1.61	1.51	0.33	0.59	0.54	4.59	3.60	0.41
Tandem Disk 15 Ft Rigid	105 MFWD	11,700	8.73	873	2.18	1.11	0.45	0.79	0.70	5.23	3.83	0.53
Tandem Disk 21 Ft Rigid	160 MFWD	19,400	12.22	1,222	2.35	0.79	0.53	0.94	0.80	5.41	3.92	0.58
Tandem Disk H.D. 12 Ft Rigid	130 MFWD	10,000	6.98	698	3.50	1.39	0.48	0.85	0.75	6.97	5.07	0.82
Tandem Disk H.D. 18 Ft Fold	160 MFWD	19,100	10.47	1,047	2.74	0.93	0.61	1.08	0.93	6.28	4.55	0.67
Tandem Disk H.D. 30 Ft Fold	360 4WD	32,300	17.45	1,745	2.98	0.56	0.62	1.10	0.91	6.16	4.37	0.79
Offset Disk 7 Ft	60	5,500	3.25	325	3.17	2.99	0.39	1.00	0.86	8.41	6.66	0.81
Offset Disk 12 Ft	105 MFWD	10,000	5.56	556	3.42	1.74	0.41	1.07	0.92	7.56	5.53	0.83
Offset Disk 16 Ft	130 MFWD	12,500	7.42	742	3.30	1.31	0.38	1.00	0.88	6.87	4.90	0.77
Offset Disk 21 Ft Wing	200 MFWD	17,800	9.74	974	3.70	1.00	0.42	1.08	0.92	7.11	5.10	0.90
V-Ripper 25 O.C., 10 Ft	160 MFWD	11,300	6.18	618	4.64	1.57	0.59	0.99	0.96	8.74	6.42	1.14
V-Ripper 25 O.C., 14 Ft	200 MFWD	13,800	8.65	865	4.16	1.12	0.51	0.86	0.84	7.50	5.43	1.02
V-Ripper 25 O.C., 18 Ft	260 4WD	17,700	11.13	1,113	3.66	0.87	0.51	0.86	0.84	6.74	4.78	0.89
V-Ripper 25 O.C., 25 Ft	310 4WD	21,400	15.45	1,545	2.98	0.63	0.45	0.75	0.74	5.55	3.91	0.77

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost /Acre[3]	Use-related Cost /Acre[4]	Diesel Fuel Gal/Acre
V-Ripper 30 O.C., 12.5 Ft	160 MFWD	9,400	7.73	773	3.71	1.25	0.39	0.66	0.66	6.68	4.92	0.91
V-Ripper 30 O.C., 17 Ft	200 MFWD	12,000	10.51	1,051	3.42	0.92	0.37	0.62	0.62	5.96	4.33	0.84
V-Ripper 30 O.C., 22.5 Ft	360 4WD	17,300	13.91	1,391	3.75	0.70	0.40	0.67	0.68	6.20	4.41	0.99
Comb Fld Cult Incorp 16 Ft	160 MFWD	17,100	11.54	1,154	2.48	0.84	0.48	0.88	0.74	5.42	3.95	0.61
Comb Fld Cult Incorp 23 Ft	200 MFWD	28,100	16.59	1,659	2.17	0.58	0.55	1.00	0.84	5.15	3.67	0.53
Comb Fld Cult Incorp 25 Ft	260 4WD	30,300	18.03	1,803	2.26	0.54	0.54	1.00	0.84	5.17	3.64	0.55
Comb Fld Cult Incorp 33 Ft	310 4WD	38,600	23.80	2,380	1.94	0.41	0.52	0.96	0.81	4.64	3.25	0.50
Comb Disk & V-Ripper 12.5 Ft	225 MFWD	20,700	6.44	644	6.98	1.50	0.73	1.90	1.56	12.68	8.91	1.54
Comb Disk & V-Ripper 17.5 Ft	360 4WD	26,500	9.02	902	5.78	1.07	0.67	1.74	1.45	10.72	7.55	1.53
Comb Disk & V-Ripper 22.5 Ft	425 4WD	45,800	11.59	1,159	5.24	0.84	0.90	2.34	1.90	11.21	7.78	1.40
Disk,Fld Cult Finish 13 Ft	130 MFWD	12,600	6.70	670	3.65	1.45	0.43	1.11	1.04	7.68	5.44	0.85
Disk,Fld Cult Finish 22 Ft	200 MFWD	22,700	11.33	1,133	3.18	0.86	0.46	1.19	1.02	6.70	4.74	0.78
Disk,Fld Cult Finish 30 Ft	260 4WD	30,400	15.45	1,545	2.63	0.63	0.45	1.17	0.99	5.87	4.07	0.64
Disk,Fld Cult Finish 38 Ft	310 4WD	36,400	19.58	1,958	2.35	0.50	0.42	1.10	0.93	5.31	3.67	0.61
Roller Harrow 12 Ft	75	9,600	7.42	742	1.69	1.31	0.29	0.77	0.69	4.75	3.59	0.44
Roller Harrow 28 Ft	160 MFWD	25,000	17.31	1,731	1.66	0.56	0.33	0.86	0.72	4.12	2.91	0.41
Springtooth Drag 30 Ft	60	8,700	21.64	649	0.48	0.47	0.08	0.73	0.67	2.43	1.62	0.12
Springtooth Drag 48 Ft	75	11,000	34.62	1,212	0.36	0.30	0.07	0.49	0.49	1.70	1.12	0.10
Springtooth Drag 58 Ft	105 MFWD	12,800	41.83	4,183	0.46	0.23	0.10	0.17	0.16	1.11	0.80	0.11
Planting Equipment												
Row Crop Planter 4 -36, 12 Ft	40	13,400	5.60	392	1.39	2.49	0.70	1.66	1.84	8.08	5.83	0.31
Row Crop Planter 6 -30, 15 Ft	60	15,000	7.00	490	1.47	1.99	0.63	1.49	1.65	7.23	5.16	0.38
Row Crop Planter 8 -30, 20 Ft	75	22,300	9.33	653	1.35	1.49	0.70	1.66	1.81	7.01	4.82	0.35
Row Crop Planter 12 -30, 30 Ft	105 MFWD	34,100	14.00	980	1.36	0.99	0.71	1.69	1.85	6.61	4.32	0.33
Min-Til Planter 4 -36, 12 Ft	60	13,400	5.09	356	2.02	2.73	0.77	1.83	2.03	9.38	6.79	0.52
Min-Til Planter 6 -30, 15 Ft	75	19,200	6.36	509	1.97	2.19	1.03	1.83	2.00	9.02	6.47	0.52
Min-Til Planter 8 -30, 20 Ft	105 MFWD	25,300	8.48	594	2.24	1.64	0.88	2.07	2.25	9.08	6.10	0.54
Min-Til Planter 12 -30, 30 Ft	160 MFWD	47,100	12.73	1,273	2.25	1.09	1.61	1.80	1.92	8.67	6.09	0.55
Min-Til Planter 16 -30, 40 Ft	200 MFWD	66,600	16.97	2,206	2.12	0.82	2.28	1.47	1.58	8.26	6.06	0.52
Potato Planter Filler 19 Ft	None	13,400	5.75	322	0.02	-	0.60	2.02	2.25	4.89	2.64	0.02
Potato Row Marker 4 Row, 12.6 Ft	130 MFWD	12,600	4.98	214	4.91	2.99	0.22	2.86	3.04	14.01	9.36	1.15
Potato Row Marker 6 Row, 19 Ft	160 MFWD	19,600	7.47	321	3.84	1.99	0.22	2.96	3.15	12.17	7.89	0.94
Potato Row Marker 8 Row, 27.4 Ft	160 MFWD	25,100	10.79	464	2.65	1.38	0.20	2.63	2.80	9.66	6.08	0.65
Potato Planter 4 Row, 12.6 Ft	130 MFWD	37,800	3.83	214	6.39	6.96	2.27	8.56	8.93	33.10	22.07	1.49
Potato Planter 6 Row, 19 Ft	130 MFWD	50,300	5.75	322	4.26	4.64	2.01	7.59	7.94	26.44	17.10	1.00
Potato Planter 8 Row, 27.4 Ft	160 MFWD	69,200	8.30	465	3.45	3.21	1.91	7.23	7.56	23.36	14.79	0.85
Beet Planter 12 Row, 22 Ft	105 MFWD	26,400	4.67	280	4.08	3.19	1.40	4.58	4.91	18.16	11.92	0.99
Grain Drill 25 Ft	130 MFWD	27,300	10.61	848	2.31	1.26	0.88	1.56	1.70	7.70	5.24	0.54

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost /Acre[3]	Use-related Cost /Acre[4]	Diesel Fuel Gal/Acre
Grain Drill 30 Ft	130 MFWD	34,600	12.73	1,018	1.92	1.05	0.92	1.65	1.78	7.33	4.91	0.45
Grain Drill 35 Ft	160 MFWD	41,600	14.85	1,188	1.93	0.90	0.95	1.70	1.83	7.31	4.91	0.47
Presswheel Drill 12 Ft	75	20,000	5.09	382	2.47	2.62	1.24	2.54	2.73	11.61	8.18	0.65
Presswheel Drill 16 Ft	105 MFWD	25,900	6.79	509	2.81	1.96	1.21	2.47	2.65	11.10	7.54	0.68
Presswheel Drill 20 Ft	130 MFWD	27,900	8.48	636	2.88	1.57	1.04	2.13	2.30	9.92	6.68	0.67
Presswheel Drill 30 Ft	160 MFWD	40,900	12.73	1,018	2.25	1.05	1.09	1.95	2.09	8.44	5.68	0.55
Presswheel Drill 40 Ft	200 MFWD	53,700	16.97	1,358	2.12	0.78	1.08	1.92	2.05	7.96	5.28	0.52
Air Seeder Drill 36 Ft	260 4WD	63,100	15.27	1,222	2.66	0.87	1.40	2.51	2.67	10.11	6.63	0.65
No-Till Drill 15 Ft	130 MFWD	27,600	6.36	509	3.84	2.09	1.47	2.63	2.83	12.87	8.78	0.90
No-Till Drill 20 Ft	160 MFWD	44,100	8.48	679	3.38	1.57	1.77	3.16	3.36	13.23	8.88	0.83
No-Till Drill 30 Ft	200 MFWD	65,200	12.73	1,018	2.83	1.05	1.74	3.11	3.29	12.02	7.89	0.69
Crop Maintenance Equipment												
Cultivator 4 -36, 12 Ft	75	3,700	6.18	618	2.03	1.60	0.14	0.32	0.33	4.43	3.53	0.53
Cultivator 6 -30, 15 Ft	60	4,600	7.73	773	1.33	1.28	0.14	0.32	0.33	3.40	2.70	0.34
Cultivator 8 -30, 20 Ft	130 MFWD	6,200	10.30	1,030	2.37	0.96	0.14	0.33	0.33	4.13	3.02	0.56
Cultivator 12 -30, 30 Ft	160 MFWD	12,200	15.45	1,545	1.85	0.64	0.19	0.43	0.41	3.52	2.56	0.46
Cultivator 16 -30, 40 Ft	200 MFWD	15,000	20.61	2,061	1.75	0.48	0.17	0.39	0.38	3.17	2.28	0.43
Cultivator High Residue 4 -36, 12 Ft	75	6,500	6.18	618	2.03	1.60	0.25	0.57	0.55	5.00	3.88	0.53
Cultivator High Residue 6 -30, 15 Ft	105 MFWD	8,900	7.73	773	2.46	1.28	0.27	0.62	0.60	5.23	3.84	0.60
Cultivator High Residue 8 -30, 20 Ft	160 MFWD	12,100	10.30	1,030	2.78	0.96	0.28	0.64	0.60	5.26	3.83	0.68
Cultivator High Residue 12 -30, 30 Ft	225 MFWD	20,600	15.45	1,545	2.91	0.64	0.31	0.72	0.67	5.26	3.66	0.64
Rotary Hoe 15 Ft	75	4,000	18.55	1,855	0.68	0.53	0.06	0.13	0.12	1.51	1.21	0.18
Rotary Hoe 21 Ft	105 MFWD	6,200	25.96	2,596	0.73	0.38	0.07	0.14	0.13	1.45	1.08	0.18
Rotary Hoe 30 Ft	160 MFWD	9,400	37.09	3,709	0.77	0.27	0.07	0.15	0.13	1.39	1.03	0.19
Potato Cultivator 4 Row, 12.6 Ft	75	4,600	5.36	778	2.34	1.84	0.31	0.32	0.30	5.12	4.16	0.62
Potato Cultivator 6 Row, 19 Ft	105 MFWD	6,900	8.04	1,126	2.37	1.23	0.30	0.33	0.32	4.55	3.46	0.57
Sugar Beet Cult 12 Row, 22 Ft	105 MFWD	10,400	5.60	336	3.40	1.76	0.24	1.68	1.64	8.71	5.97	0.83
Self-Propelled Boom Sprayer 47 Ft	None	57,800	25.92	2,592	0.12	0.58	1.07	1.08	1.14	4.00	2.86	0.11
Self-Propelled Boom Sprayer 60 Ft	None	72,000	33.09	3,309	0.12	0.45	1.05	1.06	1.11	3.79	2.68	0.11
Boom Sprayer 30 Ft	40	4,700	15.36	1,229	0.51	0.98	0.14	0.19	0.23	2.04	1.66	0.11
Boom Sprayer 50 Ft	60	5,900	25.61	2,561	0.40	0.59	0.11	0.11	0.14	1.35	1.10	0.10
Sprayer High Pressure 50 Ft	60	25,100	23.64	2,364	0.44	0.63	0.51	0.52	0.56	2.66	1.97	0.11
Hooded Sprayer 8 Row, 20 Ft	40	6,600	10.24	819	0.76	1.46	0.29	0.39	0.46	3.37	2.68	0.17
Anhydrous Applicator 30 Ft	160 MFWD	19,000	12.73	509	2.25	0.99	0.84	1.81	1.97	7.86	5.23	0.55
Fert Spreader 4 T, 40 Ft	60	9,800	23.76	713	0.43	0.53	0.21	0.67	0.73	2.57	1.72	0.11
Corn Stalk Chopper 12 Ft	60	8,700	4.65	465	2.21	2.25	0.63	1.17	0.90	7.15	5.63	0.57
Potato Shredder 18 Ft	130 MFWD	12,800	6.98	698	3.50	1.50	0.61	1.14	0.91	7.67	5.61	0.82
Stalk Shredder 20 Ft	130 MFWD	15,000	7.76	776	3.15	1.35	0.65	1.21	0.97	7.32	5.32	0.74

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost /Acre[3]	Use-related Cost /Acre[4]	Diesel Fuel Gal/Acre
Rock Picker 6 Ft	75	12,800	1.42	85	8.86	8.04	5.36	9.38	7.35	39.00	29.16	2.33
Harvesting Equipment												
Mower-Conditioner 9 Ft	40	13,100	4.36	349	1.79	2.39	0.59	2.34	1.78	8.89	6.58	0.40
Rotary Hay Mower 6 Ft	40	6,800	2.91	291	2.68	3.27	1.37	1.46	1.12	9.89	7.98	0.61
Rotary Mow/Cond 9 Ft	75	15,400	6.55	524	1.92	1.52	0.40	1.83	1.39	7.07	5.14	0.50
Hay Rake (Hyd) 9 Ft	40	4,300	3.49	698	2.23	2.72	0.33	0.38	0.33	6.00	5.01	0.50
Hay Swather-Cond 12 Ft	60	17,800	5.82	465	1.77	1.63	0.60	2.39	1.87	8.25	5.89	0.45
Swather-Cond, Self-Prop 16 Ft	None	64,000	7.76	621	0.46	1.22	0.53	6.43	4.78	13.42	8.64	0.40
Grain Swather, Pull Type 18 Ft	75	10,500	8.73	698	1.44	1.09	0.08	0.94	0.82	4.37	3.14	0.38
Grain Swather, Pull Type 21 Ft	75	15,500	10.18	815	1.23	0.93	0.10	1.19	1.00	4.45	3.11	0.32
Grain Swather, Self-Prop 21 Ft	None	53,800	10.18	815	0.35	0.93	0.34	4.12	3.11	8.85	5.74	0.30
Hay Baler PTO Twine 12 Ft	40	16,700	4.36	873	1.79	3.05	1.97	1.15	0.95	8.90	7.43	0.40
Round Baler 1000 Lb, 9 Ft	60	11,400	3.01	603	3.42	3.50	3.64	1.13	0.92	12.61	10.73	0.88
Round Baler 1500 Lb, 12 Ft	60	12,700	4.02	804	2.56	2.62	3.04	0.95	0.77	9.95	8.46	0.66
Rd Baler/Wrap 1000 Lb, 9 Ft	60	21,900	3.01	603	3.42	3.50	6.99	2.18	1.72	17.81	15.13	0.88
Large Rectangular Baler 24 Ft	130 MFWD	57,500	16.29	815	1.50	0.65	0.26	4.23	3.34	9.99	6.15	0.35
Forage Harvester 2 Row, 5 Ft	105 MFWD	25,800	1.38	138	13.81	9.66	3.48	11.22	8.92	47.10	33.69	3.35
Forage SP Harvstr 2 Row, 5 Ft	None	154,500	1.70	255	3.12	7.85	5.46	38.50	27.37	82.30	54.93	2.71
Forage SP Harvstr 3 Row, 7.5 Ft	None	172,500	2.55	382	3.12	5.23	4.07	28.66	20.41	61.48	41.07	2.71
Forage SP Harvstr 6 Row, 15 Ft	None	234,600	5.09	764	3.12	2.62	2.76	19.49	13.83	41.82	27.98	2.71
Combine w/Grain Head 20 Ft	220 HP Combine	10,300	6.79	1,358	11.99	1.96	0.18	0.49	0.35	14.97	11.83	1.43
Combine w/Grain Head 30 Ft	275 HP Combine	18,600	10.18	2,036	9.21	1.31	0.21	0.59	0.42	11.74	9.20	1.19
Soybean Combine w/Hd 15 Ft	220 HP Combine	14,000	4.45	891	18.27	2.99	0.37	1.02	0.72	23.36	18.39	2.17
Soybean Combine w/Hd 18 Ft	275 HP Combine	15,400	5.35	1,069	17.54	2.49	0.34	0.93	0.67	21.97	17.27	2.26
Soybean Combine w/Hd 25 Ft	275 HP Combine	18,200	7.42	1,485	12.63	1.79	0.29	0.79	0.56	16.07	12.60	1.63
Corn Combine w/Hd 4 -36, 12 Ft	190 HP Combine	19,100	3.36	672	22.93	3.96	0.66	1.84	1.30	30.70	24.00	2.49
Corn Combine w/Hd 4 -30, 10 Ft	190 HP Combine	20,000	2.80	560	27.51	4.76	0.83	2.31	1.62	37.03	28.94	2.99
Corn Combine w/Hd 6 -30, 15 Ft	220 HP Combine	25,300	4.20	840	19.37	3.17	0.70	1.95	1.38	26.57	20.68	2.30
Corn Combine w/Hd 8 -30, 20 Ft	220 HP Combine	32,000	5.09	1,018	15.98	2.62	0.73	2.03	1.44	22.80	17.64	1.90
Corn Combine w/Hd 12 -30, 30 Ft	275 HP Combine	49,400	7.64	1,527	12.28	1.74	0.75	2.09	1.46	18.33	14.05	1.58
Potato Windrower 2 Row, 6.3 Ft	75	32,200	1.49	149	8.41	6.87	4.89	13.45	10.14	43.76	31.26	2.21
Potato Windrower 4 Row, 12.6 Ft	105 MFWD	70,600	2.99	299	6.37	3.43	5.37	14.74	10.85	40.77	27.84	1.55
Potato Harvester Seed 2 Row, 6.3 Ft	130 MFWD	68,100	1.38	295	17.74	28.10	15.20	13.84	10.79	85.69	69.06	4.15
Potato Harvester Seed 4 Row, 12.6 Ft	130 MFWD	107,700	2.76	590	8.87	14.05	12.02	10.95	8.48	54.37	42.98	2.07
Potato Harvester 2 Row, 6.3 Ft	130 MFWD	55,700	1.84	294	13.31	21.08	8.30	11.36	8.89	62.94	49.67	3.11
Disk Bean Top Cutter 6 Row, 11 Ft	105 MFWD	13,300	6.40	512	2.98	2.08	0.45	1.54	1.26	8.31	6.08	0.72
Sugar Beet Lifter 4 Row, 7.3 Ft	105 MFWD	48,500	3.47	277	5.50	3.84	9.06	10.37	8.19	36.96	26.99	1.33
Sugar Beet Lifter 6 Row, 11 Ft	130 MFWD	63,200	5.20	426	4.70	2.56	7.93	8.78	6.95	30.93	22.43	1.10

Implement	Tractor Size (HP)	Net Cost of A New Implement[1]	- - Estimated - - Work Performed Acres/hr	Acres/yr	Power Cost Per Acre	Labor Cost Per Acre	--Implement Cost/Acre-- Repairs	Deprec-iation	Over-head[2]	Total Cost /Acre[3]	Use-related Cost /Acre[4]	Diesel Fuel Gal/Acre
Sugar Beet Topper 6 Row, 11 Ft	75	19,200	5.33	427	2.36	2.25	1.10	2.67	2.19	10.56	7.71	0.62
Sugar Beet Topper 12 Row, 22 Ft	160 MFWD	37,100	10.67	853	2.69	1.13	1.06	2.58	2.10	9.55	6.66	0.66
Sugar Beet Wagon 8 Ton, 7.3 Ft	75	10,300	3.47	277	3.63	2.74	0.62	2.23	1.91	11.13	8.20	0.95
Sugar Beet Wagon 20 Ton, 11 Ft	200 MFWD	40,900	5.20	520	6.92	1.83	1.75	4.72	3.77	18.99	13.18	1.69
Sugar Beet Wagon 24 Ton, 11 Ft	225 MFWD	43,300	5.20	520	8.65	1.83	1.86	5.00	3.98	21.31	14.58	1.90
Hay Stacker 1 Ton, 12 Ft	60	23,300	4.15	829	2.48	3.21	2.89	1.69	1.35	11.63	9.58	0.64
Hay Stacker 3 Ton, 12 Ft	75	34,400	4.84	1,064	2.60	2.75	3.95	1.94	1.55	12.79	10.52	0.68
Hay Stacker 6 Ton, 12 Ft	105 MFWD	55,500	5.53	1,548	3.45	2.41	6.77	2.15	1.71	16.48	13.65	0.84

[1]Net cost of a new unit assumes no trade-in. As of 7/1/2000, farm machinery is exempt from sales tax in Minnesota so no sales tax is included.

[2]Overhead per acre will vary with annual use.

[3]Total cost per acre is total cost per hour divided by acres per hour. Includes fuel, lubricants, repairs and maintenance, labor, overheads and depreciation. Fuel is included in power cost.

[4]Use-related cost/acre includes fuel, lubricants, power and equipment repairs and maintenance, labor, and power and equipment depreciation (depreciation is both time-related and use-related).

Implement	Tractor Size (HP)	Net Cost of A New Implement	- - Estimated - - Work Performed Hours/yr	Power Cost Per Hour	Labor Cost Per Hour	--Implement Cost/Hour-- Repairs	Deprec-iation	Overhead	Total Cost Per Hour	Use-related Cost Per Hour	Diesel Fuel Gal/Hour
Miscellaneous - Per Hour Calculations Only											
Rd Bale Wrapper Silage	60	18,300	150	10.30	9.50	13.99	7.32	5.73	46.84	38.22	2.64
Bale Wrapper Dry Hay	40	7,900	150	7.79	9.50	6.04	3.16	2.55	29.04	24.19	1.76
Forage Blower	60	5,900	50	10.30	9.50	0.96	7.08	5.61	33.45	24.94	2.64
Manure Spreader 150 Bu	75	7,000	100	12.57	9.69	5.18	3.81	3.56	34.80	27.72	3.30
Manure Spreader 300 Bu	105 MFWD	9,200	100	19.05	9.69	6.80	5.01	4.67	45.22	34.36	4.62
Manure Spreader 400 Bu	130 MFWD	13,600	100	24.46	9.69	10.06	7.41	6.86	58.48	43.57	5.72
Liquid Manure Spreader 9500 Gal	225 Tracked Tractor	42,800	70	50.18	9.69	28.43	33.29	30.52	152.11	105.12	9.90
Grain Cart 500 Bu	60	15,300	130	10.30	9.50	3.69	7.06	5.91	36.46	27.66	2.64
Gravity Grain Box 240 Bu	75	4,000	130	12.57	9.50	0.96	1.85	1.95	26.82	21.35	3.30
Baled Hay Wagon	40	3,300	250	7.79	19.00	0.97	0.79	0.87	29.42	26.25	1.76
Forage Wagon 14 Ft Long	40	11,000	130	7.79	9.50	2.55	5.08	4.39	29.31	22.62	1.76
Forage Wagon 16 Ft Long	40	12,300	130	7.79	9.50	2.86	5.68	4.72	30.55	23.52	1.76
Soil scraper bucket 12 Cu Yd	260 4WD	35,700	80	40.68	13.32	6.94	24.17	21.46	106.57	72.66	9.95