
2020/2021 Cost of Production

Farm Machinery



Cost of Production Farm Machinery

The surest way to reach a business goal is to plan on it. Successful Manitoba farmers are focused business people. They have clear, flexible, short and long term business plans - and they monitor their plans regularly.

Whether you're starting, growing or passing along your business, you need a solid business plan. Manitoba Agriculture and Resource Development can help you build a plan for success.

Farm machinery makes up a significant part of the fixed and variable costs for any farm operation. *The Cost of Production Farm Machinery* can help estimate these costs and provide the information you need to maximize farm profitability.

This guide is also available as an online calculator at www.manitoba.ca/agriculture.

Use this guide to help you prepare your plan for success.

The information in this document (the "information") is provided solely for general information purposes. This information is not intended or implied to be a substitute for professional advice. The Manitoba government and its ministers, officers, employees and agents will not be liable for any errors, oversights, omissions or inaccuracies in the information or for any damages of any kind arising from or in connection with the use of or reliance upon any of the information.

The rates provided are to be used as guidelines and should be interpreted and adjusted for individual situations if necessary.

This publication is available in multiple formats upon request.

Table of Contents

Introduction.....	3
Caution	3
Methodology	3
Assumptions.....	3
Cost of Ownership.....	4
Operating Costs	5
Using the Guide.....	6
Additional Information	6
Factors to Consider When Custom Hiring.....	6
New Information For 2020-2021 Guide	7
Equipment Summary.....	9
Power Units	10
Two Wheel Drive Tractors	10
Front Wheel Assist Tractors	10
Four Wheel Drive Tractors	11
Tracked Tractors	11
Harvesting Grain.....	12
SP Combines	12
Combine Headers	14
Swathers	15
Grain Cart.....	15
Powered Auger.....	16
Grain Auger (PTO).....	16
Grain Vac	16
Harvesting Hay.....	17
SP Forage Harvester	17
Headers for SP Forage Harvester	17
SP Mower/Conditioners	18
PT Mower/Conditioners	18
Balers	19
PT Bale Movers (Self Load/Unload)	20
SP Bale Mover.....	20
Seeding.....	21
Air Drills with Independent Openers	21
Air Hoe Drills	21
Air Disk Drills.....	22
Air Seeders	22
Other Row Crop Planters	23

Table of Contents

Soil Preparation	24
Cultivators.....	24
Harrows.....	25
Vertical Tillage Tools.....	25
Land Roller.....	26
Land Scraper.....	26
Sprayers	27
High Clearance Sprayer	27
Post Pounders	28
Vertical Feed Mixer	28
Grinder Mixers, Feed Mixers, and Bale Processors.....	29
Manure Spreader (Solid)	30
Appendix A	31
Hauling Grain from Field to Yard.....	31
Appendix B	32
Rental Rates for Farm Buildings and Bins.....	32
Appendix C	33
Combine Classifications	33
Appendix D	34
Assumptions for Machinery Cost Calculations.....	34
Appendix E	36
Fuel Consumption Based on Engine Size	36
Appendix F	37
Conversion Tables	37
Appendix G	41
Formulas Used in Calculations	41
Appendix H	43
Rental Rate Calculation Worksheet.....	43
Appendix I	44
Custom Rate Calculation Worksheet	44

This guide has been established to provide approximate costs for renting equipment or obtaining custom-farming operations from another farmer. ***This guide is not intended for establishing rates for individuals or companies that rent equipment or contract custom-farming operations as a business.***

The guide is applicable for two different situations. One is to suggest an equitable price for both parties when one farmer either rents a piece of equipment from another farmer or hires the other to do a farming operation (seeding, spraying, harvesting, etc.). In this situation, the period of rented operation is usually relatively small in proportion to the use by the owner. The other use is when farmers share equipment and need to establish the value of the machinery and/or farming operation that is being contributed to each farm.

CAUTION

Nearly every situation has circumstances and conditions that are unique. This guide cannot address every situation. It is up to the individuals to recognize special circumstances and make suitable adjustments to cover the differences. This guide also makes many assumptions that can have a large impact on the suggested rental and custom rates (e.g. annual hours of use, financing costs, etc.). It is the responsibility of both parties to agree to acceptable terms before entering into a contract.

METHODOLOGY

One of the most critical steps in establishing a rental rate is defining the cost of equipment ownership and the cost of operating and maintaining the equipment. Since it is likely that some factors will change for every situation, it was necessary to develop the following set of assumptions that form the basis for calculating costs.

Cost of ownership includes the cost of depreciation of the equipment due to use and years in service. Cost of ownership also includes an investment cost (i.e., the cost to borrow money to purchase the equipment and/or the lost interest revenue if that money had been invested), and housing/insurance costs. The cost of ownership also includes a margin to cover unexpected incidentals or fluctuations in equipment costs. To generate a suggested rental rate on a \$/hr basis, the cost of ownership was tallied for the life of the equipment, then the total hours of use over the life of the equipment was estimated to generate a rental rate on a \$/hr basis.

Operating costs include repair and maintenance (broken and worn parts, oil, filters, and labour for repair and service), and fuel use. In addition, there are operating labour costs and a margin to cover unexpected incidentals and specific conditions that affect operating costs.

Introduction

ASSUMPTIONS

In all cases, it is reasonable to assume that rented machinery is in good repair and is capable of performing the intended task in the same manner and at the same productive rate as similar machines of equal specification, ratings, or category regardless of age.

COST OF OWNERSHIP

Equipment Depreciation: The cost of equipment depreciation accounts for purchase price, salvage value, and years of service (also called optimal life).

In this guide, the purchase price is based upon the average of the base list price and the list price for that machine with all available options. For each piece of equipment and size category listed in this guide, a minimum of two manufacturers were surveyed to collect representative purchase price information.

The years of service (or optimal life) is defined as when the equipment value has declined to 1/3 of its original value. Therefore, the salvage value is assumed to always be 33% of the original purchase price, but the years of service varies for each piece of equipment. In reality, a machine's years of service depends on many factors and may vary greatly in years and hours. The optimal life and estimated annual hours of use for all equipment used in this guide are listed in **Appendix D**.

For this guide, the depreciated value (purchase price - salvage value) is split equally among the years of service of the equipment because after the first year of use, most machinery depreciates at a fairly consistent rate over the next 10 to 15 years (with typical use). Note that when calculating the depreciated value for tax purposes (capital cost allowance), the depreciated value changes from year to year depending on the allowable rate for each class of equipment. Most farm equipment falls under class 8 or class 10, which allows an annual depreciation rate of 20% and 30%, respectively. This means that the depreciated value is relatively high over the first few years of ownership and steadily decreases until the equipment has little value. This length of time (optimal life of equipment) is not defined by the capital cost allowance. The total depreciated value using either method (equally split among the years of optimal life or based on capital cost allowance rates) will be relatively close if a reasonable optimal life of the equipment is assumed.

Financing Cost: It has been assumed that 50% of the initial price is covered by the value of a trade-in and/or a cash payment with the remaining 50% financed. It is also assumed that the loan will be paid back through equal biannual installments over seven years. The cost to borrow 50% of the purchase price was based on an average interest rate for equipment loans with a seven-year payback. This annual borrowing rate is set at 5.5%. The financing cost also includes an opportunity cost on the interest that could be earned if the down payment was invested in the markets rather than equipment. This opportunity rate is set at 1.5% annually and is compounded monthly.

Many producers are able to secure lower interest rates or have different payback schedules. These parameters can be accommodated in the online calculator that allows producers to enter user-specific information to generate more accurate rental and custom rates.

Insurance and Housing: It is reasonable to expect that equipment owners will carry suitable insurance against accidental damage and for liability. Suitable housing is also a reasonable measure for maintaining equipment value and performance. These annual costs have been set at 1% of the original purchase price of the machine.

OPERATING COSTS

Repair and Maintenance (R&M): Each machine's annual usage is typically measured in hours. Routine maintenance such as oil, lubricants, and filters as well as component wear or damage is associated with hours of use regardless of when they occur over its life. Early in its life repairs due to component failure are not usually as high as later. However, during its life, repair expenses will occur. Averaging the lifetime maintenance costs on a per-hour basis provides a fair distribution of the repair costs. For this document, the average yearly basic maintenance and repairs have been added to what would be considered one major repair during the equipment's optimal life. In the guide, these repair costs are represented as a repair rate (%). This repair rate is the total cost of repairs and maintenance over the optimal life of the equipment divided by the purchase price. The repair costs are divided by the hours accumulated over its optimal life to represent these costs on a \$/hr basis.

Note that average repair and maintenance costs do not include extraordinary events brought about by extreme conditions, abuse, or accident.

Fuel costs: Fuel cost is dependent upon fuel market price and can fluctuate dramatically. In this guide, the diesel fuel price is set to \$0.950/L based on current market prices and the removal of the 5% Goods and Services Tax (GST), as this is an allowable business deduction for fuel. This fuel cost also accounts for the removal of a portion of the provincial fuel tax that farmers and custom operators are both eligible for as a *Fuel Permit Exemption Holder*.

Any power unit's fuel use is highly dependent upon the load (percentage of available power being used) and duty cycle (percentage of time at particular loads). To determine the cost based on average fuel efficiency, a 75% load is assumed. For alternative loads, fuel usage can be determined by using charts in **Appendix E**.

The selection of the power unit and the operating conditions (yield, moisture, soil type, terrain etc.) will also affect fuel use. This means that for similar tasks there can be a wide variation in fuel cost. For this reason, it is fair if the renter supplies or purchases fuel separately from the rental rate. A fuel cost estimate has been included based upon typical use and should be used only as a ball-park indication of what fuel cost might be.

Introduction

Labour Rate: The labour rate has been set at \$24 per hour based on the labour market in the agricultural sector in western Canada. This rate will vary depending upon availability and the individual's experience and skills. If more accurate labour costs are needed to reflect the varying skill levels required for different operations, producers can use the online calculator that allows users to input specific values for the labour rate for each operation.

Margin: When performing custom farming operations, conditions can be unpredictable. To account for unexpected cost increases brought about by difficult situations, it is customary to include a margin (or cushion) in the estimated custom rate. This margin has been set at 15% to coincide with typical industry practices. For machinery rental, the margin is applied to both the ownership and repair and maintenance costs. For custom rates, the margin is also applied to labour and fuel costs. **It should be noted that this margin does not cover overhead costs or other costs associated with business endeavors, nor does it cover the costs of a catastrophic breakdown.**

Work Rate: Instantaneous work rates are easily calculated based upon the implement's working width and its travel speed. However, in all field operations there is a difference between the instantaneous work rate and the average work rate accomplished over several hours. This is referred to as field efficiency. Field efficiency can vary greatly depending upon work conditions (field size and topography, soil or crop conditions, suitability of the equipment for the task, and availability of support equipment). For this guide, a field efficiency of 80% has been chosen and applied to all tasks. The estimated work rate is the product of the implement width (or average width if a range is provided), average field speed (assumed field speed values can be found in **Appendix D**) and the field efficiency (80%).

USING THE GUIDE

Per acre rate: Equipment rental or custom rates are based upon the addition of all yearly costs divided by the estimated annual hours of use. The hourly rate (\$/hr) divided by the work rate (acre/hr) yields a cost per acre rate (\$/acre). The work rate accounts for equipment width, travel speed, and the field efficiency of the operation. The \$/acre rate is often used because it fixes the renter's cost and allows the owner/operator to adjust the operation to the conditions. This may mean either going slower to minimize machine damage and operator stress in difficult conditions or being able to go faster in favorable conditions without losing revenue.

Hours of use impact: When machinery is shared between cooperating farmers, a cost often needs to be assigned for the usage of each machine to define the value of its contribution. The annual hours of use will greatly influence the \$/hr rate. When yearly costs are divided by low hours of use the \$/hr increases significantly and high hours of usage reduces the \$/hr. This method tends to exaggerate the difference because it does not consider the effect on retained value, which is often determined by the machine's

total hours. To achieve a fair evaluation, the effect of varying annual hours of use on the salvage value must be taken into account. Again, producers wishing to use their own value for annual hours of use or salvage value can do so in the online calculator.

ADDITIONAL INFORMATION

This publication can be printed from the Manitoba Agriculture and Resource Development website at www.manitoba.ca/agriculture or copies can be picked up at your local Manitoba Agriculture and Resource Development office.

Online calculator: An online calculator is also available on Manitoba Agriculture and Resource Development's website, which allows the user to enter individual information. Using the online calculator allows producers to enter user-specific information that may have a large impact on the rental or custom rate (e.g., interest rate, purchase price, annual hours of use, labour rate, etc.) The calculator can be used for any piece of equipment (not just those listed in the guide or in the drop-down menus) provided the user has values for purchase price, salvage value, annual hours of use, etc.

FACTORS TO CONSIDER WHEN CUSTOM HIRING

Custom hiring is a business arrangement. The terms of the arrangement should be written in a formal agreement. If unwritten, the terms are more likely to be misunderstood in case of a dispute. The following factors should be considered in a custom hiring agreement:

Timeliness: Significant loss can occur if an operation is not started or completed on time. To facilitate planning, a custom hiring agreement should include a schedule of operations for both parties. For example, when the custom combiner is picking up swathed grain, the schedule would outline time periods for swathing by the owner and combining by the custom operator. Such a schedule would be subject to weather conditions and crop maturity.

Operations: The parties should write into the agreement the exact operations to be performed by each party and the machine, materials, and labour to be supplied by each.

Rate Schedule: The custom operator should stipulate the rate for each operation to be performed on the basis of acreage, time (hour, day, and week), or total operation performed.

Management: A custom hiring agreement should ensure that the custom operator will employ acceptable management practices in his/her operations.

Terms of Payment: A custom hiring agreement should stipulate terms of payment for custom operations. As well, the custom operator should bill the client upon the completion of each custom operation. The bill should indicate actual units (hours, acres, etc.) completed, the rate charged per unit, the total charge, and payment due date.

Introduction

Termination: A minimum period for notice of termination should be included in a custom hiring agreement. A penalty should be stipulated for unjustified termination within the term of the agreement.

Insurance: A custom operator may be considered differently than a farmer when insuring. It is advised that this point be clarified with the insurance company if one considers doing custom work or renting equipment.

NEW INFORMATION FOR 2020-2021 GUIDE

The custom rates presented in this guide are not valid for commercial custom operators (e.g., custom sprayers). The rates in this guide are to be used as a guideline for cost recovery of equipment from farmer to farmer, not as a guideline for costing for a business. Business costs include extra liability insurance, overhead, skilled labour, etc. that will add to the cost for commercial custom operations.

The assumptions and calculation methods for the 2020-2021 guide are generally the same as those used in the previous guide, with the following exceptions based on the current market and industry practices:

- Diesel fuel price increased from \$0.819/L to \$0.950/L
- Annual interest rate for equipment loans decreased from 6.0% to 5.5%
- Labour rate increased from \$22/hr to \$24/hr
- CAD:USD exchange rate changed from 1 CAD\$ = \$0.777US\$ to 1 CAD\$ = 0.785US\$

Additionally, many of the equipment size categories were merged or removed. Most notably, all small two-wheel drive tractors less than 100 hp were removed from the guide. Some small implements (e.g., manure spreaders, post pounders, etc.) require less than 100 hp for operation but the power unit cost used for these small implements in this guide is based on the smallest available power unit (100 hp two-wheel drive). Therefore, the custom rates for some small implements will be over-estimated because of the power unit cost. These situations are noted in the footnotes for these implements.

Again, the online calculator can be used for any piece of equipment not listed in this guide provided the user has information related to purchase price, salvage value, annual hours of use, etc. The calculator can also be used to determine custom rates with appropriately sized power units if the user knows or can determine the hourly rate for a smaller power unit.

Equipment Summary

Equipment	Description	Rental Rate (per hour)	Custom Rate (per hour)	Average Custom Rate*
Tractors	Two-Wheel Drive	\$25.38 to \$33.84	\$79.20 to \$92.03	
	Front Wheel Assist	\$43.22 to \$85.27	\$99.22 to \$165.31	
	Four-Wheel Drive	\$88.95 to \$122.46	\$185.38 to \$246.20	
	Tracked	\$108.29 to \$174.26	\$188.33 to \$327.49	
Combine	Rotary	\$201.44 to \$354.91	\$276.01 to \$480.84	\$37.74 to \$41.81 per acre
Combine Header		\$9.80 to \$193.36		
Swather		\$108.04 to \$142.42	\$159.68 to \$209.35	\$10.47 to \$14.52 per acre
Grain Cart		\$18.10 to \$60.90	\$141.10 to \$276.65	
Grain Auger	Powered	\$13.01 to \$23.73		
Grain Auger	PTO	\$4.60 to \$42.47	\$103.82 to \$165.47	
Grain Vac		\$66.79 to \$74.65	\$145.99 to \$166.68	
SP Forage Harvester		\$246.37 to \$335.95	\$360.27 to \$495.75	\$24.57 to \$51.03 per acre
SP Forage Header		\$23.89 to \$94.56		
Mower Conditioner	Self Propelled	\$141.15 to \$373.41	\$203.71 to \$470.93	\$20.48 to \$22.63 per acre
Mower Conditioner	Pull Type	\$16.37 to \$39.29	\$95.57 to \$118.49	\$10.07 to \$23.89 per acre
Baler	Small Square	\$19.11 to \$30.44	\$98.31 to \$109.64	\$0.56 to \$0.63 per bale
Baler	Large Square	\$94.77 to \$142.16	\$193.99 to \$265.15	\$4.85 to \$6.63 per bale
Baler	Round	\$24.97 to \$46.24	\$104.16 to \$125.43	\$6.13 to \$10.45 per bale
Bale Mover	Pull Type	\$22.63 to \$51.99	\$121.85 to \$174.98	
Bale Mover	Self Propelled	\$180.22	\$238.41	
Air Drills		\$199.19 to \$242.49	\$384.57 to \$458.25	\$13.09 to \$24.04 per acre
Air Hoe Drills		\$175.56 to \$249.62	\$360.94 to \$465.38	\$16.62 to \$20.05 per acre
Air Disc Drills		\$202.99 to \$342.88	\$388.37 to \$528.26	\$18.87 to \$21.58 per acre
Air Seeders		\$161.84 to \$307.22	\$347.22 to \$522.98	\$17.43 to \$23.15 per acre
Row Crop Planters		\$199.01 to \$505.17	\$298.23 to \$670.48	\$19.88 to \$30.14 per acre
Cultivators	Field, heavy duty	\$26.79 to \$63.15	\$149.78 to \$248.53	\$5.35 to \$11.10 per acre
Harrows	Mid, Heavy	\$59.30 to \$76.54	\$224.60 to \$261.92	\$4.40 to \$5.82 per acre
Harrows	Packers	\$11.37	\$134.37	\$4.20 per acre
Vertical Tillage Tools	Compact, High Speed	\$79.63 to \$109.50	\$244.94 to \$325.25	\$8.34 to \$12.89 per acre
Vertical Tillage Tools	Heavy Duty	\$94.56 to \$159.27	\$259.87 to \$375.02	\$11.72 to \$15.29 per acre
Land Roller		\$16.99 to \$84.95	\$116.21 to \$250.26	\$5.56 to \$12.91 per acre
Land Scraper		\$50.94 to \$169.79	\$150.16 to \$415.99	
Sprayers	High Clearance	\$372.42 to \$462.32	\$444.82 to \$566.39	\$4.36 to \$5.55 per acre
Post Pounder		\$9.05 to \$34.97	\$88.25 to \$97.71	
Vertical Feed Mixers		\$22.87 to \$44.19	\$122.10 to \$143.41	
Grinder Mixer		\$17.01 to \$32.92	\$116.23 to \$155.91	
Feed Mixer		\$17.56	\$116.78	
Bale Processor		\$15.91 to \$30.17	\$115.13 to \$153.17	
Manure Spreaders		\$25.23 to \$102.49	\$124.45 to \$225.49	

Hauling grain from field to yard \$0.28 per bushel for first 3 miles plus \$0.04 per bushel for each additional mile
Rental rates include value of equipment only. Custom rates include value of equipment, power unit (if required), fuel, and labour.

*** Exercise caution when using these average figures as they may not reflect actual situations.
They should be used as a guideline only.**

Power Units

Two Wheel Drive Tractors										
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
100-119 hp	\$90,000	24	15.47	6.60	3.31	25.38	22.80	24.00	7.02	79.20
120+ hp	\$120,000	28	20.62	8.80	4.41	33.84	26.60	24.00	7.59	92.03

Annual hours of use: 300

Notes: Fuel type is diesel with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Power rating represents PTO power.

If tractor rating is given in net engine power, multiply by 0.88 to get PTO power.

Front Wheel Assist Tractors										
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
Small (Average) 100-159 hp	\$185,000	26	26.89	10.69	5.64	43.22	24.70	24.00	7.31	99.22
Medium (Average) 160-224 hp	\$240,000	36	34.89	13.87	7.31	56.07	34.20	24.00	8.73	123.00
Large (Average) 225+ hp	\$365,000	48	53.06	21.09	11.12	85.27	45.60	24.00	10.44	165.31

Annual hours of use: 450

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Power rating represents PTO power.

If tractor rating is given in net engine power, multiply by 0.88 to get PTO power.

Power Units

Four Wheel Drive Tractors										
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
Small (Average) 350-449 hp	\$385,000	63	55.96	21.39	11.60	88.95	59.85	24.00	12.58	185.38
Medium (Average) 450-549 hp	\$455,000	76	66.14	25.28	13.71	105.13	72.20	24.00	14.43	215.76
Large (Average) 550+ hp	\$530,000	88	77.04	29.44	15.97	122.46	83.60	24.00	16.14	246.20

Annual hours of use: 450

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Power rating represents engine power.

Tracked Tractors										
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
300-359 hp	\$435,000	48	63.23	30.93	14.12	108.29	45.60	24.00	10.44	188.33
360-449 hp	\$490,000	77	71.22	34.84	15.91	121.98	73.15	24.00	14.57	233.70
450-549 hp	\$580,000	110	84.31	41.24	18.83	144.38	104.50	24.00	19.28	292.16
550-599 hp	\$640,000	112	93.03	45.51	20.78	159.32	106.40	24.00	19.56	309.28
600+ hp	\$700,000	115	101.75	49.78	22.73	174.26	109.25	24.00	19.99	327.49

Annual hours of use: 450

Notes: Fuel type is diesel with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Power rating represents engine power.

Harvesting Grain

SP Combines						
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)
Class 5 Rotary ≤ 300 HP	\$420,000	43	133.16	42.00	26.27	201.44
Class 6 Rotary 301 - 360 HP	\$485,000	51	153.77	48.50	30.34	232.61
Class 7 Rotary 361 - 420 HP	\$530,000	55	168.04	53.00	33.16	254.19
Class 8 Rotary 421 - 500 HP	\$580,000	71	183.89	58.00	36.28	278.17
Class 9 Rotary 501 - 560 HP	\$610,000	82	193.40	61.00	38.16	292.56
Class 10 Rotary 561+ HP	\$740,000	90	234.62	74.00	46.29	354.91

Rotary annual hours of use*: 250

*Based on separator annual hours of use.

Notes: Fuel type is diesel with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Harvesting Grain

SP Combines (continued)							
Machine Size	Purchase Price	Litre / Hour	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)
Class 5 Rotary ≤ 300 HP	\$420,000	43	40.85	24.00	9.73	276.01	8
Class 6 Rotary 301 - 360 HP	\$485,000	51	48.45	24.00	10.87	315.93	10
Class 7 Rotary 361 - 420 HP	\$530,000	55	52.25	24.00	11.44	341.88	12
Class 8 Rotary 421 - 500 HP	\$580,000	71	67.45	24.00	13.72	383.34	15
Class 9 Rotary 501 - 560 HP	\$610,000	82	77.90	24.00	15.29	409.75	17
Class 10 Rotary 561+ HP	\$740,000	90	85.50	24.00	16.43	480.84	21

Rotary annual hours of use*: 250

*Based on separator annual hours of use.

Notes: Fuel type is diesel with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Harvesting Grain

Combine Headers					
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)
Pickup Headers					
12 FT	\$32,000	6.60	1.92	1.28	9.80
15 FT	\$34,000	7.01	2.04	1.36	10.41
Rigid Headers					
20-25 FT	\$44,000	9.07	3.52	1.89	14.48
30-35 FT	\$55,000	11.34	4.40	2.36	18.10
Flex Headers					
20 FT	\$41,000	10.73	4.10	2.22	17.05
25 FT	\$45,000	11.77	4.50	2.44	18.71
30 FT	\$50,000	13.08	5.00	2.71	20.79
35 FT	\$60,000	15.70	6.00	3.25	24.95
Draper Headers					
25 FT	\$80,000	20.93	8.00	4.34	33.27
30 FT	\$95,000	24.86	9.50	5.15	39.51
35 FT	\$100,000	26.16	10.00	5.42	41.59
40-45 FT	\$110,000	28.78	11.00	5.97	45.75
Corn Header					
6 row, 30" spacing	\$65,000	42.52	18.20	9.11	69.82
8 row, 30" spacing	\$80,000	52.33	22.40	11.21	85.94
12 row, 30" spacing	\$125,000	81.76	35.00	17.51	134.28
16-18 row, 20-30" spacing	\$180,000	117.74	50.40	25.22	193.36

Pickup header annual hours of use: 250
 Rigid header annual hours of use: 250
 Flex header annual hours of use: 250
 Draper header annual hours of use: 250
 Corn header annual hours of use: 100
 Rigid, flex, and draper headers include pickup reels.

Calculation to determine the custom rate (\$/acre) for a combine using a specific combine header:

$$\text{Custom Rate (\$/acre)} = \frac{\text{Combine Custom Rate (\$/hr)} + \text{Header Rental Rate (\$/hr)}}{\text{Work Rate (acre/hr)}}$$

Example: For a Class 8 rotary combine with a 30 ft Flex header:

$$\text{Custom Rate (\$/acre)} = \frac{\$383.34 + \$20.79}{15}$$

$$\text{Custom Rate (\$/acre)} = \$26.94/\text{acre}$$

Harvesting Grain

Swathers							
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)
SP Swathers - Draper Header							
18-22 FT	\$220,000	22	71.95	22.00	14.09	108.04	20.90
25 FT	\$240,000	22	78.49	24.00	15.37	117.87	20.90
30 FT	\$270,000	32	88.30	27.00	17.30	132.60	30.40
35-40 FT	\$290,000	36	94.85	29.00	18.58	142.42	34.20

Swathers (continued)							
Machine Size	Purchase Price	Litre / Hour	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
SP Swathers - Draper Header							
18-22 FT	\$220,000	22	24.00	6.74	159.68	11	14.52
25 FT	\$240,000	22	24.00	6.74	169.50	13	13.04
30 FT	\$270,000	32	24.00	8.16	195.16	16	12.20
35-40 FT	\$290,000	36	24.00	8.73	209.35	20	10.47

Annual hours of use: 200

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**. Fuel efficiency is based on 126 hp (18-22' swather), 126 hp (25' swather), 190 hp (30' swather), and 226 hp (35'+ swather).

Grain Cart							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
Small 500-1,000 bu	\$55,000	11.34	4.40	2.36	18.10	123.00 210 hp	141.10
Medium 1,050-1,600 bu	\$125,000	25.78	10.00	5.37	41.15	165.31 300 hp	206.45
Large 2,000 bu	\$185,000	38.15	14.80	7.94	60.90	215.76 460 hp	276.65

Annual hours of use: 250

Notes: Power unit cost includes fuel, labour, and margin. The power units for small and medium grain carts are FWA tractors. The power unit for the large grain cart is a 4WD tractor.

To obtain a total cost for grain cart, power unit, and fuel (but not labour), subtract \$27.60 from the Custom Rate (\$24/hr labour plus 15% margin).

Harvesting Grain

Powered Auger					
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)
8" 30-39 FT, 20 hp engine	\$17,000	8.76	2.55	1.70	13.01
8" 40-49 FT, 20 hp engine	\$17,000	8.76	2.55	1.70	13.01
8" 50-59 FT, 25 hp engine	\$17,000	8.76	2.55	1.70	13.01
10" 40-49 FT, 35 hp engine	\$22,000	11.34	3.30	2.20	16.84
10" 50-59 FT, 38 hp engine	\$23,000	11.86	3.45	2.30	17.60
12-13" 39-40 FT, 38-50 hp diesel engine	\$31,000	15.98	4.65	3.09	23.73

Annual hours of use: 100

Notes: Value of engine is included in rental rate. Rate does not include fuel or maintenance costs for engine.

Grain Auger (PTO)							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
8" 30-69 FT 2,700-3,200 bu/hr	\$6,500	3.35	0.65	0.60	4.60	99.22 50 hp	103.82
10" 40-89 FT 5,400 bu/hr	\$15,000	7.73	1.50	1.39	10.62	99.22 75 hp	109.84
12" 70+ FT 8,400 bu/hr	\$33,000	17.01	3.30	3.05	23.36	99.22 75 hp	122.58
13" 70-120 FT 9,700 bu/hr	\$37,000	19.08	3.70	3.42	26.19	99.22 100 hp	125.41
16" 80+ FT 21,000 bu/hr	\$60,000	30.93	6.00	5.54	42.47	123.00 200 hp	165.47

Annual hours of use: 100

Notes: The power units for all PTO augers are front wheel assist tractors. Note that the smallest front wheel assist tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin. To obtain a total cost for auger, power unit, and fuel (but not labour), subtract \$27.60 from the Custom Rate (\$24/hr labour plus 15% margin).

Grain Vac							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
2,400-5,000 bu/hr	\$34,400	44.48	13.60	8.71	66.79	79.20 70 hp	145.99
6,000-10,000 bu/hr	\$38,500	49.71	15.20	9.74	74.65	92.03 120 hp	166.68

Annual hours of use: 50

Notes: The power units for all grain vacs are two-wheel drive tractors. Note that the smallest two-wheel drive tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin. To obtain a total cost for auger, power unit, and fuel (but not labour), subtract \$27.60 from the Custom Rate (\$24/hr labour plus 15% margin).

Harvesting Hay

SP Forage Harvester										
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
Small 400-599 hp	\$495,000	79	115.23	99.00	32.13	246.37	75.05	24.00	14.86	360.27
Medium 600-799 hp	\$590,000	103	137.35	118.00	38.30	293.65	97.85	24.00	18.28	433.78
Large 800-899 hp	\$675,000	121	157.13	135.00	43.82	335.95	114.95	24.00	20.84	495.75

Annual hours of use: 400

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

Headers for SP Forage Harvester							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Work Rate (acre/hr)	Rental Rate (\$/acre)
Windrow Pickup, 12-17 FT width	\$48,000	11.17	9.60	3.12	23.89	17	1.41
Corn, 14-20 FT width	\$130,000	30.26	26.00	8.44	64.70	9	7.19
Corn, 21-30 FT width	\$190,000	44.23	38.00	12.33	94.56	13	7.27

Annual hours of use: 400

Calculation to determine the custom rate (\$/acre) for a SP or PT forage harvester using a specific header:

$$\text{Custom Rate (\$/acre)} = \frac{\text{Forage Harvester Rate (\$/hr)} + \text{Header Rental Rate (\$/hr)}}{\text{Work Rate (acre/hr)}}$$

Example: For a 500 hp SP Forage Harvester with a 15 FT windrow pickup header:

$$\text{Custom Rate (\$/acre)} = \frac{\$360.27 + \$23.89}{17}$$

$$\text{Custom Rate (\$/acre)} = \$22.6 / \text{acre}$$

Harvesting Hay

SP Mower/Conditioners							
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)
Disc Mower Conditioner 13-19 FT	\$201,000	36	87.65	42.88	19.58	150.11	34.20
Disc Mower Conditioner 30 FT	\$500,000	64	218.04	106.67	48.71	373.41	60.80
Sickle Mower Conditioner 14-18 FT	\$189,000	32	82.42	40.32	18.41	141.15	30.40

SP Mower/Conditioners (continued)							
Machine Size	Purchase Price	Litre / Hour	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Disc Mower Conditioner 13-19 FT	\$201,000	36	24.00	8.73	217.04	12	18.09
Disc Mower Conditioner 30 FT	\$500,000	64	24.00	12.72	470.93	23	20.48
Sickle Mower Conditioner 14-18 FT	\$189,000	32	24.00	8.16	203.71	9	22.63

Annual hours of use: 150

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**. Fuel efficiency is based on 226 hp (16' disc), 400 hp (30' disc), and 190 hp (18' sickle).

PT Mower/Conditioners									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Sickle 7-9 FT	\$25,000	10.90	3.33	2.14	16.37	79.20 50 hp	95.57	4	23.89
14 FT	\$50,000	21.80	6.67	4.27	32.74	79.20 80 hp	111.94	8	13.99
16-18 FT	\$60,000	26.16	8.00	5.12	39.29	79.20 100 hp	118.49	9	13.17
Disc 9-10 FT	\$33,000	14.39	5.50	2.98	22.87	79.20 60 hp	102.07	7	14.58
11-13 FT	\$50,000	21.80	8.33	4.52	34.66	79.20 90 hp	113.85	9	12.65
14-16 FT	\$60,000	26.16	10.00	5.42	41.59	79.20 100 hp	120.79	12	10.07

Sickle annual hours of use:150

Disc annual hours of use: 150

Notes: The power units for all PT mower/conditioners are two-wheel drive tractors. Note that the smallest two-wheel drive tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor.

Harvesting Hay

Balers									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/bale)
Large Round Balers									
4x4 FT bales	\$27,000	17.66	4.05	3.26	24.97	79.20 50 hp	104.16	17	6.13
4x5 FT bales	\$42,000	27.47	6.30	5.07	38.84	79.20 60 hp	118.04	15	7.87
4x6 FT bales	\$50,000	32.71	7.50	6.03	46.24	79.20 70 hp	125.43	15	8.36
5x5 FT bales	\$38,000	24.86	5.70	4.58	35.14	79.20 70 hp	114.34	12	9.53
5x6 FT bales	\$50,000	32.71	7.50	6.03	46.24	79.20 80 hp	125.43	12	10.45
Large Square Balers									
Small (35x31x108")	\$150,000	65.41	17.00	12.36	94.77	99.22 145 hp	193.99	40	4.85
Medium (35x47x108")	\$180,000	78.49	20.40	14.83	113.73	99.22 145 hp	212.95	40	5.32
Large (50x47x108")	\$225,000	98.12	25.50	18.54	142.16	123.00 180 hp	265.15	40	6.63
Small Square Baler									
14x18x52" bales	\$27,000	13.92	2.70	2.49	19.11	79.20 50 hp	98.31	175	0.56
16x18x52" bales	\$43,000	22.17	4.30	3.97	30.44	79.20 50 hp	109.64	175	0.63

Large Round Balers annual hours of use: 100

Large Square Balers annual hours of use: 150

Small Square Balers annual hours of use: 100

Notes: Cost of twine is not included in above rates. For the cost of twine, add \$0.27/bale for 4' diameter, \$0.40/bale for 5' diameter, and \$0.76/bale for 6' diameter. Add \$0.78/bale for large square and \$0.05/bale for small square. For the cost of mesh, add \$1.25/bale.

Power units for round and small square balers are two-wheel drive tractors and power units for large square balers are front wheel assist tractors. Note that the smallest two-wheel drive tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor.

Harvesting Hay

PT Bale Movers (Self Load/Unload)							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
Round Bale 7-12 bale	\$26,000	17.01	6.50	3.53	27.03	99.22 120 hp	126.25
Round Bale 12-18 bale	\$50,000	32.71	12.50	6.78	51.99	123.00 180 hp	174.98
Large Square 4-6 bale	\$55,000	14.18	5.50	2.95	22.63	99.22 120 hp	121.85
Large Square 6-12 bale	\$75,000	19.33	7.50	4.03	30.86	123.00 180 hp	153.85
Large Square 12-20 bale	\$95,000	24.49	9.50	5.10	39.09	123.00 220 hp	162.08

Annual hours of use: 100

Square bale mover annual hours of use: 200

Notes: Power units for all PT bale movers are front wheel assist tractors. Power unit cost includes fuel, labour, and margin for tractor.

SP Bale Mover						
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)
Self-propelled small square bale wagon	\$260,000	28	113.38	43.33	23.51	180.22

SP Bale Mover (continued)						
Machine Size	Purchase Price	Litre / Hour	Fuel Cost (\$/hr)	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)
Self-propelled small square bale wagon	\$260,000	28	26.60	24.00	7.59	238.41

Annual hours of use: 150

Notes: Fuel type is diesel, with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**. Fuel efficiency is based on 173 hp engine.

Seeding

Air Drills with Independent Openers									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Small 25-45 FT	\$345,000	112.83	60.38	25.98	199.19	185.38 300 hp	384.57	16	24.04
Medium 46-65 FT	\$455,000	148.81	79.63	34.27	262.70	185.38 400 hp	448.08	26	17.23
Large 66-86 FT	\$420,000	137.36	73.50	31.63	242.49	215.76 525+ hp	458.25	35	13.09

Annual hours of use: 200

Notes: Includes appropriately sized air tank (<550 bu for small, 550 bu for medium and >550 bu for large drills).

The power units for all air drill with independent openers are four-wheel drive tractors. Note that the smallest four-wheel drive tractor available in this guide is 350 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor. Power unit size (horsepower and hydraulic pressure requirements) will vary for each condition (soil type, implement type, etc.), so ensure that the power unit size and cost is appropriate.

Air drills, similar to air seeders, use a tillage tool bar, a towed commodity metering cart, pneumatic seed and fertilizer delivery systems, and soil-engagement tools for seed and/or fertilizer placement. However, unlike air seeders, the toolbar is supported by on-row packer gangs at the rear of the unit and castoring wheels in front connected through a parallel linkage. Depth control is achieved through hydraulic adjustment of frame height through this linkage. Typically air drills are equipped with a floating hitch that pivots at the toolbar mainframe, minimizing tractor hitch weight and maximizing downforce to the soil-engagement tools. Seed opener tools are commonly spoons, knives, discs, and paired-row tools, but rarely sweeps, as soil disturbance is generally targeted not to exceed the footprint of the on-row packer wheels.

An air drill with independent depth control openers utilizes a tool bar frame supported by wheels ahead of and behind the main frame, a towed commodity metering cart, and pneumatic seed and fertilizer delivery. Hydraulic, independently controlled shank assemblies complete with gauge wheel packers are fixed to the toolbar frame. Seed/fertilizer placement depth is controlled through adjustment of the gauge wheels, and packing pressure is regulated with hydraulic force. Either hoe or disk openers can be mounted to the shank assemblies depending on the manufacturer of the implement. Independent depth control openers offer the advantage of improved ground-following capabilities and precision seed/fertilizer placement depth control.

Air Hoe Drills									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Small 27-50 FT	\$320,000	104.66	48.00	22.90	175.56	185.38 350 hp	360.94	18	20.05
Large 51-72 FT	\$455,000	148.81	68.25	32.56	249.62	215.76 450+ hp	465.38	28	16.62

Annual hours of use: 200

Notes: Includes appropriately sized air tank (<550 bu for small and >550 bu for large drills).

The power units for all air hoe drills are four-wheel drive tractors. Power unit cost includes fuel, labour, and margin for tractor. Power unit size (horsepower and hydraulic pressure requirements) will vary for each condition (soil type, implement type, etc.), so ensure the power unit size and cost is appropriate.

Air hoe drills are air drills that use soil engagement tools to plow an opening into the soil for seed and/or fertilizer placement. There are several different types of tools on the market that fall into the hoe drill category. The specific type of tool used depends on the shank or tool holder used, the amount of allowable soil disturbance, and seed placement options.

Seeding

Air Disk Drills									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Small 30-49FT	\$370,000	121.01	55.50	26.48	202.99	185.38 200 hp	388.37	18	21.58
Large 50-70 FT	\$625,000	204.41	93.75	44.72	342.88	185.38 300+ hp	528.26	28	18.87

Annual hours of use: 200

Notes: Includes appropriately sized air tank (<550 bu for small and 550 bu for large drills).

The power units for all air disc drills are four-wheel drive tractors. Note that the smallest four-wheel drive tractor available in this guide is 350 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor. Power unit size (horsepower and hydraulic pressure requirements) will vary for each condition (soil type, implement type, etc.), so ensure that the power unit size and cost is appropriate.

Air Disk Drills are air drills that use a soil engagement tool to cut an opening into the soil for seed and/or fertilizer placement. The tool is typically a circular disk or coulter blade. Several variants of the disk are on the market with or without waves or notches, and/or may utilize a multiple disk arrangement or cleaner wheel options.

Air Seeders									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Small 25-40 FT	\$295,000	96.48	44.25	21.11	161.84	185.38 275 hp	347.22	15	23.15
Medium 41-59FT	\$470,000	153.71	70.50	33.63	257.85	185.38 400 hp	443.23	23	19.27
Large 60-70 FT	\$560,000	183.15	84.00	40.07	307.22	215.76 450+ hp	522.98	30	17.43

Annual hours of use: 200

Notes: Includes appropriately sized air tank (<550 bu for small, 550 bu for medium and >550 bu for large seeders).

The power units for all air seeders are four-wheel drive tractors. Note that the smallest four-wheel drive tractor available in this guide is 350 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor. Power unit size (horsepower and hydraulic pressure requirements) will vary for each condition (soil type, implement type, etc.), so ensure that the power unit size and cost is appropriate.

Air seeders use a medium or heavy-duty cultivator as a tillage tool bar, a towed commodity metering cart, pneumatic seed and fertilizer delivery systems, and tillage soil-engagement tools for seed and/or fertilizer placement. The cultivator's fixed-frame hitch (connected to tractor drawbar) and in-frame wheels support the implement, and hence depth control of the soil-opener tools is controlled by hydraulically actuating the height of the cultivator frame. Options for soil engagement and seed opener tools include sweeps, spoons, or knives. Appropriate seed-row finishing equipment, such as harrows, coil packers, or gang packers, are attached to the back of the cultivator frame (separate from the tillage tools).

Seeding

Other Row Crop Planters									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
12 row planter	\$130,000	121.05	52.00	25.96	199.01	99.22 150 hp	298.23	15	19.88
16 row planter	\$190,000	176.92	76.00	37.94	290.86	123.00 180 hp	413.85	19	21.78
24 row planter	\$330,000	307.28	132.00	65.89	505.17	165.31 230 hp	670.48	29	23.12
12/24 split row planter	\$215,000	200.20	86.00	42.93	329.13	123.00 210 hp	452.12	15	30.14
16/32 split row planter	\$290,000	270.04	116.00	57.91	443.94	165.31 250 hp	609.25	19	32.07

Annual hours of use: 100

Notes: The power units for all row crop planters are front wheel assist tractors. Power unit cost includes fuel, labour, and margin for tractor.

Soil Preparation

Cultivators									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Cultivators, field (with tine harrows)									
Small 24-35 FT	\$70,000	18.05	5.25	3.49	26.79	123.00 160 hp	149.78	17	8.81
Medium 36-49 FT	\$115,000	29.65	8.63	5.74	44.01	123.00 185 hp	167.01	25	6.68
Large 50-62 FT	\$140,000	36.09	10.50	6.99	53.58	123.00 220 hp	176.57	33	5.35
Cultivators, heavy-duty (with tine harrows)									
Small 23-40 FT	\$90,000	23.20	6.75	4.49	34.44	165.31 230 hp	199.75	18	11.10
Medium 41-50 FT	\$120,000	30.93	9.00	5.99	45.92	185.38 315 hp	231.31	26	8.90
Large 51-62 FT	\$165,000	42.54	12.38	8.24	63.15	185.38 385 hp	248.53	33	7.53

Annual hours of use: 200

Notes: Power units for cultivators are front wheel assist tractors except for medium and large heavy-duty cultivators, where a four wheel-drive tractor is selected. Power unit cost includes fuel, labour, and margin for tractor.

Soil Preparation

Harrows									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Harrows, mid 50-90 FT	\$70,000	40.36	11.20	7.73	59.30	165.31 225 hp	224.60	51	4.40
Harrows, heavy 40-84 FT	\$100,000	51.56	15.00	9.98	76.54	185.38 375 hp	261.92	45	5.82
Harrow packers 25-62 FT	\$41,000	8.87	1.03	1.48	11.37	123.00 175 hp	134.37	32	4.20

Mid harrows annual hours of use: 75

Heavy harrows annual hours of use: 100

Packer harrows annual hours of use: 200

Notes: The power units for mid and packer harrows are front wheel assist tractors. The power unit for heavy harrows is a four-wheel drive tractor.

Power unit cost includes fuel, labour, and margin for tractor.

Vertical Tillage Tools									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
Compact, high-speed disk Small 10-30FT	\$80,000	41.25	28.00	10.39	79.63	165.31 225+ hp	244.94	19	12.89
Large 31-50 FT	\$110,000	56.71	38.50	14.28	109.50	215.76 500 hp	325.25	39	8.34
Heavy duty, compact high-speed disk Small 10-25 FT	\$95,000	48.98	33.25	12.33	94.56	165.31 225+ hp	259.87	17	15.29
Large 26-40 FT	\$160,000	82.49	56.00	20.77	159.27	215.76 500 hp	375.02	32	11.72

Compact annual hours of use: 100

Heavy duty annual hours of use: 100

Notes: Power units for small compact and small heavy-duty disks are front wheel assist tractors. Power units for large compact and large heavy-duty disks are four-wheel drive tractors. Power unit cost includes fuel, labour, and margin for tractor.

Soil Preparation

Land Roller									
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
11-20 FT (fixed or 3 PT)	\$18,000	12.37	2.40	2.22	16.99	99.22 50 hp	116.21	9	12.91
46-85 FT (5 roller sections)	\$60,000	41.25	8.00	7.39	56.63	123.00 200 hp	179.63	38	4.73
65-89 FT (7 roller sections)	\$90,000	61.87	12.00	11.08	84.95	165.31 240 hp	250.26	45	5.56

Annual hours of use: 75

Notes: Power units for all land rollers are front wheel assist tractors. Note that the smallest front wheel assist tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor.

Land Scraper							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
6.0-7.9 CU. yard	\$30,000	34.92	9.38	6.64	50.94	99.22 100 hp	150.16
8.0-9.9 CU. yard	\$40,000	46.56	12.50	8.86	67.92	99.22 125 hp	167.14
10.0-10.9 CU. yard	\$50,000	58.20	15.63	11.07	84.90	99.22 150 hp	184.12
11.0-12.9 CU. yard	\$60,000	69.84	18.75	13.29	101.87	123.00 220 hp	224.87
13.0+ CU. yard	\$100,000	116.39	31.25	22.15	169.79	246.20 550 hp	415.99

Annual hours of use: 80

Notes: The power units for 6.0-12.9 CU yard land scrapers is front wheel assist tractors. Power unit for 13.0+ CU yard land scraper is four wheel drive tractor. Power unit cost includes fuel, labour, and margin for tractor.

Sprayers

High Clearance Sprayer							
Machine Size	Purchase Price	Litre / Hour	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Fuel Cost (\$/hr)
1,000 US gal, 90-120 FT boom	\$435,000	41	247.72	76.13	48.58	372.42	38.95
1,200 US gal, 90-120 FT boom	\$495,000	52	281.89	86.63	55.28	423.79	49.40
1,400 US gal, 90-120 FT boom	\$530,000	61	301.82	92.75	59.19	453.76	57.95
1,600 US gal, 90-120 FT boom	\$540,000	70	307.52	94.50	60.30	462.32	66.50

High Clearance Sprayer (continued)							
Machine Size	Purchase Price	Litre / Hour	Labour Cost (\$/hr)	Margin on Labour & Fuel (\$/hr)	Custom Rate (\$/hr)	Work Rate (acre/hr)	Custom Rate (\$/acre)
1,000 US gal, 90-120 FT boom	\$435,000	41	24.00	9.44	444.82	102	4.36
1,200 US gal, 90-120 FT boom	\$495,000	52	24.00	11.01	508.20	102	4.98
1,400 US gal, 90-120 FT boom	\$530,000	61	24.00	12.29	548.00	102	5.37
1,600 US gal, 90-120 FT boom	\$540,000	70	24.00	13.58	566.39	102	5.55

Annual hours of use: 200

Notes: Fuel type is diesel with a 75% load assumption. To calculate fuel consumption with alternative load, refer to **Appendix E**.

These rates are not intended to be compared to commercial custom spraying rates. Refer to the introduction of this guide for more information.

Miscellaneous

Post Pounders							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
Post pounder 3PT hitch mount	\$4,400	5.67	2.20	1.18	9.05	79.20 55 hp	88.25
Post pounder trailer mounted with engine	\$17,000	21.91	8.50	4.56	34.97	n/a	n/a
Post pounder skid steer mounted	\$9,000	11.60	4.50	2.42	18.52	79.20 55 hp	97.71

Annual hours of use: 40

Notes: The power units for all post pounders are two-wheel drive tractors. Note that the smallest two-wheel drive tractor available in this guide is 100 hp, so power unit cost for equipment that requires a smaller power unit may be over-estimated. Power unit cost includes fuel, labour, and margin for tractor.

Vertical Feed Mixer							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
280-360 CU. FT	\$44,000	14.39	5.50	2.98	22.87	99.22 110 hp	122.10
500-750 CU. FT	\$65,000	21.26	8.13	4.41	33.79	99.22 135 hp	133.01
830-1,150 CU. FT	\$85,000	27.80	10.63	5.76	44.19	99.22 150 hp	143.41

Annual hours of use: 200

Notes: The power units for all vertical feed mixers are front wheel assist tractors. Power unit cost includes fuel, labour, and margin for tractor.

Miscellaneous

Grinder Mixers, Feed Mixers, and Bale Processors							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
Grinder Mixers							
360-440 CU. FT	\$31,000	10.14	4.65	2.22	17.01	99.22 120 hp	116.23
550-750 CU. FT	\$60,000	19.62	9.00	4.29	32.92	123.00 200 hp	155.91
Feed Mixers							
Two 6 FT Bale, 40 bu grain	\$32,000	10.47	4.80	2.29	17.56	99.22 100 hp	116.78
Bale Processors							
Two 6 FT Round Bale	\$29,000	9.48	4.35	2.08	15.91	99.22 155 hp	115.13
Six 6 FT Round Bale	\$55,000	17.99	8.25	3.94	30.17	123.00 175 hp	153.17

Grinder / Feed mixer annual Hours of Use: 200

Bale processor annual Hours of Use: 200

Note: The power units for all grinder mixers, feed mixers, and bale processors are front wheel assist tractors. Power unit cost includes fuel, labour, and margin for tractor.

Miscellaneous

Manure Spreader (Solid)							
Machine Size	Purchase Price	Ownership Cost (\$/hr)	Repair & Maint. (R&M) Cost (\$/hr)	Margin on Ownership and R&M (\$/hr)	Rental Rate (\$/hr)	Power Unit Cost (\$/hr)	Custom Rate (\$/hr)
250-299 CU. FT level chain unload	\$16,000	14.90	7.04	3.29	25.23	99.22 120 hp	124.45
300-399 CU. FT level chain unload	\$22,000	20.49	9.68	4.52	34.69	99.22 125 hp	133.91
400-500 CU. FT level chain unload	\$24,000	22.35	10.56	4.94	37.84	99.22 150 hp	137.07
250-299 CU. FT level side discharge	\$40,000	37.25	17.60	8.23	63.07	99.22 120 hp	162.30
300-399 CU. FT level side discharge	\$44,000	40.97	19.36	9.05	69.38	99.22 150 hp	168.60
400-500 CU. FT level side discharge	\$65,000	60.53	28.60	13.37	102.49	123.00 180 hp	225.49
500+ CU. FT level side discharge	\$65,000	60.53	28.60	13.37	102.49	123.00 200 hp	225.49
250-300 CU. FT, hydraulic push, vertical beaters	\$45,000	41.90	19.80	9.26	70.96	99.22 120 hp	170.18
400-500 CU. FT, hydraulic push, vertical beaters	\$55,000	51.21	24.20	11.31	86.73	99.22 150 hp	185.95

Annual hours of use: 100

Notes: Power units for all manure spreaders are front wheel assist tractors. Power unit cost includes fuel, labour, and margin for tractor.

Appendix A

Hauling Grain from Field to Yard

Truck cost - excluding labour	\$154.26/hour*
Auger cost - 8 inch x 55' with gas engine (excluding labour)	\$13.01/hour
Labour cost	\$24.00/hour

Distance from Field to Yard (miles)	0.5	1	1.5	2	3	4	6	10
TIME USE								
(A) Time unload twice from one combine or once from each of two combines (min)	10	10	10	10	10	10	10	10
(B) Travel time to yard and return (min)	4	6.5	8.5	10	12	15	21	33
(C) Time truck running during unload (min)	4	4	4	4	4	4	4	4
(D) Truck running time per trip (min)	18	20.5	22.5	24	26	29	35	47
(E) Total unload time at bin (min)	7	7	7	7	7	7	7	7
Wait Time in Field (truck not running) (min)								
(F) Hauling from one combine (min)	47	44.5	42.5	41	39	36	30	18
(G) Hauling from two combines (min)	11	8.5	6.5	5	3	0	0	0
Total Time per Trip								
(H) Hauling from one combine (min)	68	68	68	68	68	68	68	68
(I) Hauling from two combines (min)	32	32	32	32	32	32	38	50
COMPONENT COSTS PER TRIP								
(J) Truck costs per trip	\$46.28	\$52.71	\$57.85	\$61.70	\$66.85	\$74.56	\$89.99	\$120.84
(K) Auger costs per trip	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52
(L) Labour costs per trip (one combine)	\$27.20	\$27.20	\$27.20	\$27.20	\$27.20	\$27.20	\$27.20	\$27.20
(M) Labour costs per trip (two combines)	\$12.80	\$12.80	\$12.80	\$12.80	\$12.80	\$12.80	\$15.20	\$20.00
CUSTOM RATE (\$/hr) (includes 15% margin)								
(N) Hauling from one combine	\$76.10	\$82.62	\$87.84	\$91.75	\$96.97	\$104.80	\$120.45	\$151.75
(O) Hauling from two combines	\$130.66	\$144.52	\$155.61	\$163.92	\$175.01	\$191.64	\$193.75	\$196.45
CUSTOM RATE (\$/bu) (includes 15% margin)								
(P) Hauling from one combine (bu/hr = 300)	\$0.25	\$0.28	\$0.29	\$0.31	\$0.32	\$0.35	\$0.40	\$0.51
(Q) Hauling from two combines (bu/hr = 600)	\$0.22	\$0.24	\$0.26	\$0.27	\$0.29	\$0.32	\$0.32	\$0.33

Calculations used to determine costs:

$$D = A + B + C$$

$$H = A + B + E + F$$

$$I = A + B + E + G$$

$$J = D / (60 \text{ min/hr}) \times (\text{truck cost})$$

$$K = E / (60 \text{ min/hr}) \times (\text{auger cost})$$

$$L = H / (60 \text{ min/hr}) \times (\text{labour cost})$$

$$M = I / (60 \text{ min/hr}) \times (\text{labour cost})$$

$$\# \text{ trips/hr one combine} = (60 \text{ min/hr}) / H$$

$$\# \text{ trips/hr two combines} = (60 \text{ min/hr}) / I$$

$$N = (J + K + L) \times (60 \text{ min/hr}) / H \times 1.15$$

$$O = (J + K + M) \times (60 \text{ min/hr}) / I \times 1.15$$

$$P = N / (300 \text{ bu/hr})$$

$$Q = O / (600 \text{ bu/hr})$$

* Truck cost based on \$180,000.00 purchase price, 150 hours of annual usage, 2.5% repair and maintenance rate, \$0.95/L diesel, 27 L/hr fuel usage, 15% fuel margin, and 15 year optimal life

Appendix B

Rental Rates for Farm Buildings and Bins

To determine the fair rental rate for farm buildings, consider:

	Your Value	Example
Replacement cost of building		\$20,000
Retained value of building (at end of years of service)		\$8,000
Interest rate (opportunity cost not included)		5.50%
Repair rate (% of replacement cost)*		0.50%
Annual insurance premium		\$60
Optimal life		30

Calculate:

A. Depreciation:

(Replacement cost - Retained Value) / Optimal Life =

	(\$20,000 - \$8,000) / 30 = \$400
--	-----------------------------------

B. Interest Cost:

(Replacement cost) x (1.98 (Interest Rate) - 0.0054) / Years of Loan =
This assumes 50% borrowed and seven-year loan

	(\$20,000 x ((1.98 x 0.055) - 0.0054)) / 7 = \$296
--	--

C. Insurance:

Annual insurance premiums =

	\$60
--	------

D. Repairs:

Annual repair rate x Replacement cost =

	(0.005 x \$20,000) = \$100
--	----------------------------

Total = A + B + C + D

	(\$400 + \$296 + \$60 + \$100) = \$856 per year
--	---

Total (per bushel)

	\$856 per year / 3000 bu = \$0.29/year per bu
--	---

Repair rates are difficult to estimate. Steel buildings (bins and quonsets) might be 0.5% of replacement cost per year. Aeration fans might be higher. Wood buildings might be 1% to 3% of the replacement cost.

For bins with aeration or natural air drying, include the purchase cost of the fan and air distribution system in the replacement cost value. Add approximately \$0.50/hr for a 7 hp fan, \$0.40/hr for a 5 hp fan and \$0.25/hr for a 3 hp fan for electricity costs.

Combine Classifications

Size	Capacity	Manufacturer	Model
Class 5	≤ 300 hp / 250 bu hopper	John Deere	S650
Class 6	301-360 hp / 300-390 bu hopper	CNH CNH John Deere John Deere CASE IH Gleaner Claas Lexion MF	CR6.80 CR6.90 S660 S760 6140 S96 730 9520
Class 7	361-420 hp / 300-390 bu hopper	CNH John Deere John Deere CASE IH CASE IH Gleaner Claas Lexion MF MF	CR7.90 S670 S770 7140 7240 S97 740 9540 9545
Class 8	421-500 hp / 330-410 bu hopper	CNH John Deere John Deere CASE IH Gleaner Claas Lexion MF MF	CR8.90 S680 S780 8240 S98 750 9560 9565
Class 9	501-560 hp / 360-410 bu hopper	CNH John Deere John Deere CASE IH Claas Lexion	CR9.90 S690 S790 9240 760
Class 10	≥ 561 hp / 360-410 bu hopper	CNH Claas Lexion	CR10.90 780

Appendix D

Assumptions for Machinery Cost Calculations

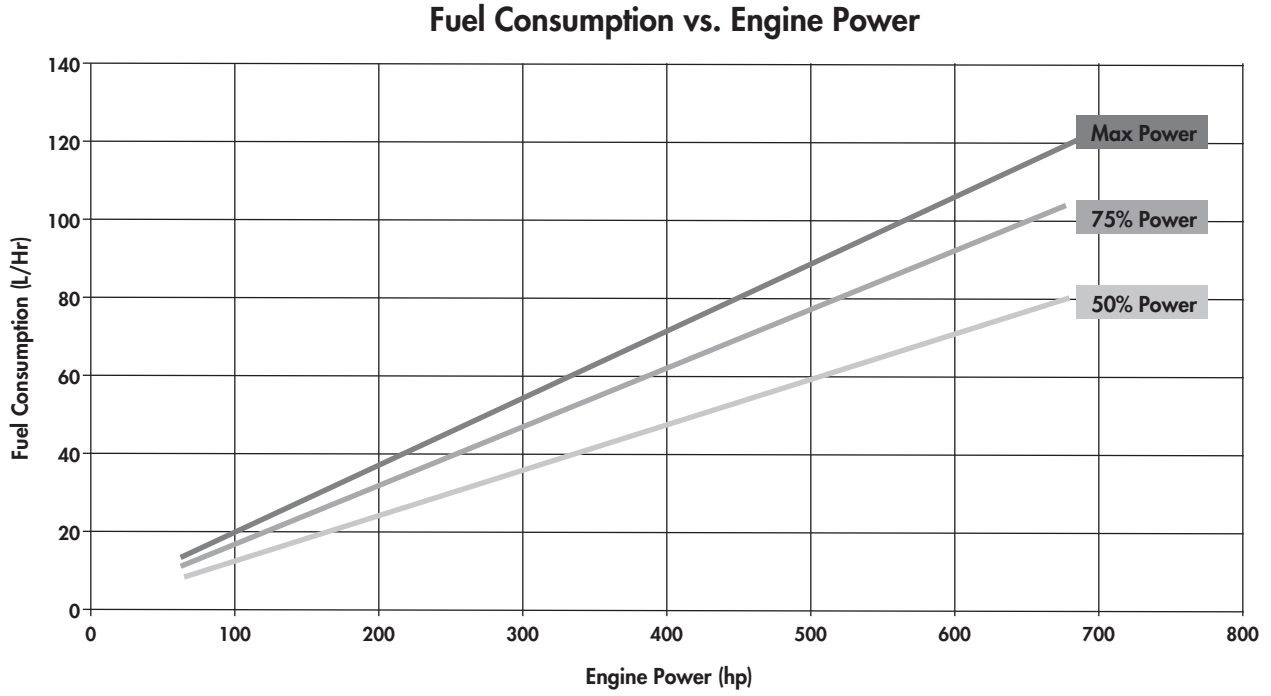
Machine	Column A	Column B	Column C	Column D
	Annual Hours of Usage	Optimal Life (years)	Repair Rate (% of purchase price)	Average Field Speed (mph)
Tractors				
Two-wheel drive	300	20	2.2	
Front wheel assist	450	15	2.6	
Four-wheel drive	450	15	2.5	
Tracked	450	15	3.2	
Combines				
SP Rotary	250	12	2.5	
Combine headers				
Rigid headers	250	20	2.0	
Pickup headers	250	20	1.5	
Flex headers	250	15	2.5	
Draper headers	250	15	2.5	
Corn headers	100	15	2.8	
Swathers SP	200	15	2.0	5.5
Grain Carts	250	20	2.0	
Powered Augers	100	20	1.5	
PTO Augers	100	20	1.0	
Grain Vac	50	15	2.0	
SP Forage Harvester	400	10	8.0	6.5
SP Forage Harvester Header	400	10	8.0	
SP Mower/conditioner	150	15	3.2	8.0
PT Mower/conditioner (sickle)	150	15	2.0	5.75
PT Mower/conditioner (disc)	150	15	2.5	8.0
Balers				
Round	100	15	1.5	
Large square	150	15	1.7	
Small square	100	20	1.0	
Bale movers				
PT Round	100	15	2.5	
PT Large square	200	20	2.0	
SP Small square	150	15	2.5	
Air drills (independent openers)	200	15	3.5	4.75
Air hoe drills	200	15	3.0	4.75
Air disk drills	200	15	3.0	4.75
Air seeder	200	15	3.0	4.75
Row crop planters	100	10	4.0	5.0
Cultivators	200	20	1.5	6.0
Standard harrows	75	25	1.2	7.5

Appendix D

	Column A	Column B	Column C	Column D
Machine	Annual Hours of Usage	Optimal Life (years)	Repair Rate (% of purchase price)	Average Field Speed (mph)
Heavy harrows	100	20	1.5	7.5
Harrow packers	200	25	0.5	7.5
Vertical tillage tools	100	20	3.5	10.0
Land roller	75	20	1.0	6.0
Land scraper	80	10	2.5	
High clearance sprayers	200	8	3.5	10.0
Post pounder	40	20	2.0	
Vertical feed mixer	200	15	2.5	
Grinder mixers and feed mixers	200	15	3.0	
Bale Processors	200	15	3.0	
Manure spreader	100	10	4.4	

Appendix E

Fuel Consumption Based on Engine Size



Conversion Tables

Dollars per Hectare or Acre													
Hectares or acres per hour	Dollars Per Hour												
	\$20.00	\$30.00	\$40.00	\$50.00	\$60.00	\$70.00	\$80.00	\$90.00	\$100.00	\$110.00	\$120.00	\$130.00	\$140.00
2.0	\$10.00	\$15.00	\$20.00	\$25.00	\$30.00	\$35.00	\$40.00	\$45.00	\$50.00	\$55.00	\$60.00	\$65.00	\$70.00
2.5	\$8.00	\$12.00	\$16.00	\$20.00	\$24.00	\$28.00	\$32.00	\$36.00	\$40.00	\$44.00	\$48.00	\$52.00	\$56.00
3.0	\$6.67	\$10.00	\$13.33	\$16.67	\$20.00	\$23.33	\$26.67	\$30.00	\$33.33	\$36.67	\$40.00	\$43.33	\$46.67
3.5	\$5.71	\$8.57	\$11.43	\$14.29	\$17.14	\$20.00	\$22.86	\$25.71	\$28.57	\$31.43	\$34.29	\$37.14	\$40.00
4.0	\$5.00	\$7.50	\$10.00	\$12.50	\$15.00	\$17.50	\$20.00	\$22.50	\$25.00	\$27.50	\$30.00	\$32.50	\$35.00
4.5	\$4.44	\$6.67	\$8.89	\$11.11	\$13.33	\$15.56	\$17.78	\$20.00	\$22.22	\$24.44	\$26.67	\$28.89	\$31.11
5.0	\$4.00	\$6.00	\$8.00	\$10.00	\$12.00	\$14.00	\$16.00	\$18.00	\$20.00	\$22.00	\$24.00	\$26.00	\$28.00
5.5	\$3.64	\$5.45	\$7.27	\$9.09	\$10.91	\$12.73	\$14.55	\$16.36	\$18.18	\$20.00	\$21.82	\$23.64	\$25.45
6.0	\$3.33	\$5.00	\$6.67	\$8.33	\$10.00	\$11.67	\$13.33	\$15.00	\$16.67	\$18.33	\$20.00	\$21.67	\$23.33
6.5	\$3.08	\$4.62	\$6.15	\$7.69	\$9.23	\$10.77	\$12.31	\$13.85	\$15.38	\$16.92	\$18.46	\$20.00	\$21.54
7.0	\$2.86	\$4.29	\$5.71	\$7.14	\$8.57	\$10.00	\$11.43	\$12.86	\$14.29	\$15.71	\$17.14	\$18.57	\$20.00
7.5	\$2.67	\$4.00	\$5.33	\$6.67	\$8.00	\$9.33	\$10.67	\$12.00	\$13.33	\$14.67	\$16.00	\$17.33	\$18.67
8.0	\$2.50	\$3.75	\$5.00	\$6.25	\$7.50	\$8.75	\$10.00	\$11.25	\$12.50	\$13.75	\$15.00	\$16.25	\$17.50
8.5	\$2.35	\$3.53	\$4.71	\$5.88	\$7.06	\$8.24	\$9.41	\$10.59	\$11.76	\$12.94	\$14.12	\$15.29	\$16.47
9.0	\$2.22	\$3.33	\$4.44	\$5.56	\$6.67	\$7.78	\$8.89	\$10.00	\$11.11	\$12.22	\$13.33	\$14.44	\$15.56
9.5	\$2.11	\$3.16	\$4.21	\$5.26	\$6.32	\$7.37	\$8.42	\$9.47	\$10.53	\$11.58	\$12.63	\$13.68	\$14.74
10.0	\$2.00	\$3.00	\$4.00	\$5.00	\$6.00	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$12.00	\$13.00	\$14.00
10.5	\$1.90	\$2.86	\$3.81	\$4.76	\$5.71	\$6.67	\$7.62	\$8.57	\$9.52	\$10.48	\$11.43	\$12.38	\$13.33
11.0	\$1.82	\$2.73	\$3.64	\$4.55	\$5.45	\$6.36	\$7.27	\$8.18	\$9.09	\$10.00	\$10.91	\$11.82	\$12.73
11.5	\$1.74	\$2.61	\$3.48	\$4.35	\$5.22	\$6.09	\$6.96	\$7.83	\$8.70	\$9.57	\$10.43	\$11.30	\$12.17
12.0	\$1.67	\$2.50	\$3.33	\$4.17	\$5.00	\$5.83	\$6.67	\$7.50	\$8.33	\$9.17	\$10.00	\$10.83	\$11.67
12.5	\$1.60	\$2.40	\$3.20	\$4.00	\$4.80	\$5.60	\$6.40	\$7.20	\$8.00	\$8.80	\$9.60	\$10.40	\$11.20
13.0	\$1.54	\$2.31	\$3.08	\$3.85	\$4.62	\$5.38	\$6.15	\$6.92	\$7.69	\$8.46	\$9.23	\$10.00	\$10.77
13.5	\$1.48	\$2.22	\$2.96	\$3.70	\$4.44	\$5.19	\$5.93	\$6.67	\$7.41	\$8.15	\$8.89	\$9.63	\$10.37
14.0	\$1.43	\$2.14	\$2.86	\$3.57	\$4.29	\$5.00	\$5.71	\$6.43	\$7.14	\$7.86	\$8.57	\$9.29	\$10.00
14.5	\$1.38	\$2.07	\$2.76	\$3.45	\$4.14	\$4.83	\$5.52	\$6.21	\$6.90	\$7.59	\$8.28	\$8.97	\$9.66
15.0	\$1.33	\$2.00	\$2.67	\$3.33	\$4.00	\$4.67	\$5.33	\$6.00	\$6.67	\$7.33	\$8.00	\$8.67	\$9.33
15.5	\$1.29	\$1.94	\$2.58	\$3.23	\$3.87	\$4.52	\$5.16	\$5.81	\$6.45	\$7.10	\$7.74	\$8.39	\$9.03
16.0	\$1.25	\$1.88	\$2.50	\$3.13	\$3.75	\$4.38	\$5.00	\$5.63	\$6.25	\$6.88	\$7.50	\$8.13	\$8.75
16.5	\$1.21	\$1.82	\$2.42	\$3.03	\$3.64	\$4.24	\$4.85	\$5.45	\$6.06	\$6.67	\$7.27	\$7.88	\$8.48
17.0	\$1.18	\$1.76	\$2.35	\$2.94	\$3.53	\$4.12	\$4.71	\$5.29	\$5.88	\$6.47	\$7.06	\$7.65	\$8.24
17.5	\$1.14	\$1.71	\$2.29	\$2.86	\$3.43	\$4.00	\$4.57	\$5.14	\$5.71	\$6.29	\$6.86	\$7.43	\$8.00
18.0	\$1.11	\$1.67	\$2.22	\$2.78	\$3.33	\$3.89	\$4.44	\$5.00	\$5.56	\$6.11	\$6.67	\$7.22	\$7.78

Appendix F

Dollars per Hectare or Acre													
Hectares or acres per hour	Dollars Per Hour												
	\$150.00	\$160.00	\$170.00	\$180.00	\$190.00	\$200.00	\$210.00	\$220.00	\$230.00	\$240.00	\$250.00	\$260.00	\$270.00
4.0	\$37.50	\$40.00	\$42.50	\$45.00	\$47.50	\$50.00	\$52.50	\$55.00	\$57.50	\$60.00	\$62.50	\$65.00	\$67.50
4.5	\$33.33	\$35.56	\$37.78	\$40.00	\$42.22	\$44.44	\$46.67	\$48.89	\$51.11	\$53.33	\$55.56	\$57.78	\$60.00
5.0	\$30.00	\$32.00	\$34.00	\$36.00	\$38.00	\$40.00	\$42.00	\$44.00	\$46.00	\$48.00	\$50.00	\$52.00	\$54.00
5.5	\$27.27	\$29.09	\$30.91	\$32.73	\$34.55	\$36.36	\$38.18	\$40.00	\$41.82	\$43.64	\$45.45	\$47.27	\$49.09
6.0	\$25.00	\$26.67	\$28.33	\$30.00	\$31.67	\$33.33	\$35.00	\$36.67	\$38.33	\$40.00	\$41.67	\$43.33	\$45.00
6.5	\$23.08	\$24.62	\$26.15	\$27.69	\$29.23	\$30.77	\$32.31	\$33.85	\$35.38	\$36.92	\$38.46	\$40.00	\$41.54
7.0	\$21.43	\$22.86	\$24.29	\$25.71	\$27.14	\$28.57	\$30.00	\$31.43	\$32.86	\$34.29	\$35.71	\$37.14	\$38.57
7.5	\$20.00	\$21.33	\$22.67	\$24.00	\$25.33	\$26.67	\$28.00	\$29.33	\$30.67	\$32.00	\$33.33	\$34.67	\$36.00
8.0	\$18.75	\$20.00	\$21.25	\$22.50	\$23.75	\$25.00	\$26.25	\$27.50	\$28.75	\$30.00	\$31.25	\$32.50	\$33.75
8.5	\$17.65	\$18.82	\$20.00	\$21.18	\$22.35	\$23.53	\$24.71	\$25.88	\$27.06	\$28.24	\$29.41	\$30.59	\$31.76
9.0	\$16.67	\$17.78	\$18.89	\$20.00	\$21.11	\$22.22	\$23.33	\$24.44	\$25.56	\$26.67	\$27.78	\$28.89	\$30.00
9.5	\$15.79	\$16.84	\$17.89	\$18.95	\$20.00	\$21.05	\$22.11	\$23.16	\$24.21	\$25.26	\$26.32	\$27.37	\$28.42
10.0	\$15.00	\$16.00	\$17.00	\$18.00	\$19.00	\$20.00	\$21.00	\$22.00	\$23.00	\$24.00	\$25.00	\$26.00	\$27.00
10.5	\$14.29	\$15.24	\$16.19	\$17.14	\$18.10	\$19.05	\$20.00	\$20.95	\$21.90	\$22.86	\$23.81	\$24.76	\$25.71
11.0	\$13.64	\$14.55	\$15.45	\$16.36	\$17.27	\$18.18	\$19.09	\$20.00	\$20.91	\$21.82	\$22.73	\$23.64	\$24.55
11.5	\$13.04	\$13.91	\$14.78	\$15.65	\$16.52	\$17.39	\$18.26	\$19.13	\$20.00	\$20.87	\$21.74	\$22.61	\$23.48
12.0	\$12.50	\$13.33	\$14.17	\$15.00	\$15.83	\$16.67	\$17.50	\$18.33	\$19.17	\$20.00	\$20.83	\$21.67	\$22.50
12.5	\$12.00	\$12.80	\$13.60	\$14.40	\$15.20	\$16.00	\$16.80	\$17.60	\$18.40	\$19.20	\$20.00	\$20.80	\$21.60
13.0	\$11.54	\$12.31	\$13.08	\$13.85	\$14.62	\$15.38	\$16.15	\$16.92	\$17.69	\$18.46	\$19.23	\$20.00	\$20.77
13.5	\$11.11	\$11.85	\$12.59	\$13.33	\$14.07	\$14.81	\$15.56	\$16.30	\$17.04	\$17.78	\$18.52	\$19.26	\$20.00
14.0	\$10.71	\$11.43	\$12.14	\$12.86	\$13.57	\$14.29	\$15.00	\$15.71	\$16.43	\$17.14	\$17.86	\$18.57	\$19.29
14.5	\$10.34	\$11.03	\$11.72	\$12.41	\$13.10	\$13.79	\$14.48	\$15.17	\$15.86	\$16.55	\$17.24	\$17.93	\$18.62
15.0	\$10.00	\$10.67	\$11.33	\$12.00	\$12.67	\$13.33	\$14.00	\$14.67	\$15.33	\$16.00	\$16.67	\$17.33	\$18.00
15.5	\$9.68	\$10.32	\$10.97	\$11.61	\$12.26	\$12.90	\$13.55	\$14.19	\$14.84	\$15.48	\$16.13	\$16.77	\$17.42
16.0	\$9.38	\$10.00	\$10.63	\$11.25	\$11.88	\$12.50	\$13.13	\$13.75	\$14.38	\$15.00	\$15.63	\$16.25	\$16.88
16.5	\$9.09	\$9.70	\$10.30	\$10.91	\$11.52	\$12.12	\$12.73	\$13.33	\$13.94	\$14.55	\$15.15	\$15.76	\$16.36
17.0	\$8.82	\$9.41	\$10.00	\$10.59	\$11.18	\$11.76	\$12.35	\$12.94	\$13.53	\$14.12	\$14.71	\$15.29	\$15.88
17.5	\$8.57	\$9.14	\$9.71	\$10.29	\$10.86	\$11.43	\$12.00	\$12.57	\$13.14	\$13.71	\$14.29	\$14.86	\$15.43
18.0	\$8.33	\$8.89	\$9.44	\$10.00	\$10.56	\$11.11	\$11.67	\$12.22	\$12.78	\$13.33	\$13.89	\$14.44	\$15.00
18.5	\$8.11	\$8.65	\$9.19	\$9.73	\$10.27	\$10.81	\$11.35	\$11.89	\$12.43	\$12.97	\$13.51	\$14.05	\$14.59
19.0	\$7.89	\$8.42	\$8.95	\$9.47	\$10.00	\$10.53	\$11.05	\$11.58	\$12.11	\$12.63	\$13.16	\$13.68	\$14.21
19.5	\$7.69	\$8.21	\$8.72	\$9.23	\$9.74	\$10.26	\$10.77	\$11.28	\$11.79	\$12.31	\$12.82	\$13.33	\$13.85
20.0	\$7.50	\$8.00	\$8.50	\$9.00	\$9.50	\$10.00	\$10.50	\$11.00	\$11.50	\$12.00	\$12.50	\$13.00	\$13.50

Appendix F

Dollars per Bale													
Bales per hour	Dollars Per Hour												
	\$40.00	\$50.00	\$60.00	\$70.00	\$80.00	\$90.00	\$100.00	\$110.00	\$120.00	\$130.00	\$140.00	\$150.00	\$160.00
10	\$4.00	\$5.00	\$6.00	\$7.00	\$8.00	\$9.00	\$10.00	\$11.00	\$12.00	\$13.00	\$14.00	\$15.00	\$16.00
12	\$3.33	\$4.17	\$5.00	\$5.83	\$6.67	\$7.50	\$8.33	\$9.17	\$10.00	\$10.83	\$11.67	\$12.50	\$13.33
14	\$2.86	\$3.57	\$4.29	\$5.00	\$5.71	\$6.43	\$7.14	\$7.86	\$8.57	\$9.29	\$10.00	\$10.71	\$11.43
16	\$2.50	\$3.13	\$3.75	\$4.38	\$5.00	\$5.63	\$6.25	\$6.88	\$7.50	\$8.13	\$8.75	\$9.38	\$10.00
18	\$2.22	\$2.78	\$3.33	\$3.89	\$4.44	\$5.00	\$5.56	\$6.11	\$6.67	\$7.22	\$7.78	\$8.33	\$8.89
20	\$2.00	\$2.50	\$3.00	\$3.50	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00	\$6.50	\$7.00	\$7.50	\$8.00
22	\$1.82	\$2.27	\$2.73	\$3.18	\$3.64	\$4.09	\$4.55	\$5.00	\$5.45	\$5.91	\$6.36	\$6.82	\$7.27
24	\$1.67	\$2.08	\$2.50	\$2.92	\$3.33	\$3.75	\$4.17	\$4.58	\$5.00	\$5.42	\$5.83	\$6.25	\$6.67
26	\$1.54	\$1.92	\$2.31	\$2.69	\$3.08	\$3.46	\$3.85	\$4.23	\$4.62	\$5.00	\$5.38	\$5.77	\$6.15
28	\$1.43	\$1.79	\$2.14	\$2.50	\$2.86	\$3.21	\$3.57	\$3.93	\$4.29	\$4.64	\$5.00	\$5.36	\$5.71
30	\$1.33	\$1.67	\$2.00	\$2.33	\$2.67	\$3.00	\$3.33	\$3.67	\$4.00	\$4.33	\$4.67	\$5.00	\$5.33
100	\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.90	\$1.00	\$1.10	\$1.20	\$1.30	\$1.40	\$1.50	\$1.60
110	\$0.36	\$0.45	\$0.55	\$0.64	\$0.73	\$0.82	\$0.91	\$1.00	\$1.09	\$1.18	\$1.27	\$1.36	\$1.45
120	\$0.33	\$0.42	\$0.50	\$0.58	\$0.67	\$0.75	\$0.83	\$0.92	\$1.00	\$1.08	\$1.17	\$1.25	\$1.33
130	\$0.31	\$0.38	\$0.46	\$0.54	\$0.62	\$0.69	\$0.77	\$0.85	\$0.92	\$1.00	\$1.08	\$1.15	\$1.23
140	\$0.29	\$0.36	\$0.43	\$0.50	\$0.57	\$0.64	\$0.71	\$0.79	\$0.86	\$0.93	\$1.00	\$1.07	\$1.14
150	\$0.27	\$0.33	\$0.40	\$0.47	\$0.53	\$0.60	\$0.67	\$0.73	\$0.80	\$0.87	\$0.93	\$1.00	\$1.07
160	\$0.25	\$0.31	\$0.38	\$0.44	\$0.50	\$0.56	\$0.63	\$0.69	\$0.75	\$0.81	\$0.88	\$0.94	\$1.00
170	\$0.24	\$0.29	\$0.35	\$0.41	\$0.47	\$0.53	\$0.59	\$0.65	\$0.71	\$0.76	\$0.82	\$0.88	\$0.94
180	\$0.22	\$0.28	\$0.33	\$0.39	\$0.44	\$0.50	\$0.56	\$0.61	\$0.67	\$0.72	\$0.78	\$0.83	\$0.89
190	\$0.21	\$0.26	\$0.32	\$0.37	\$0.42	\$0.47	\$0.53	\$0.58	\$0.63	\$0.68	\$0.74	\$0.79	\$0.84
200	\$0.20	\$0.25	\$0.30	\$0.35	\$0.40	\$0.45	\$0.50	\$0.55	\$0.60	\$0.65	\$0.70	\$0.75	\$0.80
210	\$0.19	\$0.24	\$0.29	\$0.33	\$0.38	\$0.43	\$0.48	\$0.52	\$0.57	\$0.62	\$0.67	\$0.71	\$0.76
220	\$0.18	\$0.23	\$0.27	\$0.32	\$0.36	\$0.41	\$0.45	\$0.50	\$0.55	\$0.59	\$0.64	\$0.68	\$0.73
230	\$0.17	\$0.22	\$0.26	\$0.30	\$0.35	\$0.39	\$0.43	\$0.48	\$0.52	\$0.57	\$0.61	\$0.65	\$0.70
240	\$0.17	\$0.21	\$0.25	\$0.29	\$0.33	\$0.38	\$0.42	\$0.46	\$0.50	\$0.54	\$0.58	\$0.63	\$0.67
250	\$0.16	\$0.20	\$0.24	\$0.28	\$0.32	\$0.36	\$0.40	\$0.44	\$0.48	\$0.52	\$0.56	\$0.60	\$0.64

Appendix F

Hectares per Hour (at 80% field efficiency)													
Speed in km/h	Width in Metres												
	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0
2	0.32	0.48	0.64	0.80	0.96	1.12	1.28	1.44	1.60	1.76	1.92	2.08	2.24
4	0.64	0.96	1.28	1.60	1.92	2.24	2.56	2.88	3.20	3.52	3.84	4.16	4.48
5	0.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60
6	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80	5.28	5.76	6.24	6.72
7	1.12	1.68	2.24	2.80	3.36	3.92	4.48	5.04	5.60	6.16	6.72	7.28	7.84
8	1.28	1.92	2.56	3.20	3.84	4.48	5.12	5.76	6.40	7.04	7.68	8.32	8.96
9	1.44	2.16	2.88	3.60	4.32	5.04	5.76	6.48	7.20	7.92	8.64	9.36	10.08
10	1.60	2.40	3.20	4.00	4.80	5.60	6.40	7.20	8.00	8.80	9.60	10.40	11.20
11	1.76	2.64	3.52	4.40	5.28	6.16	7.04	7.92	8.80	9.68	10.56	11.44	12.32
12	1.92	2.88	3.84	4.80	5.76	6.72	7.68	8.64	9.60	10.56	11.52	12.48	13.44
13	2.08	3.12	4.16	5.20	6.24	7.28	8.32	9.36	10.40	11.44	12.48	13.52	14.56
14	2.24	3.36	4.48	5.60	6.72	7.84	8.96	10.08	11.20	12.32	13.44	14.56	15.68
15	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80	12.00	13.20	14.40	15.60	16.80
16	2.56	3.84	5.12	6.40	7.68	8.96	10.24	11.52	12.80	14.08	15.36	16.64	17.92
17	2.72	4.08	5.44	6.80	8.16	9.52	10.88	12.24	13.60	14.96	16.32	17.68	19.04
18	2.88	4.32	5.76	7.20	8.64	10.08	11.52	12.96	14.40	15.84	17.28	18.72	20.16

Acres per Hour (at 80% field efficiency)													
Speed in mph	Width in Feet												
	6.0	10.0	14.0	18.0	22.0	26.0	30.0	34.0	38.0	42.0	46.0	50.0	54.0
3	1.75	2.91	4.07	5.24	6.40	7.56	8.73	9.89	11.05	12.22	13.38	14.55	15.71
4	2.33	3.88	5.43	6.98	8.53	10.08	11.64	13.19	14.74	16.29	17.84	19.39	20.95
5	2.91	4.85	6.79	8.73	10.67	12.61	14.55	16.48	18.42	20.36	22.30	24.24	26.18
6	3.49	5.82	8.15	10.47	12.80	15.13	17.45	19.78	22.11	24.44	26.76	29.09	31.42
7	4.07	6.79	9.50	12.22	14.93	17.65	20.36	23.08	25.79	28.51	31.22	33.94	36.65
8	4.65	7.76	10.86	13.96	17.07	20.17	23.27	26.38	29.48	32.58	35.68	38.79	41.89
9	5.24	8.73	12.22	15.71	19.20	22.69	26.18	29.67	33.16	36.65	40.15	43.64	47.13
10	5.82	9.70	13.58	17.45	21.33	25.21	29.09	32.97	36.85	40.73	44.61	48.48	52.36
11	6.40	10.67	14.93	19.20	23.47	27.73	32.00	36.27	40.53	44.80	49.07	53.33	57.60
12	6.98	11.64	16.29	20.95	25.60	30.25	34.91	39.56	44.22	48.87	53.53	58.18	62.84

Formulas Used in Calculations

A) Ownership costs per hour are the sum of (i) Depreciation, (ii) Investment costs, (iii) Insurance and Housing.

i) Depreciation represents the “value” of equipment over the hours it is owned.

$$\text{Depreciation Cost (\$/hr)} = ((\text{Purchase Price} - \text{Retained Value}) / (\text{Optimal Life})) / (\text{Annual hrs of use})$$

Where:

- *Purchase price* = average purchase price of manufacturer’s base list price and the list price with all available options (\$)
- *Retained value* = value of equipment at end of ownership (\$) (also known as salvage value)
- *Optimal Life* = number of years before trade-in or 2/3 useful life (yr)
- *Annual hours of use* = typical number of hours equipment is used in one year (hr)

For example, for a conventional combine with a purchase price of \$420,000, a retained value of \$140,000 at the end of its 12 year optimal life, and 250 annual hours of usage, the depreciation cost is:

$$\text{Depreciation Cost (\$/hr)} = ((\$420,000 - \$140,000) / 12) / 250 = \$93.33/\text{hr}$$

ii) Investment represents the interest cost of borrowing money to purchase the equipment along with the opportunity cost of the down payment.

It is assumed that 50% of the purchase price is financed over a seven-year term. The interest is compounded biannually, so each year includes two payment periods.

In the printed and online guides, amortization tables were used to determine the total interest paid over the seven-year loan. This total interest cost was divided by the optimal life and annual hours of use to determine an interest cost per hour.

To estimate the investment cost by hand, an equation was developed based on the amortization tables. This equation allows you to calculate the total investment cost over the life of the loan for each piece of equipment (which has a unique purchase price, optimal life and annual hours of use). Note that this equation still assumes that 50% of the purchase price is borrowed:

$$\text{Investment Cost (\$/hr)} = ((\text{Purchase Price} [1.98 \times ((\text{Interest Rate } \%) / (100\%)) - 0.0054]) / (\text{Optimal Life})) / (\text{Annual hrs of Use})$$

To account for both the cost of borrowing and the opportunity cost, the borrowing rate should be added to the opportunity rate and used as the interest rate in the above equation. Since 50% of the purchase price is financed and 50% is paid down, this simplification is reasonable. Otherwise, the opportunity cost needs to be calculated separately. Using the default interest rates for the 2020-2021 guide, the total interest rate is 5.5% (borrowed) + 1.5% (opportunity) = 7.0%.

For example, for a conventional combine (borrowing rate = 5.5%, opportunity rate = 1.5%, \$420,000 purchase price, 12-year optimal life, 250 hours annual usage), the investment cost is:

$$\text{Investment Cost (\$/hr)} = ((\$420,000 \times [1.98 \times ((7.0\%) / (100\%))] - 0.0054) / 12) / 250$$

$$\text{Investment Cost (\$/hr)} = ((\$420,000 \times \{0.1431\}) / 12) / 250$$

$$\text{Investment Cost} = \$18.65/\text{hr}$$

iii) Insurance and Housing are assumed to be 1% of the purchase price per year

For the conventional combine with a \$420,000 purchase price and 250 hours/year:

$$\text{Insurance \& Housing Cost (\$/hr)} = (1\%) / (100\%) \times (\$420,000) / 250 = \$16.80/\text{hr}$$

Therefore, the total ownership cost for this conventional combine is:

$$\text{Ownership Cost} = \text{Depreciation} + \text{Investment} + \text{Insurance \& Housing} = \$93.33/\text{hr} + \$18.65/\text{hr} + \$16.80/\text{hr} = \$128.78/\text{hr}$$

Appendix G

B) Repair and Maintenance Costs are calculated based on a repair rate that represents the repair costs per year of ownership. These repair rates were determined by estimating the total repair and maintenance costs over the ownership of the equipment (including oil and filters, general maintenance, and one major rebuild). The total repair cost was divided by the ownership years and purchase price to determine the repair rates used in the guide.

$$\text{Repair and Maintenance Cost (\$/hr)} = ((\text{Repair Rate (\%)}) / (100\%) \times (\text{Purchase Price})) / (\text{Annual hrs of use})$$

For example, for a conventional combine, the annual cost of a repair program is approximately \$3,000, the annual cost of oil changes is approximately \$500 and the cost of one major rebuild is approximately \$70,000 (\$4,666 per year assuming 12 years of ownership). Therefore, the total repair cost per year is \$8,166. This represents 2.5% of the purchase price. For the rental rates in the Guide, repair rates (based on a percentage of purchase price) were established for each type of equipment (refer to **Appendix D**).

$$\text{Repair and Maintenance Cost (\$/hr)} = ((2.5\%) / (100\%) \times (\$420,000)) / 250 = \$42.00/\text{hr}$$

C) Margin on Ownership and Repair and Maintenance represents a cushion (or contingency) and is calculated by:

$$\text{Margin} = (\text{Margin (\%)}) / (100\%) \times (\text{Ownership Cost} + \text{Repair and Maintenance Cost})$$

For the conventional combine example, the margin on ownership and repair and maintenance is:

$$\text{Margin} = (15\%) / (100\%) \times (\$128.78 + \$42.00) = \$25.62/\text{hr}$$

D) Rental Rate per hour is the sum of the Ownership Costs, Repair and Maintenance Costs, and Margin on Ownership and Repair and Maintenance.

$$\text{Rental Rate (\$/hr)} = \text{Ownership Cost} + \text{Repair and Maintenance Cost} + \text{Margin}$$

For the conventional combine example, the total rental rate is:

$$\text{Rental Rate} = \$128.78 + \$42.00 + \$25.62 = \$196.40/\text{hr}$$

E) Fuel Costs are calculated by:

$$\text{Fuel cost (\$/hr)} = \text{Fuel efficiency (L/hr)} \times \text{Price of fuel (\$/L)}$$

For example, for a conventional combine the fuel efficiency is approximately 43 L/hr and the price of diesel is \$0.950/L:

$$\text{Fuel cost (\$/hr)} = 43 \times \$0.950 = \$40.85/\text{hr}$$

F) Labour Costs are assumed to be \$24/hr.

G) Margin on Fuel and Labour is calculated by:

$$\text{Margin} = (\text{Margin (\%)}) / (100\%) \times (\text{Fuel Cost} + \text{Labour Cost})$$

For the conventional combine example, the margin on fuel and labour is:

$$\text{Margin on fuel and labour} = (15\%) / (100\%) \times (\$40.85 + \$24.00) = \$9.73/\text{hr}$$

H) Custom Rate per hour is the sum of the Rental Rate, Fuel and Labour Cost, and a Margin on fuel and labour.

$$\text{Custom Rate (\$/hr)} = \text{Rental Rate (\$/hr)} + \text{Fuel cost (\$/hr)} + \text{Labour (\$/hr)} + \text{Margin on fuel and labour (\$/hr)}$$

For the conventional combine example, the custom rate is:

$$\text{Custom Rate} = \$196.40 + \$40.85 + \$24.00 + \$9.73 = \$270.98/\text{hr}$$

The custom rental rate (per acre) is calculated by:

$$\text{Custom Rate (\$/acre)} = (\text{Custom Rate (\$/hr)}) / (\text{Work Rate (acre/hr)})$$

Combine headers are considered as an add-on rental rate to the custom rate since the rental rate does not include fuel, labor, or a margin on fuel and labor. For example, for a conventional combine, if the rental rate for a 15 ft pickup header is \$10.41/hr, and the work rate of the combine and header combined is 8 acre/hr then the custom rate is:

$$\text{Custom Rate (\$/acre)} = (\$270.98 + \$10.41) / 8 = \$35.17/\text{acre}$$

Rental Rate Calculation Worksheet

The Ownership Cost per hour is the sum of (i) Depreciation Costs, (ii) Investment Costs, and (iii) Insurance and Housing Costs.

$$\text{i) Depreciation Cost (\$/hr)} = (\text{Purchase Price} - \text{Retained Value}) / (\text{Optimal Life} / \text{Annual Hours of Use})$$

$$\text{ii) Investment Cost (\$/hr)} = \text{Purchase Price} \times (1.98 \times \text{Interest Rate} - 0.054) / (\text{Optimal Life} / \text{Annual Hours of Use})$$

The total cost of borrowing depends on the interest rate and the purchase price. The regression factors in the above equation (1.98 and 0.0054) account for this. This calculation assumes that 50% of the purchase price is borrowed and the payback period of the loan is seven years and equal payments are made biannually. The borrowing rate and opportunity rate should be added together to determine the interest rate and total investment cost.

$$\text{iii) Insurance and Housing Cost (\$/hr)} = \frac{\text{Purchase Price} \times 0.01}{\text{Annual Hours of Use}}$$

The total rental rate (\$/hr) is the sum of the Ownership Cost, Repair and Maintenance Cost, and Margin.

$$\text{iv) Repair and Maintenance Cost (\$/hr)} = \frac{\text{Repair Rate} \times \text{Purchase Price}}{\text{Annual Hours of Use}}$$

$$\text{v) Margin (\$/hr)} = \text{Margin} \times (\text{Ownership Cost} + \text{Repair and Maintenance Cost})$$

The rental rate (\$/acre) can be estimated by dividing the total rental rate (\$/hr) by the work rate (acre/hr).

$$\text{vi) Work Rate (acre/hr)} = \text{Width (ft)} \times \text{Speed (mph)} \times \text{Field Efficiency} \times \frac{5280 \text{ ft/mile}}{43560 \text{ ft}^2/\text{acre}}$$

The **purchase price** is the cash value of the new equipment without a trade-in

The **retained value** of the equipment is the value at the end of its optimal life (assumed to be 33% of the purchase price)

The **optimal life** of the equipment is the years of useful life before trade-in (refer to Appendix D for typical values)

The **annual hours of use** are the typical number of hours equipment is used in one year (refer to **Appendix D** for typical values)

The **interest rate** can be used to represent the cost of borrowing only or the cost of borrowing plus the lost revenue of investment. For this calculation, the interest rate must be presented as a decimal (e.g., 5.5% = 0.055)

Typical repair rates for equipment can be found in **Appendix D**. The repair rate must be presented as a decimal (e.g., 2% = 0.02)

The **margin** represents a profit for the farmer (assumed to be 15%). The margin must be presented as a decimal (e.g., 15% = 0.15)

The **width** represents the implement width in feet

The **speed** is the average ground speed in miles per hour

The **field efficiency** accounts for time spent turning, filling, and emptying equipment. Average field efficiency for tillage operations is 80%. Average field efficiency for seeding and harvesting operations is 69%. The field efficiency must be presented as a decimal (e.g., 69% = 0.69)

Appendix I

Custom Rate Calculation Worksheet

The custom rate (\$/hr) is the sum of the rental rate (\$/hr), the fuel cost (\$/hr), the labour cost (\$/hr) and the margin on fuel and labour (\$/hr). Custom operations may include costs for a power unit only (e.g., four-wheel drive tractor) or a power unit and implement (e.g., tractor and air seeder).

Power Unit Cost (\$/hr) = Rental Rate + Fuel Cost + Labour Cost + Margin on Fuel and Labour

- i) Use **Appendix H** to calculate the rental rate of the power unit (\$/hr)
- ii) *Fuel Cost (\$/hr) = Fuel usage (L/hr) x Fuel price (\$/L)*
- iii) *Labour Cost (\$/hr)*
- iv) *Margin on Fuel and Labour (\$/hr) = Margin x (Fuel Cost + Labour Cost)*

Machine Cost (\$/hr) = rental rate based on **Appendix H**

v) *Total Custom Rate (\$/hr) = Power Unit Cost + Machine Cost*

i) *Total Custom Rate (\$/acre) = $\frac{\text{Power Unit Cost (\$/hr) + Machine Cost (\$/hr)}{\text{Work Rate (acre/hr)}}$*

vii) *Work Rate (acre/hr) = Width (ft) x Speed (mph) x Field Efficiency x $\frac{5280 \text{ ft/mile}}{43560 \text{ ft}^2/\text{acre}}$*

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