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STAFF PAPER SERIES

Farm Machinery Economic Costs for 1998: Minnesota Estimates With Adjustments for Use in Canada

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Minnesota Estimates with Adjustments for Use in Canada**

by

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**Farm Machinery Economic Costs for 1998:
Minnesota Estimates with Adjustments for Use in Canada**

The tables in this publication contain estimates of farm machinery operations function costs for 1998. The estimates use an economic engineering approach. The data represents an average farming industry cost for specified machines and operations. As other states have reduced their extension programming in the area of farm machinery management, the Minnesota cost estimates have been receiving broader usage around the United States.

Many agricultural input suppliers today are taking a more active role in providing management education as a way of adding value to their products and helping their customers to make decisions about the products. One particular instance of this role is Deere and Company of Moline, Illinois. Deere now uses the figures from this report to provide economic cost estimates for its tillage equipment to make it easier for farmers to compare the cost of tillage with other weed control alternatives such as chemicals. Staff at Deere provided data which was used to refine the set of prices, tractor sizes, and operating speeds in this paper, for use by anyone with an interest in farm machinery operating costs. This paper is similar to University of Minnesota Extension Service folder FO-6696, "MINNESOTA FARM MACHINERY ECONOMIC COST ESTIMATES FOR 1998," but includes a second set of tables with costs expressed in Canadian dollar terms and with adjustments in fuel prices and taxes to Canadian levels, to make the information more useful to producers in Canada.

Machine costs are separated into time and use related categories. Overhead costs accrue to the owner whether or not a machine is used. Overhead includes time-related economic costs: depreciation, interest, insurance and housing. There are no personal property taxes in Minnesota. Operating costs occur only when a machine is used. They include fuel, lubrication, use related repairs and labor charges an economic cost.

OVERHEAD COSTS: Time-related costs are prorated over a 12 year economic life. Salvage values are estimated based on procedures suggested in a February 1995 American Journal of Agricultural Economics article "Depreciation Patterns for Agricultural Machinery," by Timothy Cross and Gregory Perry. Salvage values at 12 years of life now range from 18 to 50 percent. Producers are keeping machinery longer than in the past. Managers, striving for cost control, are sometimes buying a second item often "twinned" to one now in use.

Purchase prices are discounted from manufacturers' list prices. A 10 percent discount off list price appears "normal." The tables include some adjustment for Minnesota sales tax, delivery and setup. An equivalent price adjustment for the income tax expensing option is not included. Insurance is 0.85 percent of new cost. A housing charge on average investment 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 calculated by taking a nominal rate charged by lenders, minus a measure of the inflation rate per year expected over the years of ownership. The rationale for using the lower real rate is that inflation is expected to increase the income that the equipment will generate in the later years of its life, other things being equal. The first year's income is consequently an underestimate of productivity in later years. An interest charge based on the lower real rate correlates with the lower first year income.

Formulas used to compute machinery overhead costs:

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

$$\text{Interest, \$ per year} = \frac{\text{purchase cost} + \text{salvage value}}{\text{-----}} \times \text{interest rate}$$

$$\text{Insurance, \$ per year} = \frac{\text{purchase cost} + \text{salvage value}}{2} \times \text{rate}$$

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

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

OPERATING COSTS: Fuel cost is calculated by multiplying the fuel consumption by the price of fuel, with fuel consumption assumed to be 0.053 gallons of diesel fuel per horsepower hour. The price of farm diesel fuel is projected at 80 cents 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 to 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 a 30 percent benefits factor. Charge rates are \$9.50 per hour for unskilled labor and \$12.00 per hour for skilled labor. 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.

The assumption made about the number of acres of use is a major influence on the average overhead and the average total machine function cost per acre.

These estimates will not represent any given individual's cost. They can still be used to help plan the cropping operation if more specific data are not available. Differences in buying power, repair programs, average annual use, and overall replacement programs should be considered when making adjustments.

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 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 operating costs and the total of operating plus allocated per acre or hour overhead.

The following tables provide the 1998 machinery function costs broken down into several categories. Some relevant supporting data also are included.

Tractor Hp, Combine or Truck Size	Net Cost of a New Power Unit	Annual Hours of Use	-- Overhead -- Cost per Year Hour		-- Operating -- Expense per Hour Year		- Total Cost - Per Year Per Hour of Use of Use		Maintenance & Repair Cost/hr	Diesel Use/hr Gallons
Tractors and Combines (Without Heads)										
40	19,350	500	1,964	3.93	2.85	1,427	3,391	6.78	0.90	2.1
60	25,830	500	2,616	5.23	4.13	2,066	4,682	9.36	1.21	3.2
75	33,210	500	3,357	6.71	5.21	2,603	5,961	11.92	1.55	4.0
105 MFWD	51,300	550	5,262	9.57	6.25	3,437	8,699	15.82	1.13	5.6
130 MFWD	70,020	550	7,168	13.03	7.88	4,334	11,502	20.91	1.54	6.9
160 MFWD	88,110	600	9,506	15.84	9.92	5,950	15,455	25.76	2.11	8.5
200 MFWD	104,850	600	11,302	18.84	12.27	7,361	18,664	31.11	2.52	10.6
225 MFWD	114,120	500	12,258	24.52	13.25	6,627	18,885	37.77	2.28	11.9
260 4WD	117,900	500	12,661	25.32	15.04	7,518	20,179	40.36	2.36	13.8
310 4WD	118,800	500	12,757	25.51	17.49	8,746	21,503	43.01	2.38	16.4
360 4WD	127,440	500	13,679	27.36	20.10	10,051	23,730	47.46	2.55	19.1
425 4WD	149,580	500	16,041	32.08	23.71	11,857	27,898	55.80	2.99	22.5
190 HP Combine	104,490	300	11,884	39.61	28.27	8,480	20,364	67.88	19.00	10.1
220 HP Combine	123,300	300	14,038	46.79	33.15	9,945	23,984	79.95	22.42	11.7
275 HP Combine	136,170	300	15,523	51.74	38.17	11,452	26,975	89.92	24.76	14.6

Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr	-- Acres/yr	Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars			Operating Expense / Acre ³	Diesel Fuel Gal/acre		
Tillage Equipment											
Chisel Plow 11 Ft	75	4,860	6.40	640	28.42	1.86	1.06	1.51	4.44	1.07	0.62
Chisel Plow 15 Ft	130 MFWD	6,300	8.73	873	39.32	2.40	1.00	1.11	4.51	1.14	0.79
Chisel Plow 19 Ft	160 MFWD	10,890	11.05	1,105	49.98	2.33	1.31	0.88	4.52	1.23	0.77
Chisel Plow 23 Ft	200 MFWD	13,680	13.38	1,338	58.94	2.32	1.36	0.72	4.40	1.26	0.79
Chisel Plow 31 Ft	225 MFWD	17,370	18.04	1,804	70.43	2.09	1.27	0.54	3.91	1.06	0.66
Chisel Plow 37 Ft	310 4WD	19,800	21.53	2,153	78.98	2.00	1.22	0.45	3.67	1.12	0.76
Chisel Plow 57 Ft	425 4WD	26,398	33.16	3,316	100.12	1.68	1.04	0.29	3.02	0.98	0.68

¹ See footnotes at end of table.

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Tillage Equipment											
Chisel Plow, Front Dsk 8.75 Ft	105 MFWD	8,370	5.41	541	37.04	2.92	2.13	1.79	6.85	1.51	1.03
Chisel Plow, Front Dsk 16.25 Ft	200 MFWD	15,030	10.05	1,005	61.19	3.10	2.03	0.96	6.09	1.56	1.06
Chisel Plow, Front Dsk 18.75 Ft Fold	260 4WD	19,710	11.59	1,159	76.56	3.48	2.29	0.84	6.61	1.68	1.19
Chisel Plow, Front Dsk 21.25 Ft Fold	310 4WD	22,680	13.14	1,314	83.09	3.27	2.31	0.74	6.33	1.72	1.25
Moldboard Plow 4-18, 6 Ft	75	9,720	2.78	334	33.55	4.29	4.29	3.48	12.06	3.38	1.43
Moldboard Plow 5-18, 7.5 Ft	105 MFWD	11,970	3.48	417	40.24	4.55	4.24	2.79	11.57	3.28	1.60
Moldboard Plow 6-18, 9 Ft	130 MFWD	14,220	4.17	542	47.66	5.01	4.09	2.32	11.42	3.46	1.65
Moldboard Plow 8-18, 12 Ft	160 MFWD	19,080	5.56	723	58.27	4.63	4.10	1.74	10.47	3.36	1.52
Moldboard Plow 10-18, 15 Ft	260 4WD	25,470	6.95	1,043	79.37	5.80	4.22	1.39	11.41	4.05	1.98
Reversible Plow 2-18, 3 Ft	60	2,250	1.39	209	21.79	6.73	1.96	6.97	15.66	3.80	2.29
Reversible Plow 5-18, 7.5 Ft	160 MFWD	6,660	3.48	522	43.25	7.41	2.24	2.79	12.44	3.84	2.44
Reversible Plow 5-18 HD, 7.5 Ft	160 MFWD	9,270	3.48	522	46.31	7.41	3.12	2.79	13.32	4.23	2.44
Reversible Plow 8-18, 12 Ft	225 MFWD	13,050	5.56	835	62.75	6.79	2.75	1.74	11.28	3.59	2.14
Field Cultivator 12.5 Ft	75	5,220	9.02	1,082	27.95	1.32	0.70	1.07	3.10	0.78	0.44
Field Cultivator 18 Ft	105 MFWD	8,370	12.98	1,558	35.46	1.22	0.77	0.75	2.73	0.71	0.43
Field Cultivator 28 Ft	160 MFWD	13,230	20.19	2,423	51.13	1.28	0.78	0.48	2.53	0.72	0.42
Field Cultivator 37 Ft	225 MFWD	18,810	26.68	3,202	69.55	1.42	0.83	0.36	2.61	0.74	0.45
Field Cultivator 47 Ft	260 4WD	28,170	33.90	4,068	82.78	1.19	0.97	0.29	2.44	0.73	0.41
Field Cultivator 60 Ft	310 4WD	34,920	43.27	5,193	93.01	0.99	0.93	0.22	2.15	0.68	0.38
Tandem Disk 8.75 Ft Rigid	40	5,040	5.41	541	23.39	1.25	1.28	1.79	4.32	0.74	0.39
Tandem Disk 11 Ft Rigid	60	5,580	6.40	640	27.48	1.46	1.32	1.51	4.29	0.94	0.50
Tandem Disk 15 Ft Rigid	105 MFWD	10,260	8.73	873	40.72	1.81	1.74	1.11	4.67	1.11	0.64
Tandem Disk 21 Ft Fold	160 MFWD	17,100	12.22	1,222	60.50	2.11	2.05	0.79	4.95	1.28	0.69
Tandem Disk H.D. 12 Ft Rigid	130 MFWD	8,820	6.98	698	43.68	3.00	1.87	1.39	6.26	1.55	0.99
Tandem Disk H.D. 18 Ft Fold	160 MFWD	16,830	10.47	1,047	60.19	2.46	2.36	0.93	5.75	1.48	0.81
Tandem Disk H.D. 30 Ft Fold	360 4WD	28,440	17.45	1,745	98.31	2.72	2.36	0.56	5.63	1.70	1.09
Offset Disk 7 Ft	60	4,860	3.25	325	25.67	2.89	2.04	2.99	7.91	1.61	0.98
Offset Disk 12 Ft	105 MFWD	8,820	5.56	556	37.53	2.84	2.16	1.74	6.75	1.48	1.00

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Offset Disk 16 Ft	130 MFWD	10,980	7.42	742	45.75	2.82	2.04	1.31	6.17	1.40	0.93
Offset Disk Wing 21 Ft	200 MFWD	15,660	9.74	974	62.00	3.19	2.18	1.00	6.37	1.63	1.09
V-Ripper 25 O.C. 10 Ft	160 MFWD	9,990	6.18	618	48.47	4.17	2.11	1.57	7.84	2.13	1.37
V-Ripper 25 O.C. 14 Ft	200 MFWD	12,150	8.65	865	56.66	3.59	1.83	1.12	6.55	1.87	1.22
V-Ripper 25 O.C. 18 Ft	260 4WD	15,570	11.13	1,113	70.39	3.63	1.83	0.87	6.33	1.80	1.24
V-Ripper 25 O.C. 25 Ft	310 4WD	18,810	15.45	1,545	77.47	2.78	1.60	0.63	5.01	1.52	1.06
V-Ripper 30 O.C. 12.5 Ft	160 MFWD	8,280	7.73	773	46.42	3.33	1.42	1.25	6.01	1.63	1.10
V-Ripper 30 O.C. 17 Ft	200 MFWD	10,530	10.51	1,051	54.79	2.96	1.33	0.92	5.21	1.49	1.01
V-Ripper 30 O.C. 22.5 Ft	360 4WD	15,210	13.91	1,391	77.37	3.41	1.45	0.70	5.56	1.80	1.37
Comb Fld Cult Incorp 16 Ft	160 MFWD	15,030	11.54	1,154	57.20	2.23	1.88	0.84	4.96	1.28	0.73
Comb Fld Cult Incorp 23 Ft	200 MFWD	24,750	16.59	1,659	76.54	1.88	2.15	0.58	4.61	1.22	0.64
Comb Fld Cult Incorp 25 Ft	260 4WD	26,730	18.03	1,803	88.70	2.24	2.14	0.54	4.92	1.31	0.76
Comb Fld Cult Incorp 33 Ft	310 4WD	34,020	23.80	2,380	101.91	1.81	2.07	0.41	4.28	1.20	0.69
Comb Disk & V-Ripper 12.5 Ft	225 MFWD	18,180	6.44	644	71.72	5.87	3.77	1.50	11.14	2.70	1.85
Comb Disk & V-Ripper 17.5 Ft	360 4WD	23,310	9.02	902	88.49	5.26	3.48	1.07	9.82	2.82	2.12
Disk,Fld Cult Finish 13 Ft	130 MFWD	11,070	6.70	670	46.20	3.12	2.33	1.45	6.90	1.55	1.03
Disk,Fld Cult Finish 22 Ft	200 MFWD	19,980	11.33	1,133	68.04	2.74	2.40	0.86	6.00	1.48	0.94
Disk,Fld Cult Finish 30 Ft	260 4WD	26,820	15.45	1,545	86.43	2.61	2.35	0.63	5.59	1.37	0.89
Disk,Fld Cult Finish 38 Ft	310 4WD	32,040	19.58	1,958	96.07	2.20	2.22	0.50	4.91	1.27	0.84
Roller Harrow 12 Ft	75	8,460	7.42	742	33.33	1.61	1.58	1.31	4.49	0.96	0.54
Roller Harrow 28 Ft	160 MFWD	22,050	17.31	1,731	65.27	1.49	1.72	0.56	3.77	0.86	0.49
Springtooth Drag 30 Ft	60	7,650	21.64	649	45.44	0.43	1.19	0.47	2.10	0.26	0.15
Springtooth Drag 48 Ft	75	9,720	34.62	1,212	51.80	0.34	0.86	0.30	1.50	0.21	0.11
Springtooth Drag 58 Ft	105 MFWD	11,340	41.83	4,183	40.19	0.38	0.36	0.23	0.96	0.24	0.13
Planting Equipment											
Row Crop Planter 4-36, 12 Ft	40	12,510	5.60	392	42.91	1.21	3.97	2.49	7.66	1.17	0.38
Row Crop Planter 6-30, 15 Ft	60	16,560	7.00	490	52.55	1.34	4.18	1.99	7.51	1.28	0.45
Row Crop Planter 8-30, 20 Ft	75	23,670	9.33	653	67.47	1.28	4.46	1.49	7.23	1.30	0.43
Row Crop Planter 12-30, 30 Ft	105 MFWD	35,910	14.00	980	92.88	1.13	4.51	0.99	6.63	1.20	0.40

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Min-Til Planter 4-36, 12 Ft	60	18,540	5.09	356	55.86	1.84	6.40	2.73	10.97	1.88	0.62
Min-Til Planter 6-30, 15 Ft	75	24,120	6.36	509	64.83	1.87	6.13	2.19	10.19	2.11	0.62
Min-Til Planter 8-30, 20 Ft	105 MFWD	28,710	8.48	594	80.03	1.86	5.93	1.64	9.43	1.73	0.66
Min-Til Planter 12-30, 30 Ft	160 MFWD	49,770	12.73	1,273	111.76	2.02	5.66	1.09	8.78	2.48	0.67
Min-Til Planter 16-30, 40 Ft	200 MFWD	70,380	16.97	2,206	140.87	1.83	5.65	0.82	8.30	3.13	0.62
Potato Planter Filler	None	11,790	5.75	322	25.05	0.00	4.36	0.00	4.36	0.54	0.00
Potato Row Marker 4 Row	130 MFWD	11,070	4.98	214	62.84	4.20	5.43	2.99	12.62	1.77	1.38
Potato Row Marker 6 Row	160 MFWD	17,280	7.47	321	82.86	3.45	5.65	1.99	11.09	1.53	1.14
Potato Row Marker 8 Row	160 MFWD	22,140	10.79	464	94.86	2.39	5.02	1.38	8.79	1.09	0.79
Potato Planter 4 Row	130 MFWD	33,210	3.83	214	114.69	5.46	17.52	6.96	29.94	4.05	1.80
Potato Planter 6 Row	130 MFWD	44,280	5.75	322	137.14	3.64	15.59	4.64	23.87	3.14	1.20
Potato Planter 8 Row	160 MFWD	60,930	8.30	465	175.71	3.10	14.85	3.21	21.16	2.88	1.02
Beet Planter 12 Row	105 MFWD	23,220	4.67	280	75.89	3.39	9.68	3.19	16.26	2.57	1.19
Grain Drill 25 Ft	130 MFWD	23,490	10.61	848	72.44	1.97	3.60	1.26	6.83	1.50	0.65
Grain Drill 30 Ft	130 MFWD	29,610	12.73	1,018	82.22	1.64	3.77	1.05	6.46	1.41	0.54
Grain Drill 35 Ft	160 MFWD	35,730	14.85	1,188	96.84	1.73	3.89	0.90	6.52	1.49	0.57
Presswheel Drill 12 Ft	75	17,190	5.09	382	54.08	2.34	5.67	2.62	10.62	2.09	0.78
Presswheel Drill 16 Ft	105 MFWD	22,320	6.79	509	66.56	2.33	5.51	1.96	9.81	1.96	0.82
Presswheel Drill 20 Ft	130 MFWD	23,940	8.48	636	74.48	2.46	4.74	1.57	8.78	1.82	0.81
Presswheel Drill 30 Ft	160 MFWD	35,190	12.73	1,018	95.92	2.02	4.47	1.05	7.54	1.72	0.67
Presswheel Drill 40 Ft	200 MFWD	46,170	16.97	1,358	118.86	1.83	4.39	0.78	7.00	1.65	0.62
Air Seeder Drill 36 Ft	260 4WD	54,270	15.27	1,222	140.93	2.64	5.71	0.87	9.23	2.19	0.90
No-Till Drill 15 Ft	130 MFWD	26,010	6.36	509	76.17	3.29	6.59	2.09	11.97	2.63	1.08
No-Till Drill 20 Ft	160 MFWD	37,890	8.48	679	100.04	3.04	7.18	1.57	11.79	2.69	1.00
No-Till Drill 30 Ft	200 MFWD	56,070	12.73	1,018	134.41	2.44	7.07	1.05	10.56	2.46	0.83
Crop Maintenance Equipment											
Cultivator 4-36, 12 Ft	75	3,330	6.18	618	25.97	1.93	0.67	1.60	4.20	0.97	0.64
Cultivator 6-30, 15 Ft	60	4,230	7.73	773	24.51	1.21	0.68	1.28	3.17	0.66	0.41
Cultivator 8-30, 20 Ft	130 MFWD	5,670	10.30	1,030	37.87	2.03	0.69	0.96	3.68	0.89	0.67

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Cultivator 12-30, 30 Ft	160 MFWD	11,160	15.45	1,545	49.12	1.67	0.87	0.64	3.18	0.81	0.55
Cultivator 16-30, 40 Ft	200 MFWD	13,680	20.61	2,061	57.55	1.51	0.80	0.48	2.79	0.75	0.51
Cultivator Hi Res 4-36, 12 Ft	75	5,940	6.18	618	29.10	1.93	1.17	1.61	4.71	1.07	0.64
Cultivator Hi Res 6-30, 15 Ft	105 MFWD	8,100	7.73	773	35.47	2.05	1.27	1.28	4.59	1.06	0.72
Cultivator Hi Res 8-30, 20 Ft	160 MFWD	11,070	10.30	1,030	48.94	2.50	1.29	0.96	4.75	1.22	0.82
Cultivator Hi Res 12-30, 30 Ft	225 MFWD	18,810	15.45	1,545	71.60	2.44	1.45	0.74	4.63	1.14	0.77
Rotary Hoe 15 Ft	75	3,780	18.55	1,855	27.25	0.64	0.29	0.53	1.47	0.34	0.21
Rotary Hoe 21 Ft	105 MFWD	5,760	25.96	2,596	34.00	0.61	0.32	0.38	1.31	0.30	0.21
Rotary Hoe 30 Ft	160 MFWD	8,730	37.09	3,709	48.06	0.69	0.33	0.27	1.30	0.33	0.23
Potato Cultivator 4 Row, 13 Ft	75	4,230	5.36	778	26.13	2.22	0.81	1.84	4.87	1.26	0.74
Potato Cultivator 6 Row, 19 Ft	105 MFWD	6,390	8.04	1,126	32.40	1.97	0.83	1.23	4.03	1.06	0.69
Sugar Beet Cult 12 Row, 22 Ft	105 MFWD	9,540	5.60	336	42.54	2.82	3.01	1.76	7.60	1.33	0.99
S-P Boom Sprayer, 47 Ft	None	50,670	25.92	2,592	90.53	0.00	2.91	0.58	3.49	0.94	0.00
S-P Boom Sprayer, 60 Ft	None	63,000	33.09	3,309	108.83	0.00	2.84	0.45	3.29	0.92	0.00
Sprayer, 30 Ft	40	4,140	15.36	1,229	29.43	0.44	0.50	0.98	1.92	0.31	0.14
Boom Sprayer, 50 Ft	60	5,220	25.61	2,561	32.74	0.37	0.33	0.59	1.28	0.26	0.12
Sprayer Hi Pres, 50 Ft	60	21,960	23.64	2,364	57.50	0.40	1.40	0.63	2.43	0.62	0.13
Hooded Sprayer 8 Row, 20 Ft	40	5,850	10.24	819	32.33	0.66	1.03	1.46	3.16	0.54	0.21
Anhydrous Applicator, 30 Ft	160 MFWD	17,100	12.73	509	91.85	2.02	4.20	0.99	7.22	1.53	0.67
Fert Spreader 4 T, 40 Ft	60	8,820	23.76	713	56.76	0.39	1.46	0.53	2.39	0.37	0.13
Corn Stalk Chopper, 12 Ft	60	7,830	4.65	465	31.15	2.01	2.44	2.25	6.69	1.45	0.68
Potato Shredder, 18 Ft	130 MFWD	11,520	6.98	698	48.20	3.00	2.41	1.50	6.90	1.68	0.99
Stalk Shredder, 20 Ft	130 MFWD	13,410	7.76	776	51.03	2.70	2.54	1.35	6.58	1.59	0.89
Rock Picker, 6 Ft	75	11,520	1.42	85	51.64	8.41	19.96	8.04	36.41	8.50	2.80
Harvesting Equipment											
Mower-Conditioner, 9 Ft	40	12,510	4.36	349	36.90	1.55	4.51	2.39	8.46	1.21	0.49
Rotary Hay Mower, 6 Ft	40	5,940	2.91	291	26.34	2.33	3.46	3.27	9.06	2.18	0.73
Rotary Mow/Cond, 9 Ft	75	15,030	4.36	349	45.08	2.73	5.31	2.29	10.33	1.78	0.91
Hay Rake (Hyd), 9 Ft	40	4,410	3.49	698	20.03	1.94	1.07	2.72	5.74	1.16	0.61

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Hay Swather-Cond, 12 Ft	60	20,070	5.82	465	50.60	1.61	5.46	1.63	8.70	1.38	0.55
Swather-Cond, Self-Prop, 16 Ft	None	64,980	7.76	621	104.92	0.00	12.30	1.22	13.53	0.90	0.00
Grain Swather, Pull Type, 18 Ft	75	9,810	8.73	698	36.51	1.37	1.73	1.09	4.18	0.67	0.46
Grain Swather, Pull Type, 21 Ft	75	14,490	10.18	815	43.25	1.17	2.14	0.93	4.25	0.60	0.39
Grain Swather, Self-Prop, 21 Ft	None	44,280	10.18	815	76.13	0.00	6.54	0.93	7.48	0.56	0.00
Hay Baler PTO Twine, 12 Ft Swath	40	14,040	4.36	873	34.71	1.55	3.35	3.05	7.95	2.31	0.49
Round Baler 1000 Lb, 9 Ft Swath	60	14,940	3.01	603	41.98	3.11	7.32	3.50	13.93	6.14	1.06
Round Baler 1500 Lb, 12 Ft Swath	60	17,460	4.02	804	45.70	2.33	6.42	2.62	11.37	5.21	0.79
Rd Baler/Wrapper 1000 Lb, 9 Ft Swath	60	19,620	3.01	603	48.84	3.11	9.60	3.50	16.21	7.64	1.06
Rd Bale Wrapper Silage, 9 Ft Swath	60	16,740	2.48	372	43.04	3.77	9.74	3.83	17.34	6.82	1.28
Bale Wrapper Dry Hay, 9 Ft Swath	40	7,200	2.48	372	26.76	2.73	4.22	3.83	10.78	3.37	0.85
Large Rectangular Baler, 24 Ft Swath	130 MFWD	52,290	16.29	815	142.33	1.28	6.81	0.65	8.74	0.72	0.42
Forage Harvester 2 Row, 6 Ft	105 MFWD	24,210	1.65	165	58.49	9.56	17.74	8.05	35.35	6.50	3.36
Forage SP Harvstr 2 Row, 6 Ft	None	132,300	2.04	305	123.53	0.00	54.12	6.54	60.66	6.11	0.00
Forage SP Harvstr 3 Row, 9 Ft	None	141,300	3.05	458	132.13	0.00	38.90	4.36	43.26	4.67	0.00
Large Forage Blower, 8 Ft	60	5,040	1.00	50	30.04	9.36	11.17	9.50	30.04	4.95	3.18
Combine Grain Head , 15 Ft	190 HP Combine	8,820	5.09	1,018	87.25	13.33	1.19	2.62	17.14	5.75	1.98
Combine Grain Head , 20 Ft	220 HP Combine	9,270	6.79	1,358	99.63	11.78	0.94	1.96	14.68	5.04	1.72
Combine Grain Head , 30 Ft	275 HP Combine	16,740	10.18	2,036	114.64	8.83	1.12	1.31	11.26	3.94	1.43
Soybean Combine Hd Small, 13 Ft	190 HP Combine	11,880	3.86	772	89.32	17.58	2.10	3.45	23.14	7.68	2.61
Soybean Combine Hd Medium, 15 Ft	220 HP Combine	12,690	4.45	891	101.93	17.95	1.94	2.99	22.88	7.77	2.62
Soybean Combine Hd Large, 18 Ft	275 HP Combine	13,860	5.35	1,069	112.73	16.82	1.78	2.49	21.09	7.44	2.73
Soybean Combine Hd Large, 25 Ft	275 HP Combine	16,380	7.42	1,485	114.43	12.11	1.51	1.79	15.41	5.40	1.96
Corn Combine 4-36, 12 Ft	190 HP Combine	16,470	3.36	672	92.44	20.20	3.35	3.96	27.51	8.98	3.00
Corn Combine 4-30, 10 Ft	190 HP Combine	18,000	2.80	560	93.44	24.24	4.37	4.76	33.37	10.84	3.60
Corn Combine 6-30, 15 Ft	220 HP Combine	22,230	4.20	840	108.41	19.03	3.61	3.17	25.81	8.51	2.78
Corn Combine 8-30, 20 Ft	220 HP Combine	28,800	5.09	1,018	112.89	15.70	3.86	2.62	22.18	7.17	2.29
Corn Combine 12-30, 30 Ft	275 HP Combine	44,460	7.64	1,527	133.39	11.77	3.95	1.74	17.47	5.68	1.91
Potato Windrower 2 Row, 6 Ft	75	28,800	1.49	149	60.35	7.98	25.55	6.87	40.40	7.86	2.66

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Potato Windrower 4 Row, 13 Ft	105 MFWD	63,090	2.99	299	108.90	5.29	27.72	3.43	36.45	6.89	1.86
Potato Harvester Seed 2 Row, 6 Ft	130 MFWD	60,930	1.38	295	107.38	15.17	34.61	28.10	77.88	19.32	5.00
Potato Harvester Seed 4 Row, 13 Ft	130 MFWD	96,300	2.76	590	134.92	7.58	27.29	14.05	48.92	13.61	2.50
Potato Harvester 2 Row, 6 Ft	130 MFWD	49,860	1.84	294	105.09	11.37	24.71	21.08	57.16	11.72	3.75
Disk Bean Top Cutter 6R, 11 Ft	105 MFWD	11,880	6.40	512	48.15	2.47	2.97	2.08	7.52	1.38	0.87
Sugar Beet Lifter 4 Row, 7 Ft	105 MFWD	43,290	3.47	277	116.02	4.56	25.07	3.84	33.48	9.89	1.61
Sugar Beet Lifter 6 Row, 11 Ft	130 MFWD	56,520	5.20	520	134.89	4.02	19.36	2.56	25.94	9.04	1.33
Sugar Beet Topper 6 Row, 11 Ft	75	17,190	5.33	427	52.97	2.24	5.45	2.25	9.93	1.96	0.75
Sugar Beet Topper 12 Row, 22 Ft	160 MFWD	33,210	10.67	853	93.76	2.41	5.25	1.13	8.79	1.88	0.80
Sugar Beet Wagon 8 Ton, 7 Ft	75	9,180	3.47	277	35.62	3.44	4.10	2.74	10.28	2.06	1.15
Sugar Beet Wagon 20 Ton, 11 Ft	200 MFWD	36,540	5.20	520	86.39	5.98	8.81	1.83	16.61	3.93	2.04
Sugar Beet Wagon 24 Ton, 11 Ft	225 MFWD	38,700	5.20	520	95.71	7.26	9.32	1.83	18.41	4.21	2.29
Manure Spreader 150 Bu, 6 Ft	75	6,030	3.49	349	33.12	3.42	3.30	2.78	9.49	2.77	1.14
Manure Spreader 300 Bu, 6 Ft	105 MFWD	8,010	3.49	349	40.79	4.53	4.38	2.78	11.69	3.49	1.59
Manure Spreader 400 Bu, 8 Ft	130 MFWD	11,880	4.65	465	53.23	4.49	4.86	2.08	11.44	3.58	1.48
Gravity Grain Box 185 Bu, 6 Ft	60	2,340	1.65	215	21.75	5.66	1.74	5.74	13.14	2.84	1.92
Gravity Grain Box 240 Bu, 6 Ft	75	3,780	1.65	215	25.80	7.21	2.64	5.74	15.59	3.70	2.40
Baled Hay Wagon, 12 Ft	40	2,970	3.78	945	28.12	1.79	0.62	5.02	7.43	0.99	0.56
Forage Wagon 14 Ft Long, 6 Ft Swath	40	10,080	1.65	215	26.94	4.10	6.44	5.74	16.28	3.14	1.28
Forage Wagon 16 Ft, 6 Ft Swath	40	11,340	1.65	215	28.08	4.10	7.13	5.74	16.97	3.32	1.28
1 Ton Hay Stack, 12 Ft Swath	60	21,240	4.15	829	44.57	2.26	5.28	3.21	10.75	3.63	0.77
3 Ton Hay Stack, 12 Ft Swath	75	31,410	4.84	1,064	57.39	2.47	6.65	2.75	11.87	4.69	0.82
6 Ton Hay Stack, 12 Ft Swath	105 MFWD	50,760	5.53	1,548	81.96	2.86	9.56	2.41	14.83	7.32	1.01

¹Total cost per hour is calculated as yearly depreciation, interest, insurance, housing and repairs divided by hours used per year. Implement and power unit costs are summed. Fuel, lubricants and labor are added to the total.

²Total cost per acre is total cost per hour divided by acres per hour. Includes operating expenses, labor, and overhead costs.

³Operating expenses are included in total cost/acre. Operating expenses include fuel, lubricants, repairs and maintenance, but not labor. Labor is listed separately.

CONVERSION OF THE MINNESOTA COST ESTIMATES TO CANADIAN ECONOMIC CONDITIONS

The above cost estimates may be more useful to Canadian farm operators if some simple adjustments are made. The Minnesota cost estimates were converted to Canadian dollar terms using a March 26, 1998 conversion rate of \$1.4098 Canadian dollars per \$1.00 U.S. Machinery prices, interest and insurance rates, and the equipment shelter charge were assumed to be the same, apart from the currency conversion, based on information provided by the machinery manufacturer and Canadian machinery dealers. The hourly charge for the machinery operator's wage and fringe benefits, with the currency conversion, is \$13.40 for an unskilled operator and \$16.90 for operations requiring a skilled operator.

The only two cost items that are assumed to be different from costs under Minnesota conditions are fuel and taxes. The diesel fuel price is \$1.45 per gallon, or just under \$0.384 per liter. Canadian sales taxes on machinery (the GST and PST) are rebated on farm machinery so are not included here. Minnesota charges a 2.5 percent sales tax on machinery sales above the trade-in value, so that tax (on the difference between the purchase price and salvage value) which was included in the Minnesota cost estimates, is not included in the Canadian estimates.

Tractor Hp, Combine or Truck Size	Net Cost of a New Power Unit	Annual Hours of Use	- - Overhead - - Cost per Year Hour		- - Operating - - Expense per Hour Year		- Total Cost - Per Year Per Hour of Use of Use		Maintenance & Repair Cost/hr	Diesel Use/hr Gallons
Tractors and Combines (Without Heads)										
40	27,280	500	2,723	5.45	4.81	2,404	5,127	10.25	1.27	2.1
60	36,415	500	3,626	7.25	7.00	3,501	7,127	14.25	1.70	3.2
75	46,819	500	4,654	9.31	8.81	4,407	9,060	18.12	2.18	4.0
105 MFWD	72,323	550	7,288	13.25	10.87	5,979	13,267	24.12	1.59	5.6
130 MFWD	98,714	550	9,928	18.05	13.66	7,513	17,441	31.71	2.17	6.9
160 MFWD	124,217	600	13,142	21.90	17.12	10,273	23,415	39.02	2.98	8.5
200 MFWD	147,818	600	15,626	26.04	21.22	12,734	28,360	47.27	3.55	10.6
225 MFWD	160,886	500	16,949	33.90	23.10	11,551	28,501	57.00	3.22	11.9
260 4WD	166,215	500	17,507	35.01	26.30	13,151	30,658	61.32	3.32	13.8
310 4WD	167,484	500	17,640	35.28	30.75	15,373	33,013	66.03	3.35	16.4
360 4WD	179,665	500	18,914	37.83	35.41	17,705	36,619	73.24	3.59	19.1
425 4WD	210,878	500	22,180	44.36	41.78	20,889	43,069	86.14	4.22	22.5
190 HP Combine	147,310	300	16,401	54.67	43.58	13,075	29,476	98.25	26.79	10.1
220 HP Combine	173,828	300	19,375	64.58	51.06	15,317	34,692	115.64	31.61	11.7
275 HP Combine	191,972	300	21,425	71.42	59.22	17,765	39,190	130.63	34.91	14.6

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Tillage Equipment											
Chisel Plow 11 Ft	75	6,852	6.40	640	41.30	2.83	1.49	2.14	6.45	1.74	0.62
Chisel Plow 15 Ft	130 MFWD	8,882	8.73	873	57.55	3.63	1.39	1.57	6.59	1.91	0.79
Chisel Plow 19 Ft	160 MFWD	15,353	11.05	1,105	72.97	3.53	1.83	1.24	6.60	2.01	0.77
Chisel Plow 23 Ft	200 MFWD	19,286	13.38	1,338	86.25	3.53	1.89	1.02	6.45	2.07	0.79
Chisel Plow 31 Ft	225 MFWD	24,488	18.04	1,804	102.73	3.16	1.78	0.76	5.70	1.74	0.66
Chisel Plow 37 Ft	310 4WD	27,914	21.53	2,153	116.37	3.07	1.70	0.63	5.41	1.86	0.76
Chisel Plow 57 Ft	425 4WD	26,398	33.16	3,316	134.59	2.60	1.05	0.41	4.06	1.53	0.68
Chisel Plow, Front Dsk 8.75 Ft	105 MFWD	11,800	5.41	541	53.80	4.46	2.96	2.53	9.95	2.51	1.03
Chisel Plow, Front Dsk 16.25 Ft	200 MFWD	21,189	10.05	1,005	89.23	4.71	2.82	1.36	8.88	2.59	1.06
Chisel Plow, Front Dsk 18.75 Ft	260 4WD	27,787	11.59	1,159	111.77	5.29	3.17	1.18	9.64	2.81	1.19
Chisel Plow, Dsk 21.25 Ft Fold	310 4WD	31,974	13.14	1,314	121.86	5.03	3.21	1.04	9.28	2.89	1.25
Moldboard Plow 4-18, 6 Ft	75	13,703	2.78	334	48.47	6.51	6.00	4.91	17.42	5.29	1.43
Moldboard Plow 5-18, 7.5 Ft	105 MFWD	16,875	3.48	417	58.38	6.94	5.92	3.93	16.79	5.22	1.60
Moldboard Plow 6-18, 9 Ft	130 MFWD	20,047	4.17	542	69.22	7.60	5.71	3.28	16.59	5.48	1.65
Moldboard Plow 8-18, 12 Ft	160 MFWD	26,899	5.56	723	84.59	7.01	5.73	2.46	15.20	5.30	1.52
Moldboard Plow 10-18, 15 Ft	260 4WD	35,908	6.95	1,043	116.00	8.82	5.90	1.97	16.68	6.44	1.98
Reversible Plow 2-18, 3 Ft	60	3,172	1.39	209	31.75	10.25	2.75	9.83	22.82	6.21	2.29
Reversible Plow 5-18, 7.5 Ft	160 MFWD	9,389	3.48	522	63.60	11.22	3.14	3.93	18.29	6.32	2.44
Reversible Plow 5-18 HD, 7.5 Ft	160 MFWD	13,069	3.48	522	67.89	11.22	4.37	3.93	19.52	6.86	2.44
Reversible Plow 8-18, 12 Ft	225 MFWD	18,398	5.56	835	92.06	10.25	3.85	2.46	16.55	5.86	2.14
Field Cultivator 12.5 Ft	75	7,359	9.02	1,082	40.65	2.01	0.98	1.52	4.51	1.26	0.44
Field Cultivator 18 Ft	105 MFWD	11,800	12.98	1,558	51.69	1.86	1.07	1.05	3.98	1.15	0.43
Field Cultivator 28 Ft	160 MFWD	18,652	20.19	2,423	74.59	1.93	1.08	0.68	3.69	1.17	0.42
Field Cultivator 37 Ft	225 MFWD	26,518	26.68	3,202	101.51	2.14	1.16	0.51	3.80	1.21	0.45
Field Cultivator 47 Ft	260 4WD	39,714	33.90	4,068	120.69	1.81	1.35	0.40	3.56	1.18	0.41
Field Cultivator 60 Ft	310 4WD	49,230	43.27	5,193	135.98	1.53	1.30	0.32	3.14	1.11	0.38
Tandem Disk 8.75 Ft Rigid	40	7,105	5.41	541	33.53	1.90	1.78	2.53	6.20	1.19	0.39
Tandem Disk 11 Ft Rigid	60	7,867	6.40	640	39.63	2.23	1.83	2.14	6.19	1.51	0.50
Tandem Disk 15 Ft Rigid	105 MFWD	14,465	8.73	873	58.92	2.76	2.42	1.57	6.75	1.80	0.64

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated --		Total Cost /Hour ¹	---- Total Cost/Acre ² ----				Operating Expense / Acre ³	Diesel Fuel Gal/acre
			Work Performed Acres/hr	Acres/yr		Equipment Tractor + Machine	Labor + Charge	Total = Dollars			
Tandem Disk 21 Ft Fold	160 MFWD	24,108	12.22	1,222	87.50	3.19	2.85	1.12	7.16	2.06	0.69
Tandem Disk H.D. 12 Ft Rigid	130 MFWD	12,434	6.98	698	63.55	4.54	2.60	1.96	9.10	2.55	0.99
Tandem Disk H.D. 18 Ft Fold	160 MFWD	23,727	10.47	1,047	87.06	3.73	3.28	1.31	8.31	2.39	0.81
Tandem Disk H.D. 30 Ft Fold	360 4WD	40,095	17.45	1,745	144.08	4.20	3.28	0.78	8.25	2.80	1.09
Offset Disk 7 Ft	60	6,852	3.25	325	37.11	4.39	2.83	4.21	11.43	2.64	0.98
Offset Disk 12 Ft	105 MFWD	12,434	5.56	556	54.48	4.34	3.00	2.46	9.79	2.46	1.00
Offset Disk 16 Ft	130 MFWD	15,480	7.42	742	66.41	4.27	2.83	1.84	8.95	2.32	0.93
Offset Disk Wing 21 Ft	200 MFWD	22,077	9.74	974	90.35	4.85	3.02	1.40	9.28	2.70	1.09
V-Ripper 25 O.C. 10 Ft	160 MFWD	14,084	6.18	618	70.86	6.31	2.94	2.21	11.46	3.50	1.37
V-Ripper 25 O.C. 14 Ft	200 MFWD	17,129	8.65	865	83.07	5.46	2.56	1.58	9.60	3.09	1.22
V-Ripper 25 O.C. 18 Ft	260 4WD	21,951	11.13	1,113	103.38	5.51	2.55	1.23	9.29	3.00	1.24
V-Ripper 25 O.C. 25 Ft	310 4WD	26,518	15.45	1,545	114.26	4.27	2.24	0.88	7.39	2.54	1.06
V-Ripper 30 O.C. 12.5 Ft	160 MFWD	11,673	7.73	773	68.01	5.05	1.98	1.77	8.80	2.70	1.10
V-Ripper 30 O.C. 17 Ft	200 MFWD	14,845	10.51	1,051	80.47	4.50	1.86	1.30	7.66	2.48	1.01
V-Ripper 30 O.C. 22.5 Ft	360 4WD	21,443	13.91	1,391	115.13	5.27	2.03	0.98	8.28	3.04	1.37
Comb Fld Cult Incorp 16 Ft	160 MFWD	21,189	11.54	1,154	82.90	3.38	2.62	1.18	7.18	2.08	0.73
Comb Fld Cult Incorp 23 Ft	200 MFWD	34,893	16.59	1,659	110.58	2.85	2.99	0.82	6.67	1.96	0.64
Comb Fld Cult Incorp 25 Ft	260 4WD	37,684	18.03	1,803	128.68	3.40	2.98	0.76	7.14	2.13	0.76
Comb Fld Cult Incorp 33 Ft	310 4WD	47,961	23.80	2,380	148.05	2.77	2.87	0.57	6.22	1.94	0.69
Comb Disk & V-Ripper 12.5 Ft	225 MFWD	25,630	6.44	644	104.33	8.85	5.23	2.12	16.20	4.49	1.85
Comb Disk & V-Ripper 17.5 Ft	360 4WD	32,862	9.02	902	130.38	8.12	4.82	1.52	14.46	4.76	2.12
Disk,Fld Cult Finish 13 Ft	130 MFWD	15,606	6.70	670	67.03	4.74	3.23	2.04	10.01	2.57	1.03
Disk,Fld Cult Finish 22 Ft	200 MFWD	28,168	11.33	1,133	98.74	4.17	3.34	1.21	8.71	2.44	0.94
Disk,Fld Cult Finish 30 Ft	260 4WD	37,811	15.45	1,545	125.47	3.97	3.27	0.88	8.12	2.26	0.89
Disk,Fld Cult Finish 38 Ft	310 4WD	45,170	19.58	1,958	139.88	3.37	3.07	0.70	7.15	2.09	0.84
Roller Harrow 12 Ft	75	11,927	7.42	742	48.06	2.44	2.19	1.84	6.48	1.55	0.54
Roller Harrow 28 Ft	160 MFWD	31,086	17.31	1,731	94.07	2.25	2.39	0.79	5.43	1.40	0.49
Springtooth Drag 30 Ft	60	10,785	21.64	649	64.65	0.66	1.66	0.67	2.99	0.42	0.15
Springtooth Drag 48 Ft	75	13,703	34.62	1,212	73.82	0.52	1.19	0.42	2.13	0.34	0.11
Springtooth Drag 58 Ft	105 MFWD	15,987	41.83	4,183	58.28	0.58	0.50	0.32	1.39	0.38	0.13

	Tractor Size (HP)	Net Cost of A New Implement	- - Estimated - - Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	- - - - Total Cost/Acre ² - - - - Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Planting Equipment											
Row Crop Planter 4-36, 12 Ft	40	17,637	5.60	392	60.75	1.83	5.52	3.50	10.85	1.78	0.38
Row Crop Planter 6-30, 15 Ft	60	23,346	7.00	490	74.56	2.04	5.81	2.80	10.65	1.98	0.45
Row Crop Planter 8-30, 20 Ft	75	33,370	9.33	653	95.61	1.94	6.20	2.10	10.24	1.99	0.43
Row Crop Planter 12-30, 30 Ft	105 MFWD	50,626	14.00	980	131.52	1.72	6.27	1.40	9.39	1.84	0.40
Min-Til Planter 4-36, 12 Ft	60	26,138	5.09	356	79.15	2.80	8.90	3.85	15.55	2.88	0.62
Min-Til Planter 6-30, 15 Ft	75	34,004	6.36	509	91.97	2.85	8.52	3.08	14.45	3.20	0.62
Min-Til Planter 8-30, 20 Ft	105 MFWD	40,475	8.48	594	113.65	2.84	8.24	2.31	13.39	2.68	0.66
Min-Til Planter 12-30, 30 Ft	160 MFWD	70,166	12.73	1,273	159.06	3.07	7.89	1.54	12.50	3.74	0.67
Min-Til Planter 16-30, , 40 Ft	200 MFWD	99,222	16.97	2,206	200.71	2.79	7.89	1.16	11.83	4.64	0.62
Potato Planter Filler	None	16,622	5.75	322	34.85	0.00	6.07	0.00	6.07	0.77	0.00
Potato Row Marker 4 Row	130 MFWD	15,606	4.98	214	90.19	6.37	7.53	4.21	18.11	3.01	1.38
Potato Row Marker 6 Row	160 MFWD	24,361	7.47	321	118.55	5.22	7.84	2.81	15.87	2.57	1.14
Potato Row Marker 8 Row	160 MFWD	31,213	10.79	464	135.20	3.62	6.97	1.94	12.53	1.83	0.79
Potato Planter 4 Row	130 MFWD	46,819	3.83	214	162.49	8.28	24.33	9.81	42.42	6.37	1.80
Potato Planter 6 Row	130 MFWD	62,426	5.75	322	193.67	5.52	21.65	6.54	33.71	4.87	1.20
Potato Planter 8 Row	160 MFWD	85,899	8.30	465	247.82	4.70	20.62	4.53	29.85	4.44	1.02
Beet Planter 12 Row	105 MFWD	32,736	4.67	280	107.87	5.17	13.45	4.49	23.11	4.07	1.19
Grain Drill 25 Ft	130 MFWD	33,116	10.61	848	103.64	2.99	5.01	1.77	9.77	2.35	0.65
Grain Drill 30 Ft	130 MFWD	41,744	12.73	1,018	117.24	2.49	5.25	1.47	9.21	2.19	0.54
Grain Drill 35 Ft	160 MFWD	50,372	14.85	1,188	138.15	2.63	5.41	1.26	9.30	2.31	0.57
Presswheel Drill 12 Ft	75	24,234	5.09	382	76.99	3.56	7.88	3.68	15.12	3.24	0.78
Presswheel Drill 16 Ft	105 MFWD	31,467	6.79	509	94.93	3.55	7.67	2.76	13.99	3.07	0.82
Presswheel Drill 20 Ft	130 MFWD	33,751	8.48	636	106.45	3.74	6.60	2.21	12.55	2.87	0.81
Presswheel Drill 30 Ft	160 MFWD	49,611	12.73	1,018	136.87	3.07	6.21	1.47	10.75	2.67	0.67
Presswheel Drill 40 Ft	200 MFWD	65,090	16.97	1,358	169.59	2.79	6.10	1.11	9.99	2.55	0.62
Air Seeder Drill 36 Ft	260 4WD	76,510	15.27	1,222	201.46	4.01	7.95	1.23	13.19	3.43	0.90
No-Till Drill 15 Ft	130 MFWD	36,669	6.36	509	108.83	4.98	9.17	2.95	17.10	4.11	1.08
No-Till Drill 20 Ft	160 MFWD	53,417	8.48	679	142.60	4.60	10.00	2.21	16.81	4.16	1.00
No-Till Drill 30 Ft	200 MFWD	79,047	12.73	1,018	191.21	3.71	9.84	1.47	15.02	3.78	0.83

	Tractor Size (HP)	Net Cost of A New Implement	- - Estimated - - Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	- - - - Total Cost/Acre ² - - - - Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Crop Maintenance Equipment											
Cultivator 4-36, 12 Ft	75	4,695	6.18	618	37.86	2.93	0.94	2.25	6.13	1.60	0.64
Cultivator 6-30, 15 Ft	60	5,963	7.73	773	35.53	1.84	0.95	1.80	4.60	1.09	0.41
Cultivator 8-30, 20 Ft	130 MFWD	7,994	10.30	1,030	55.51	3.08	0.96	1.35	5.39	1.51	0.67
Cultivator 12-30, 30 Ft	160 MFWD	15,733	15.45	1,545	71.75	2.53	1.22	0.90	4.64	1.35	0.55
Cultivator 16-30, 40 Ft	200 MFWD	19,286	20.61	2,061	84.30	2.29	1.12	0.68	4.09	1.25	0.51
Cultivator Hi Res 4-36, 12 Ft	75	8,374	6.18	618	42.24	2.93	1.63	2.28	6.83	1.74	0.64
Cultivator Hi Res 6-30, 15 Ft	105 MFWD	11,419	7.73	773	51.69	3.12	1.76	1.80	6.69	1.75	0.72
Cultivator Hi Res 8-30, 20 Ft	160 MFWD	15,606	10.30	1,030	71.51	3.79	1.80	1.35	6.94	2.02	0.82
Cultivator Hi Res 12-30, 30 Ft	225 MFWD	26,518	15.45	1,545	104.35	3.69	2.02	1.04	6.75	1.90	0.77
Rotary Hoe 15 Ft	75	5,329	18.55	1,855	39.63	0.98	0.41	0.75	2.14	0.55	0.21
Rotary Hoe 21 Ft	105 MFWD	8,120	25.96	2,596	49.59	0.93	0.44	0.54	1.91	0.50	0.21
Rotary Hoe 30 Ft	160 MFWD	12,308	37.09	3,709	70.21	1.05	0.47	0.38	1.89	0.55	0.23
Potato Cultivator 4 Row, 13 Ft	75	5,963	5.36	778	38.11	3.38	1.13	2.60	7.11	2.05	0.74
Potato Cultivator 6 Row, 19 Ft	105 MFWD	9,009	8.04	1,126	47.42	3.00	1.16	1.73	5.90	1.75	0.69
Sugar Beet Cult 12 Row, 22 Ft	105 MFWD	13,449	5.60	336	61.51	4.31	4.19	2.49	10.98	2.25	0.99
S-P Boom Sprayer, 47 Ft	None	71,435	25.92	2,592	126.40	0.00	4.06	0.81	4.88	1.33	0.00
S-P Boom Sprayer, 60 Ft	None	88,817	33.09	3,309	151.91	0.00	3.95	0.64	4.59	1.29	0.00
Sprayer, 30 Ft	40	5,837	15.36	1,229	42.03	0.67	0.69	1.38	2.74	0.48	0.14
Boom Sprayer, 50 Ft	60	7,359	25.61	2,561	47.07	0.56	0.46	0.83	1.84	0.41	0.12
Sprayer Hi Pres, 50 Ft	60	30,959	23.64	2,364	81.57	0.60	1.95	0.89	3.45	0.93	0.13
Hooded Sprayer 8 Row, 20 Ft	40	8,247	10.24	819	46.08	1.00	1.43	2.06	4.50	0.83	0.21
Anhydrous Appl., 30 Ft	160 MFWD	24,108	12.73	509	131.19	3.07	5.84	1.40	10.31	2.41	0.67
Fert Sprd 4 T, 40 Ft	60	12,434	23.76	713	80.38	0.60	2.03	0.75	3.38	0.56	0.13
Corn Stalk Chopper, 12 Ft	60	11,039	4.65	465	44.74	3.06	3.38	3.17	9.61	2.30	0.68
Potato Shredder, 18 Ft	130 MFWD	16,241	6.98	698	69.85	4.54	3.35	2.11	10.00	2.74	0.99
Stalk Shredder, 20 Ft	130 MFWD	18,905	7.76	776	73.78	4.09	3.52	1.90	9.51	2.58	0.89
Rock Picker, 6 Ft	75	16,241	1.42	85	73.55	12.78	27.74	11.34	51.86	13.02	2.80
Harvesting Equipment											
Mower-Conditioner, 9 Ft	40	17,637	4.36	349	52.26	2.35	6.25	3.38	11.98	1.89	0.49

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated -- Work Performed Acres/hr Acres/yr		Total Cost /Hour ¹	---- Total Cost/Acre ² ---- Equipment Labor Total Tractor + Machine + Charge = Dollars				Operating Expense / Acre ³	Diesel Fuel Gal/acre
Rotary Hay Mower, 6 Ft	40	8,374	2.91	291	37.66	3.52	4.81	4.61	12.95	3.34	0.73
Rotary Mow/Cond, 9 Ft	75	21,189	4.36	349	64.31	4.15	7.36	3.22	14.74	2.85	0.91
Hay Rake (Hyd), 9 Ft	40	6,217	3.49	698	28.87	2.94	1.49	3.84	8.27	1.85	0.61
Hay Swather-Cond, 12 Ft	60	28,295	5.82	465	71.65	2.45	7.56	2.30	12.32	2.15	0.55
Swather-Cond, Self-Prop, 16 Ft	None	91,609	7.76	621	146.66	0.00	17.18	1.73	18.91	1.42	0.00
Grain Swather, Pull Type, 18 Ft	75	13,830	8.73	698	52.43	2.08	2.40	1.54	6.01	1.11	0.46
Grain Swather, Pull Type, 21 Ft	75	20,428	10.18	815	61.75	1.78	2.97	1.32	6.07	0.99	0.39
Grain Swather, Self-Prop, 21 Ft	None	62,426	10.18	815	106.83	0.00	9.18	1.32	10.49	0.90	0.00
Hay Baler Pto Twine, 12 Ft Swath	40	19,794	4.36	873	49.43	2.35	4.68	4.30	11.33	3.44	0.49
Round Baler 1000 Lb, 9 Ft Swath	60	21,062	3.01	603	60.06	4.73	10.26	4.94	19.93	9.05	1.06
Round Baler 1500 Lb, 12 Ft Swath	60	24,615	4.02	804	65.27	3.55	9.00	3.70	16.24	7.64	0.79
Rd Baler/Wrap 1000 Lb, 9 Ft Swath	60	27,660	3.01	603	69.68	4.73	13.45	4.94	23.12	11.16	1.06
Rd Bale Wrapper Silage, 9 Ft Swath	60	23,600	2.48	372	61.46	5.74	13.62	5.40	24.77	10.09	1.28
Bale Wrapper Dry Hay, 9 Ft Swath	40	10,151	2.48	372	38.30	4.13	5.90	5.40	15.43	5.06	0.85
Large Rectangular Baler, 24 Ft Swath	130 MFWD	73,718	16.29	815	200.33	1.95	9.44	0.91	12.30	1.17	0.42
Forage Harvester 2 Row, 6 Ft	105 MFWD	34,131	1.65	165	83.67	14.58	24.65	11.34	50.57	10.41	3.36
Forage SP Harvstr 2 Row, 6 Ft	None	186,517	2.04	305	173.15	0.00	75.82	9.21	85.03	9.51	0.00
Forage SP Harvstr 3 Row, 9 Ft	None	199,205	3.05	458	185.60	0.00	54.62	6.14	60.76	7.35	0.00
Large Forage Blower, 8 Ft	60	7,105	1.00	50	43.16	14.25	15.50	13.40	43.16	8.16	3.18
Combine Grain Head , 15 Ft	190 HP Combine	12,434	5.09	1,018	125.39	19.30	1.65	3.68	24.63	8.85	1.98
Combine Grain Head , 20 Ft	220 HP Combine	13,069	6.79	1,358	143.22	17.04	1.30	2.76	21.10	7.75	1.72
Combine Grain Head , 30 Ft	275 HP Combine	23,600	10.18	2,036	165.20	12.83	1.55	1.84	16.22	6.09	1.43
Soybean Combine Hd Small, 13 Ft	190 HP Combine	16,748	3.86	772	128.26	25.45	2.91	4.86	33.22	11.79	2.61
Soybean Combine Hd Medium, 15 Ft	220 HP Combine	17,890	4.45	891	146.40	25.96	2.69	4.21	32.87	11.93	2.62
Soybean Combine Hd Large, 18 Ft	275 HP Combine	19,540	5.35	1,069	162.56	24.44	2.46	3.51	30.41	11.50	2.73
Soybean Combine Hd Large, 25 Ft	275 HP Combine	23,093	7.42	1,485	164.90	17.60	2.09	2.53	22.21	8.34	1.96
Corn Combine 4-36, 12 Ft	190 HP Combine	23,219	3.36	672	132.59	29.24	4.64	5.58	39.46	13.78	3.00
Corn Combine 4-30, 10 Ft	190 HP Combine	25,376	2.80	560	133.97	35.09	6.06	6.70	47.85	16.62	3.60
Corn Combine 6-30, 15 Ft	220 HP Combine	31,340	4.20	840	155.39	27.53	5.00	4.47	37.00	13.03	2.78
Corn Combine 8-30, 20 Ft	220 HP Combine	40,602	5.09	1,018	161.60	22.72	5.34	3.68	31.74	10.96	2.29

	Tractor Size (HP)	Net Cost of A New Implement	-- Estimated --		Total Cost /Hour ¹	---- Total Cost/Acre ² ----				Operating Expense / Acre ³	Diesel Fuel Gal/acre
			Work Performed Acres/hr	Acres/yr		Equipment Tractor + Machine	Labor + Charge	Total = Dollars			
Corn Combine 12-30, 30 Ft	275 HP Combine	62,680	7.64	1,527	191.19	17.11	5.47	2.46	25.04	8.71	1.91
Potato Windrower 2 Row, 6 Ft	75	40,602	1.49	149	85.55	12.13	35.45	9.69	57.27	12.07	2.66
Potato Windrower 4 Row, 13 Ft	105 MFWD	88,944	2.99	299	153.49	8.07	38.46	4.84	51.37	10.40	1.86
Potato Harvester Seed 2 Row, 6 Ft	130 MFWD	85,899	1.38	295	152.91	23.00	48.28	39.61	110.90	29.08	5.00
Potato Harvester Seed 4 Row, 13 Ft	130 MFWD	135,764	2.76	590	191.34	11.50	38.07	19.81	69.38	20.11	2.50
Potato Harvester 2 Row, 6 Ft	130 MFWD	70,293	1.84	294	149.62	17.25	34.42	29.71	81.38	17.91	3.75
Disk Bean Top Cutter 6R, 11 Ft	105 MFWD	16,748	6.40	512	69.23	3.77	4.12	2.93	10.82	2.27	0.87
Sugar Beet Lifter 4 Row, 7 Ft	105 MFWD	61,030	3.47	277	163.74	6.96	34.88	5.41	47.25	14.54	1.61
Sugar Beet Lifter 6 Row, 11 Ft	130 MFWD	79,682	5.20	520	190.67	6.10	26.96	3.61	36.67	13.24	1.33
Sugar Beet Topper 6 Row, 11 Ft	75	24,234	5.33	427	75.33	3.40	7.56	3.17	14.12	3.04	0.75
Sugar Beet Topper 12 Row, 22 Ft	160 MFWD	46,819	10.67	853	133.62	3.66	7.28	1.58	12.53	2.95	0.80
Sugar Beet Wagon 8 Ton, 7 Ft	75	12,942	3.47	277	51.25	5.23	5.69	3.87	14.79	3.32	1.15
Sugar Beet Wagon 20 Ton, 11 Ft	200 MFWD	51,514	5.20	520	124.32	9.09	12.24	2.58	23.91	6.29	2.04
Sugar Beet Wagon 24 Ton, 11 Ft	225 MFWD	54,559	5.20	520	137.75	10.96	12.95	2.58	26.49	6.78	2.29
Manure Spreader 150 Bu, 6 Ft	75	8,501	3.49	349	47.81	5.19	4.59	3.92	13.70	4.33	1.14
Manure Spreader 300 Bu, 6 Ft	105 MFWD	11,292	3.49	349	59.07	6.91	6.09	3.92	16.92	5.51	1.59
Manure Spreader 400 Bu, 8 Ft	130 MFWD	16,748	4.65	465	76.87	6.81	6.77	2.94	16.52	5.60	1.48
Gravity Grain Box 185 Bu, 6 Ft	60	3,299	1.65	215	31.68	8.62	2.43	8.10	19.15	4.71	1.92
Gravity Grain Box 240 Bu, 6 Ft	75	5,329	1.65	215	37.62	10.95	3.68	8.10	22.74	6.10	2.40
Baled Hay Wagon, 12 Ft	40	4,187	3.78	945	40.31	2.71	0.86	7.09	10.66	1.60	0.56
Forage Wagon 14 Ft Long, 6 Ft Swath	40	14,211	1.65	215	38.49	6.20	8.97	8.10	23.26	4.90	1.28
Forage Wagon 16 Ft, 6 Ft Swath	40	15,987	1.65	215	40.08	6.20	9.93	8.10	24.22	5.15	1.28
1 Ton Hay Stack, 12 Ft Swath	60	29,944	4.15	829	63.61	3.44	7.38	4.53	15.35	5.41	0.77
3 Ton Hay Stack, 12 Ft Swath	75	44,282	4.84	1,064	81.85	3.75	9.30	3.88	16.92	6.91	0.82
6 Ton Hay Stack, 12 Ft Swath	105 MFWD	71,561	5.53	1,548	116.91	4.36	13.39	3.39	21.15	10.69	1.01

¹Total cost per hour is calculated as yearly depreciation, interest, insurance, housing and repairs divided by hours used per year. Implement and power unit costs are summed. Fuel, lubricants and labor are added to the total.

²Total cost per acre is total cost per hour divided by acres per hour. Includes operating expenses, labor, and overhead costs.

³Operating expenses are included in total cost/acre. Operating expenses include fuel, lubricants, repairs and maintenance, but not labor. Labor is listed separately.