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# 2021 Cost of Production Silage





## Guidelines For Estimating Silage Production Costs - 2021

Date: January, 2021

This guide is designed to provide planning information and a format for calculating the costs of producing barley, corn and alfalfa grass silage for the purpose of feeding livestock in Manitoba. General Manitoba Agriculture recommendations are assumed in using fertilizers and chemical inputs. These figures provide an economic evaluation of the crops and estimated yields required to cover all costs. Costs include labour, investment and depreciation, but do not include management costs, nor do they necessarily represent the average cost of production in Manitoba.

The assumptions on which the costs were calculated are clearly defined in the supporting pages. They were developed using a combination of recommended practices and methods followed by many producers. The major advantage of silage is that the crop can be harvested when it is ready in almost all weather conditions. Since there are fewer harvesting losses, more nutrients are harvested per acre compared with most other systems. Ensiling permits the use of a wider range of crops including grasses, legumes, grains, corn and miscellaneous salvage crops that have suffered weather damage or weed infestation. The major disadvantages of silage compared with hay is that it requires more capital investment and labour. Also, silage has limited market potential, because trucking costs limit distance to market, it must be produced near the location where it will be fed.

These budgets may be adjusted by putting in your own figures. As a producer, you are encouraged to calculate your own costs of production for your silage crops. On each farm, costs and yields differ due to soil type, climate and agronomic practices.

This tool is available as an Excel worksheet at: [www.manitoba.ca/agriculture](http://www.manitoba.ca/agriculture) or at your local [Manitoba Agriculture and Resource Development Office](#). [The Farm Machinery Custom and Rental Rate Guide](#) is also available to help determine machinery costs.

**Note:** This budget is only a guide and is not intended as an in depth study of the cost of production of this industry. Interpretation and use of this information is the responsibility of the user. If you need help with a budget, contact your local Manitoba Agriculture and Resource Development office.

**Silage Production Cost Summary - 2021**

	Barley Silage			Corn Silage			Alfalfa-Grass Silage				Your Farm	
	Annual			Annual			Year 1 Forage		Annual (Years 2 to 8)			
	Production Costs			Production Costs			Establishment <sup>1</sup>		Production Costs			
	\$/acre	(as fed) \$/ton	(Dry Matter-DM) \$/ton	\$/acre	(as fed) \$/ton	(DM) \$/ton	\$/acre	\$/acre	(as fed) \$/ton	(DM) \$/ton		
<b>A. Operating Costs</b>												
Seed & Treatment	\$16.88			\$92.80			\$36.00	-				
Nurse Crop Seed	-			-			\$9.06	-				
Establishment (amortized)	-			-			-	\$18.90				
Fertilizer	\$50.99			\$95.76			\$61.86	\$41.58				
Herbicide/Insecticide	\$12.00			\$12.00			\$25.00	\$0.00				
Field Fuel Costs	\$13.73			\$13.97			\$18.41	\$10.02				
Moving Fuel Costs	\$2.30			\$4.30			\$1.25	\$1.94				
Packing Fuel Costs	\$2.25			\$4.20			\$1.22	\$1.89				
Machinery Operating	\$15.00			\$15.00			\$15.00	\$15.00				
Machinery Lease	\$4.80			\$4.80			\$4.80	\$4.80				
Crop Insurance	\$10.94			\$13.62			\$5.00	\$9.91				
Miscellaneous	\$7.50			\$8.50			\$2.00	\$4.50				
Land Taxes	\$10.00			\$10.00			\$10.00	\$10.00				
Rental & Custom Costs	\$0.00			\$0.00			\$0.00	\$0.00				
Interest on Operating	\$3.29			\$6.19			\$4.27	\$2.67				
<b>Total Operating</b>	<b>\$149.68</b>			<b>\$281.14</b>			<b>\$193.88</b>	<b>\$121.21</b>				
<b>B. Fixed Costs</b>												
Land Costs	\$50.29			\$50.29			\$50.29	\$50.29				
Machinery Costs	\$50.48			\$50.48			\$50.48	\$50.48				
Storage Costs	\$3.91			\$3.91			\$3.91	\$3.91				
<b>Total Fixed</b>	<b>\$104.68</b>			<b>\$104.68</b>			<b>\$104.68</b>	<b>\$104.68</b>				
<b>C. Owner - Labour &amp; Living</b>	<b>\$36.77</b>			<b>\$54.98</b>			<b>\$36.77</b>	<b>\$21.77</b>				
<b>Total Costs</b>	<b>\$291.13</b>	<b>\$38.82</b>	<b>\$105.48</b>	<b>\$440.80</b>	<b>\$31.49</b>	<b>\$109.33</b>	<b>\$335.33</b>	<b>\$247.66</b>	<b>\$39.25</b>	<b>\$90.85</b>		
<b>Total Costs (\$/lb.)</b>		<b>0.0194</b>	<b>0.0527</b>		<b>0.0157</b>	<b>0.0547</b>			<b>0.0196</b>	<b>0.0454</b>		

**Profitability & Breakeven Analysis**

Estimated Farmgate	As Fed		DM		As Fed		DM		As Fed		DM	
	\$/ton	\$/acre	\$/ton	\$/acre	\$/ton	\$/acre	\$/ton	\$/acre	\$/ton	\$/acre	\$/ton	\$/acre
Price \$ per ton	\$49.80		\$135.33		\$36.00	\$125.00	\$49.76		\$49.76	\$115.18		
Yield per acre (ton)	7.50		2.76		14.00	4.03	4.08		6.31	2.73		
Total Yield (tons/300 acres)	2,250		828		4,200	1,210			1,893	818		
<b>Gross Revenue</b>	<b>\$373.50</b>				<b>\$504.00</b>				<b>\$203.01</b>	<b>\$313.97</b>		

Marginal Returns	(as fed)			(DM)			(as fed)			(DM)		
	\$/acre	\$/ton	\$/ton	\$/acre	\$/ton	\$/ton	\$/acre	\$/acre	\$/ton	\$/ton	\$/ton	\$/ton
Over Operating Costs	\$223.82	\$29.84	\$81.09	\$222.86	\$15.92	\$55.27	\$9.13	\$192.76	\$30.55	\$70.71		
Over Total Costs (Net Profit)	\$82.37	\$10.98	\$29.84	\$63.20	\$4.51	\$15.67	(\$132.32)	\$66.31	\$10.51	\$24.32		
<b>Operating Expense Ratio</b>	<b>40.1%</b>			<b>55.8%</b>			<b>95.5%</b>	<b>38.6%</b>				

Breakeven Price Per Ton												
Operating Costs		\$19.96	\$54.23		\$20.08	\$69.73			\$19.21	\$44.47		
<b>Total Costs</b>		<b>\$38.82</b>	<b>\$105.48</b>		<b>\$31.49</b>	<b>\$109.33</b>			<b>\$39.25</b>	<b>\$6.22</b>		

Breakeven Yield (tons per acre)												
Operating Costs		3.0			7.8				2.4			
<b>Total Costs</b>		<b>5.8</b>			<b>12.2</b>				<b>5.0</b>			

<b>Cost of Standing Silage (\$/lb.)</b>		<b>\$0.012</b> <sup>2</sup>			<b>\$0.011</b> <sup>2</sup>				<b>\$0.011</b> <sup>3</sup>			
<b>Cost of Standing Silage (\$/ton)</b>		<b>\$23.06</b> <sup>2</sup>			<b>\$21.63</b> <sup>2</sup>				<b>\$21.41</b> <sup>3</sup>			
<b>On-Farm Harvest Cost (\$/ton)</b>		<b>\$15.76</b>			<b>\$9.86</b>				<b>\$17.84</b>			

**TDN & Crude Protein Cost Analysis**

	Barley Silage		Corn Silage		Alfalfa-Grass Silage	
	Nutrient Cost (\$/pound DM)		Nutrient Cost (\$/pound DM)		Nutrient Cost (\$/pound DM)	
	TDN	Crude Protein	TDN	Crude Protein	TDN	Crude Protein
	(62.8%)	(11.1%)	(64.6%)	(8.7%)	(60.4%)	(14.6%)
<b>Without Storage Loss</b>	<b>\$0.0840</b>	<b>\$0.4751</b>	<b>\$0.0846</b>	<b>\$0.6283</b>	<b>\$0.0752</b>	<b>\$0.3111</b>
<b>With 5% Storage Loss (as fed)</b>	<b>\$0.0884</b>	<b>\$0.5002</b>	<b>\$0.0891</b>	<b>\$0.6614</b>	<b>\$0.0792</b>	<b>\$0.3275</b>

1. Alfalfa-grass establishment (with oat silage nurse crop) net cost of \$132.32 (total cost minus estimated gross revenue) were amortized over 7 silage production years.  
 2. Cost of barley and corn standing silage (includes: seed; fertilizer; pesticide; land taxes; crop insurance; 40% of fuel; 20% of labour, machinery lease, and machinery operating; 50% of other costs, and land costs.)  
 3. Cost of alfalfa and alfalfa-grass standing silage (includes: establishment, fertilizer, pesticide, land taxes, crop insurance, 5% of fuel and labour, 50% of other costs, and land costs.)

**Note:** This budget is only a guide and is not intended as an in depth study of the cost of production of this industry. Interpretation and utilization of this information is the responsibility of the user.

**Risk & Sensitivity Analysis (Stress Test)**

Percent Market Price Change	0.0%
Percent Crop Yield Change	-10%

	Barley Silage	Corn Silage	Alfalfa-Grass Silage	Your Farm
Market Price (\$ per unit)	\$49.80	\$36.00	\$49.76	_____
Yield (per acre)	6.75	12.60	5.68	_____
<b>Stress Test Scenario = Market Price Up 0%, and Crop Yield Down 10%</b>				
Net Profit (Loss)	\$45.02	\$12.80	\$34.96	_____
Operating Expense Ratio	44.5%	62.0%	42.9%	_____
Cost per ton	\$43.13	\$34.98	\$43.60	_____
Cost of TDN (\$ per pound)	\$0.093	\$0.094	\$0.084	_____
Cost of Crude Protein (\$ per pound)	\$0.528	\$0.698	\$0.346	_____

**Agrilinsurance Analysis**

Forage Region 6
Risk Area 14

Barley Silage
80% Coverage

Corn Silage	Alfalfa Grass	
	>4 years	
80% Coverage	Select Hay	Basic Hay
	High - \$84/tonne	

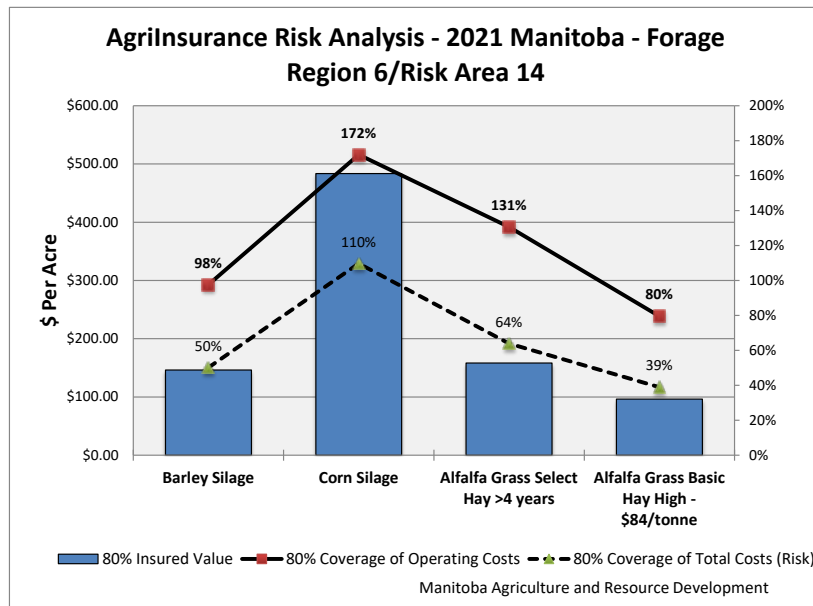
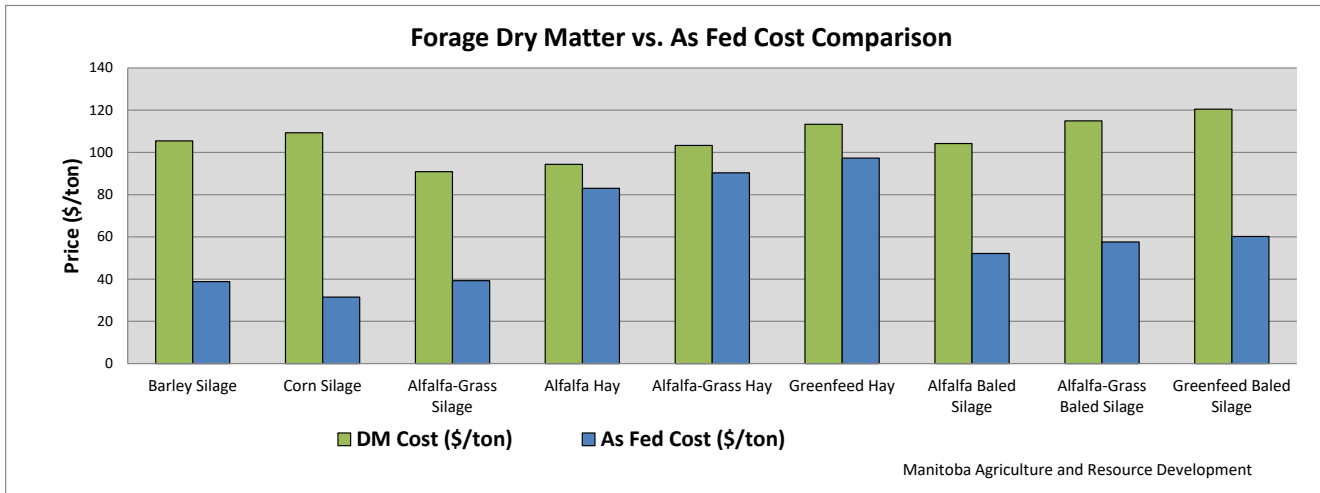
Your Farm \_\_\_\_\_

	Barley Silage	Corn Silage	Select Hay	Basic Hay	Your Farm
<b>Agrilinsurance</b>					
Probable Yield - IC (tons/acre)	4.838	13.323	3.198	3.198	_____
Coverage per acre (tons)	3.870	10.658	2.558	2.558	\$3.00 _____
Dollar Coverage per acre	\$146.11	\$483.55	\$158.34	\$96.40	\$4.00 _____
Premium (\$/Acre)	\$10.42	\$13.10	\$9.91	\$4.83	\$5.00 _____
Premium Cost (% of Insured)	7.1%	2.7%	6.3%	5.0%	_____
<b>Costs Not Covered By Agrilinsurance</b>					
Operating Costs	\$3.57	\$0.00	\$0.00	\$24.81	\$8.00 _____
Operating & Fixed Costs	\$108.25	\$0.00	\$67.55	\$129.50	\$9.00 _____
<b>Total Costs</b>	<b>\$145.02</b>	<b>\$0.00</b>	<b>\$89.32</b>	<b>\$151.26</b>	<b>\$10.00</b> _____
<b>Agrilinsurance Risk Ratio (Agrilinsurance Coverage / Cost)</b>					
Operating Costs	98%	172%	131%	80%	12% _____
<b>Total Costs</b>	50%	110%	64%	39%	13% _____

**Forage Cost Comparison Analysis**

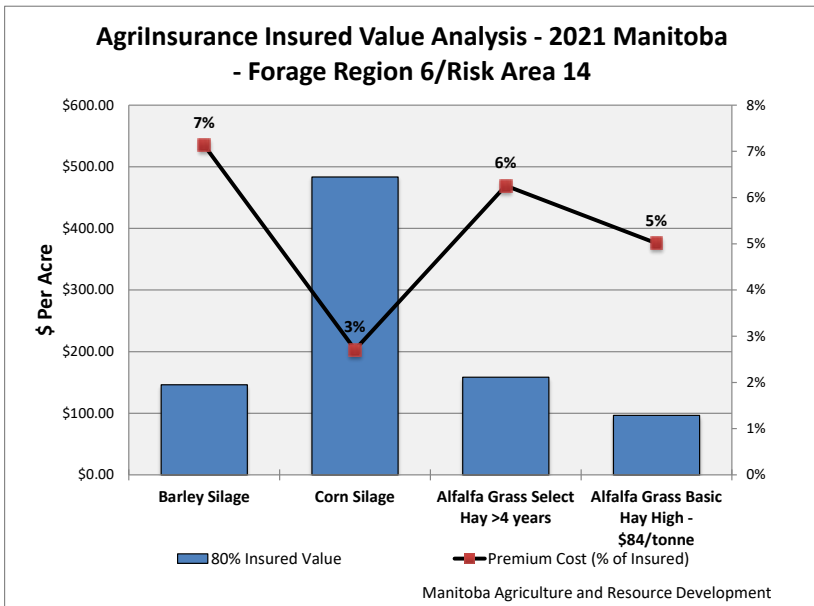
	Barley Silage	Corn Silage	Alfalfa Grass Silage
Cost of Silage (\$/wet ton)	\$38.82	\$31.49	\$39.25
<b>Equivalent Dry Hay Value (TDN Basis) for Breakeven Purchase Decision:</b>			
Alfalfa/Grass - 12.6% H2O, 60% TDN	(\$/ton) \$88.08	\$88.75	\$78.88
	(\$/lb.) \$0.044	\$0.044	\$0.039
Alfalfa - 12.1% H2O, 61.5%TDN	(\$/ton) \$90.80	\$91.49	\$81.32
	(\$/lb.) \$0.045	\$0.046	\$0.041
<b>Equivalent Dry Hay Value (CP Basis) for Breakeven Purchase Decision:</b>			
Alfalfa/Grass - 12.6% H2O, 14% CP	(\$/ton) \$116.28	\$153.76	\$76.14
	(\$/lb.) \$0.058	\$0.077	\$0.038
Alfalfa - 12.1% H2O, 18.2% CP	(\$/ton) \$152.03	\$201.03	\$99.55
	(\$/lb.) \$0.076	\$0.101	\$0.050

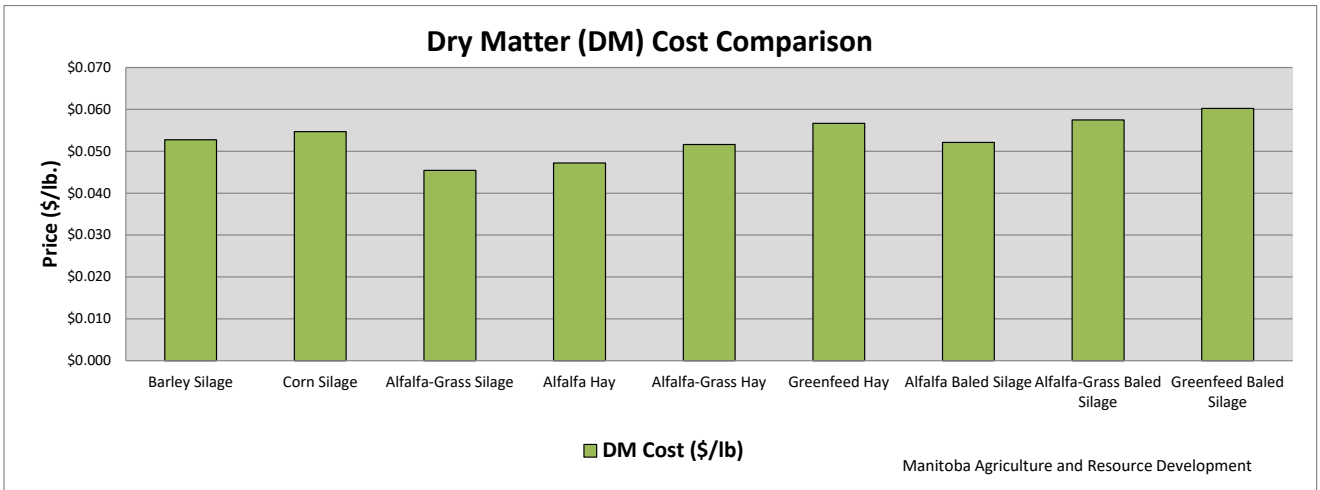
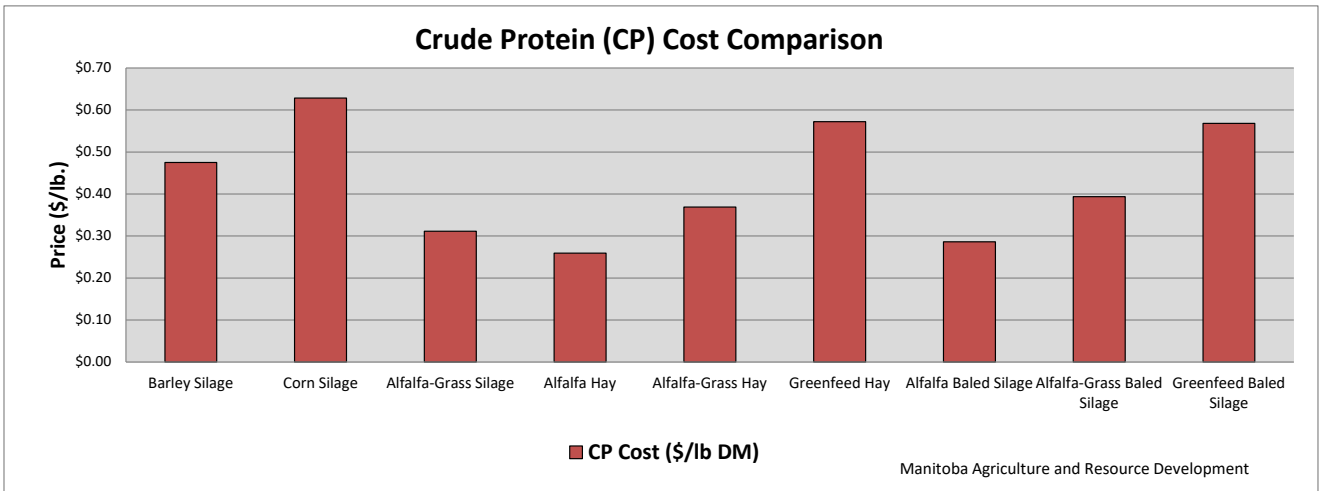
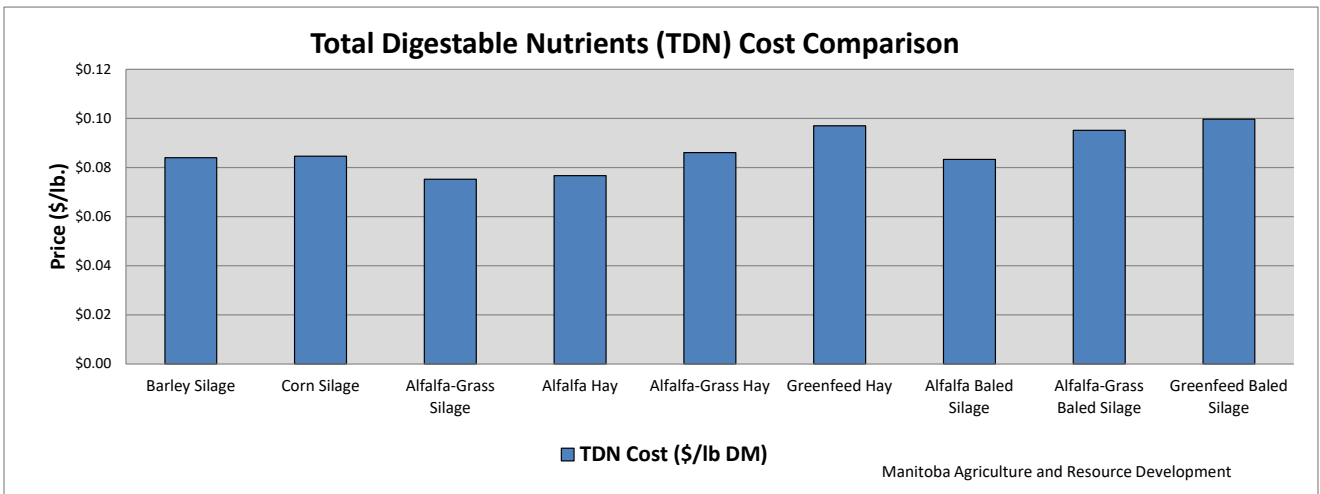
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Analysis of your Agrilinsurance coverage of operating and total costs is an important step in Risk Management Planning for your farm.

Analysis of Agrilinsurance coverage and premium cost is useful in comparing cost efficiency and production cost risk. This is an important step in Risk Management Planning for your farm.





**On-Farm Silage Harvest Cost Summary**

	Barley Silage		Corn Silage		Alfalfa-Grass Silage	
	(as fed)		(as fed)		(as fed)	
	<u>\$/acre</u>	<u>\$/ton</u>	<u>\$/acre</u>	<u>\$/ton</u>	<u>\$/acre</u>	<u>\$/ton</u>
Cost of Standing Silage	\$172.92	\$23.06	\$302.81	\$21.63	\$135.12	\$21.41
+ On-Farm Harvest Cost	\$118.21	\$15.76	\$137.99	\$9.86	\$112.54	\$17.84
= Total Production Costs	\$291.13	\$38.82	\$440.80	\$31.49	\$247.66	\$39.25

**Custom Harvest Cost Comparison**

	Barley Silage			Corn Silage			Alfalfa-Grass Silage		
	Options (\$/hour)			Options (\$/hour)			Options (\$/hour)		
	<u>#1</u>	<u>#2</u>	<u>#3</u>	<u>#1</u>	<u>#2</u>	<u>#3</u>	<u>#1</u>	<u>#2</u>	<u>#3</u>
<b>Self Propelled Custom Harvest</b>									
SP Forage Harvester (400-599HP)	\$360	-	-	\$360	-	-	\$360	-	-
SP Forage Harvester (600-799HP)	-	\$434	-	-	\$434	-	-	\$434	-
SP Forage Harvester (800-899HP)	-	-	\$496	-	-	\$496	-	-	\$496
SP Corn Header (14-20FT)	-	-	-	\$65	-	-	-	-	-
SP Corn Header (21-30FT)	-	-	-	-	\$95	\$95	-	-	-
SP Windrow Header (12-17FT)	\$24	\$24	\$24	-	-	-	\$24	\$24	\$24
Tandem Truck	\$104	\$104	\$104	\$104	\$104	\$104	\$104	\$104	\$104
Tandem Truck	\$104	\$104	\$104	\$104	\$104	\$104	\$104	\$104	\$104
Tandem Truck	-	\$104	\$104	-	\$104	\$104	-	\$104	\$104
Tandem Truck	-	-	-	-	-	\$104	-	-	-
4WD Tractor (Packing)	\$185	\$185	\$185	\$185	\$185	\$185	\$185	\$185	\$185
<b>Total Custom Cost (\$/hour)</b>	\$777	\$955	\$1,017	\$818	\$1,025	\$1,191	\$777	\$955	\$1,017
Work Rate (acres/hour)	17	19	21	9	13	15	17	19	21
Silage Yield (tons/acre)	7.5	7.5	7.5	14	14	14	6.31	6.31	6.31
Work Rate (tons/hour)	128	143	158	126	182	210	107	120	133
<b>Total Custom Harvest Cost (\$/ton)</b>	\$6.07	\$6.68	\$6.43	\$6.49	\$5.63	\$5.67	\$7.26	\$7.96	\$7.64
<b>Total Custom Harvest Cost (\$/acre)</b>	\$45.54	\$50.07	\$48.26	\$90.90	\$78.87	\$79.41	\$45.84	\$50.20	\$48.23

	Barley Silage		Corn Silage		Alfalfa-Grass Silage	
	Option (\$/hour)		Option (\$/hour)		Option (\$/hour)	
	<u>#1</u>	<u>#2</u>	<u>#1</u>	<u>#2</u>	<u>#1</u>	<u>#2</u>
<b>Pull Type Custom Harvest</b>						
PT Forage Harvester (150-250 HP)	\$149	-	\$149	-	\$149	-
PT Forage Harvester (up tp 300 HP)	-	\$169	-	\$169	-	\$169
Tractor FWA (160-224HP)	\$123	-	\$123	-	\$123	-
Tractor FWA (225+HP)	-	\$165	-	\$165	-	\$165
PT Forage Header - 2 Row	-	-	\$28	-	-	-
PT Forage Header - 3 Row	-	-	-	\$56	-	-
PT Pickup Header (70-79inch)	\$16	-	-	-	\$16	-
PT Pickup Header (80-96inch)	-	\$28	-	-	-	\$28
Tandem Truck	\$104	\$104	\$104	\$104	\$104	\$104
Tandem Truck	-	-	-	-	-	-
4WD Tractor (Packing)	\$185	\$185	\$185	\$185	\$185	\$185
<b>Total Custom Cost (\$/hour)</b>	\$578	\$652	\$589	\$680	\$578	\$652
Work Rate (acres/hour)	3	4	2	4	3	4
Silage Yield (tons/acre)	7.5	7.5	14	14	6.31	6.31
Work Rate (tons/hour)	23	30	28	56	19	25
<b>Total Custom Harvest Cost (\$/ton)</b>	\$25.11	\$21.72	\$21.05	\$12.13	\$30.39	\$26.07
<b>Total Custom Harvest Cost (\$/acre)</b>	\$188.32	\$162.92	\$294.72	\$169.88	\$191.79	\$164.48



**Custom Harvest Cost Analysis**

**Custom Silage Harvest Cost (\$/Ton) - calculated from Work Rate and Custom Rate Per Hour**

Work Rate (tons/hr)	Custom Rate (\$/hour)					
	\$500	\$750	\$1,000	\$1,250	\$1,500	\$1,750
25	\$20	\$30	\$40	\$50	\$60	\$70
50	\$10	\$15	\$20	\$25	\$30	\$35
75	\$7	\$10	\$13	\$17	\$20	\$23
100	\$5	\$8	\$10	\$13	\$15	\$18
125	\$4	\$6	\$8	\$10	\$12	\$14
150	\$3	\$5	\$7	\$8	\$10	\$12
175	\$3	\$4	\$6	\$7	\$9	\$10
200	\$3	\$4	\$5	\$6	\$8	\$9

Work Rate (tons/hr) increment **25**  
 Custom Rate (\$/hr) increment **\$250**

**Custom Silage Harvest Rate (\$/Hour) - Calculated from Work Rate and Custom Rate Per Ton**

Work Rate (tons/hr)	Custom Rate (\$/Ton)					
	\$6	\$7	\$8	\$9	\$10	\$11
10	\$60	\$70	\$80	\$90	\$100	\$110
35	\$210	\$245	\$280	\$315	\$350	\$385
60	\$360	\$420	\$480	\$540	\$600	\$660
85	\$510	\$595	\$680	\$765	\$850	\$935
110	\$660	\$770	\$880	\$990	\$1,100	\$1,210
135	\$810	\$945	\$1,080	\$1,215	\$1,350	\$1,485
160	\$960	\$1,120	\$1,280	\$1,440	\$1,600	\$1,760
185	\$1,110	\$1,295	\$1,480	\$1,665	\$1,850	\$2,035

Work Rate (tons/hr) increment **25**  
 Custom Rate (\$/ton) increment **\$1**

**Silage Harvest (Total Annual Hours) - Calculated from Work Rate and Silage Acres**

Work Rate (acres/hr)	Silage Acres					
	200	225	250	275	300	325
1	200	225	250	275	300	325
3	67	75	83	92	100	108
5	40	45	50	55	60	65
7	29	32	36	39	43	46
9	22	25	28	31	33	36
11	18	20	23	25	27	30
13	15	17	19	21	23	25
15	13	15	17	18	20	22

Work Rate (tons/hr) increment **2**  
 Silage Acre increment **25**

**Silage Harvest (Total Annual Acres) - Calculated from Work Rate and Silage Harvest Hours**

Work Rate (acres/hr)	Silage Harvest (Annual Hours)					
	100	150	200	250	300	350
2	200	300	400	500	600	700
4	400	600	800	1,000	1,200	1,400
6	600	900	1,200	1,500	1,800	2,100
8	800	1,200	1,600	2,000	2,400	2,800
10	1,000	1,500	2,000	2,500	3,000	3,500
12	1,200	1,800	2,400	3,000	3,600	4,200
14	1,400	2,100	2,800	3,500	4,200	4,900
16	1,600	2,400	3,200	4,000	4,800	5,600

Work Rate (tons/hr) increment **2**  
 Silage Annual Hours increment **50**

**Estimated Yield of Silage - Wet Tons per Acre <sup>1</sup>**

<u>Years</u>	<u>Barley tons/acre</u>	<u>Corn tons/acre</u>	<u>Alfalfa-Grass tons/acre</u>	(establishment year)
1	7.50	14.00	4.08	
2	-	-	7.25	
3	-	-	7.25	
4	-	-	6.80	
5	-	-	6.34	
6	-	-	5.89	
7	-	-	5.44	
8	-	-	5.21	
9	-	-		
10	-	-		
<b>Total Yield</b>	-	-	<b>44.2</b>	
<b>Average Yield (tons/acre)</b>	<b>7.50</b>	<b>14.00</b>	<b>6.31</b>	
<b>Avg. Dry Matter Yield (tons/acre)</b>	<b>2.76</b>	<b>4.03</b>	<b>2.73</b>	
<b>Years Production</b>	<b>1</b>	<b>1</b>	<b>7</b>	
<b>Years Rotation</b>	<b>1</b>	<b>1</b>	<b>8</b>	

1. Users are reminded to adjust fertilizer rates when making changes to forage yields.

<b>AgrilInsurance - Individual Coverage</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Estimated Storage Loss	<b>5%</b>		

Forage yields are based on Forage Region #6 and Risk Area #14 average yields with an IC of 1.25.

**Silage Forage Analysis**

	<u>Barley</u>	<u>Corn</u>	<u>Alfalfa-Grass</u>
Crude protein DM (CP)%	11.1	8.7	14.6
Energy DM (TDN) %	62.8	64.6	60.4
As fed moisture %	63.2	71.2	56.8

**Silage Price Formula**

	<u>Barley</u>	<u>Corn</u>	<u>Alfalfa-Grass</u>
Grain price (per bushel)	\$4.15	\$4.00	-
Dry Hay price (\$ per ton)	-	-	\$100.00
Silage Price Factor	x 12.00	x 9.00	x 0.4976
<b>Silage (\$ per wet ton)</b>	<b>\$49.80</b>	<b>\$36.00</b>	<b>\$49.76</b>

**Forage Value Comparison (Feed Analysis)**

	<u>Alfalfa/Grass Hay</u>	<u>Alfalfa Hay</u>	<u>Greenfeed</u>
Crude Protein feed analysis %	14.0	18.2	9.9
TDN feed analysis %	60.0	61.5	58.4
Moisture content %	12.6	12.1	14.2

<b>Seed &amp; Treatment</b>			
<b>Crop</b>	<b>Seeding Rate per Acre</b>	<b>Price per Unit</b>	<b>Cost per Acre</b>
<b>Cereal Silage</b>			
Barley	2.25 bu	\$7.50 /bu	\$16.88
Corn	32,000 plants	\$0.00290 /plant	\$92.80
<b>Alfalfa-Grass Silage</b>			
Alfalfa-grass	10 lb.	\$3.60 /lb.	\$36.00
Oat nurse crop (silage)	1.25 bu	\$7.25 /bu	\$9.06

<b>Fertilizer<sup>1</sup></b>				
<b>Fertilizer Type</b>	<b>Bulk Price \$/tonne</b>	<b>Actual Nutrient \$/lb.</b>	<b>Nitrogen Usage</b>	<b>Sulphur Usage</b>
Nitrogen: (urea) 46-0-0	\$475	\$0.468	100%	-
Nitrogen: (NH3) 82-0-0	\$735	\$0.407	0%	-
Nitrogen: (liquid) 28-0-0	\$280	\$0.454	0%	-
Phosphorus: 11-52-0	\$630	\$0.450	-	-
Potash: 0-0-60	\$460	\$0.348	-	-
Sulphur: 20.5-0-0-24	\$405	\$0.365	-	100%
MES S15: 13-33-0-15	\$635	\$0.523	-	0%

<b>Crop</b>	<b>Amount of Actual Pounds of Elements Applied Per Acre</b>								<b>Total \$/acre</b>
	<b>Nitrogen</b>		<b>Phosphorus</b>		<b>Potash</b>		<b>Sulphur</b>		
	<b>lbs.</b>	<b>\$/acre</b>	<b>lbs.</b>	<b>\$/acre</b>	<b>lbs.</b>	<b>\$/acre</b>	<b>lbs.</b>	<b>\$/acre</b>	
<b>Cereal Silage</b>									
Barley	80	\$37.47	30	\$13.51	0	\$0.00	0	\$0.00	\$50.99
Corn	130	\$60.89	50	\$22.52	25	\$8.69	10	\$3.65	\$95.76
<b>Alfalfa-Grass Silage</b>									
Alfalfa-grass	0	\$0.00	40	\$18.02	52	\$18.08	15	\$5.48	\$41.58
Oat nurse crop (silage)	50	\$23.42	50	\$22.52	30	\$10.43	15	\$5.48	\$61.86

The fertilizer recommendation will vary depending on the soil type, climate and crop rotation. Manitoba Agriculture recommends that soil test sampling and analysis be conducted each year to produce a better baseline for fertility. On many Manitoba soil types, potash application can be reduced based on soil test results. Custom soil sampling and analysis typically costs \$1.00 to \$2.00/acre.

1. Users are reminded to adjust silage yields when making changes to fertilizer rates.

<b>Chemicals</b>				
<b>Crop</b>	<b>Weed Control \$/acre</b>	<b>Insect Control \$/acre</b>	<b>Forage Removal \$/acre</b>	<b>Total Cost \$/acre</b>
<b>Cereal Silage</b>				
Barley	\$12.00	\$0.00		\$12.00
Corn	\$12.00	\$0.00		\$12.00
<b>Alfalfa-Grass Silage</b>				
Alfalfa-grass	\$0.00	\$0.00		\$0.00
Oat nurse crop (silage)	\$15.00	\$0.00	\$10.00	\$25.00

**Operating Costs**

Interest Rate on Operating	<b>4.50%</b>
Silage machinery repair	<b>4.00%</b> (% of total investment)
Land Taxes (\$/acre)	<b>\$10.00</b>
Fuel Cost (\$/litre)	<b>\$0.90</b>
Labour Cost per Hour	<b>\$24.00</b>

	Barley	Corn	Alfalfa Grass Silage	
	Silage	Silage	Establishment	Production
<b>Field Fuel Cost (\$/acre)</b>	<b>\$13.73</b>	<b>\$13.97</b>	<b>\$18.41</b>	<b>\$10.02</b>
<b>Moving Fuel Cost</b>				
Truck capacity (tons)	20	20	20	20
Fuel Use (miles/gal)	2	2	2	2
Distance to storage (miles)	3	3	3	3
<b>Total (\$/acre)</b>	<b>\$2.30</b>	<b>\$4.30</b>	<b>\$1.25</b>	<b>\$1.94</b>
<b>Packing Fuel Cost</b>				
Tons per hour	45	45	45	45
Fuel Consumption (litres/hour)	15	15	15	15
<b>Total (\$/acre)</b>	<b>\$2.25</b>	<b>\$4.20</b>	<b>\$1.22</b>	<b>\$1.89</b>
<b>Crop Insurance <sup>1</sup> (\$/acre)</b>	<b>80% Coverage</b>	<b>80% Coverage</b>	<b>Select Hay</b>	
	<b>\$10.94</b>	<b>\$13.62</b>	<b>\$5.00</b>	<b>\$9.91</b>
<b>Other Costs (\$/acre)</b>	<b>\$7.50</b>	<b>\$8.50</b>	<b>\$2.00</b>	<b>\$4.50</b>
<b>Rental and Custom Work</b>				
Seeding/Planting (\$/acre)	\$0.00	\$0.00	\$0.00	-
Application (\$/acre)	\$0.00	\$0.00	\$0.00	\$0.00
Silage Harvesting (\$/acre)	\$0.00	\$0.00	\$0.00	\$0.00
General (\$/acre)	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total (\$/acre)</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>

<sup>1</sup>Crop insurance: (2020 rates)

Forage Establishment Insurance for \$80/ac coverage. Annual Insurance for Alfalfa-Grass Select Hay Silage coverage in MASc (Forage Region 6) with LTAY >4 years yield=3.198 tons/acre. Annual Insurance for Greenfeed Silage 80% Coverage coverage in MASc (Risk Area 14) with Long Term Average Yield (LTAY)=4.838 tons/acre including \$0.52/acre Excess Moisture Insurance (EMI) coverage and Corn Silage 80% Coverage coverage in MASc (Risk Area 14) with LTAY yield=13.323 tons/acre including \$0.52/acre EMI coverage.

Labour Hours per Acre		Barley	Corn	Alfalfa	Grass	# Hired	# of	Acres	Hours
						Staff	Months	Farmed	Per Acre
Cropping	0.875	1.131	0.875	0.250	1	4	300	2.13	
Swathing	0.125	0.000	0.125	0.125	2	0.5	300	0.53	
Forage Harvest	0.133	0.200	0.133	0.133	0	0	300	0.00	
Trucking	0.266	0.640	0.266	0.266	0	0	300	0.00	
Packing	0.133	0.320	0.133	0.133			300	0.00	
<b>Total Hours</b>	<b>1.532</b>	<b>2.291</b>	<b>1.532</b>	<b>0.907</b>			<b>Total</b>	<b>2.7</b>	
<b>Total (\$/acre)</b>	<b>\$36.77</b>	<b>\$54.98</b>	<b>\$36.77</b>	<b>\$21.77</b>					

**Field Fuel Usage**

Crop	L/acre	Number of Field Operations									Trucks
		cultivate	tandem disk	harrow	air drill	row planter	SP sprayer	swather	forage harvester	spin spreader	3/4 ton pickup
<b>Cereal Silage</b>		<b>1.29</b>	<b>1.85</b>	<b>0.75</b>	<b>2.42</b>	<b>1.29</b>	<b>0.42</b>	<b>1.21</b>	<b>9</b>	<b>0.42</b>	<b>0.5</b>
Barley	15.26	1	0	0	1	0	2	1	1	0	0.5
Corn	15.52	1	1	1	0	1	2	0	1	0	0.5
<b>Alfalfa-Grass Silage</b>											
Alfalfa-grass	11.13	0	0	0	0	0	0	1	1	1	0.5
Oat nurse crop	20.46	1	2	2	1	0	2	1	1	0	0.5

**Fixed Costs**

<b>Land</b>				<b>Machinery</b>			
Average Land value (\$/acre)	<b>\$2,250</b>			Total Investment (\$/acre)			<b>\$375</b>
Total Silage acres	<b>300</b>			Residual Value (End of Useful Life)			<b>25%</b>
Owned Land Equity	<b>85%</b>			Useful Life (years)			<b>15</b>
Land Financed (\$338 per acre)	<b>15%</b>			Owned Equipment Equity			<b>55%</b>
Land Opportunity Cost (Investment Rate)	<b>1.50%</b>			Equipment Financed (\$169 per acre)			<b>45%</b>
<b>Land cost (\$/acre)</b>				<b>Machinery Cost (\$/acre)</b>			
Finance Rate & Term	<b>4.000%</b>	<b>25</b>	Years	Finance Rate & Term	<b>4.500%</b>	<b>7</b>	Years
Principle & Interest Cost		<b>\$21.60</b>		Principle & Interest Cost			<b>\$28.64</b>
Owned Land Opportunity Cost		<b>\$28.69</b>		Machinery Depreciation Cost			<b>\$18.75</b>
<b>Total Cost</b>		<b>\$50.29</b>		Owned Machinery Opportunity Cost			<b>\$3.09</b>
<b>Silage Storage</b>				<b>Total Cost</b>			
Silage Bunker Storage (total cost)		<b>\$15,000</b>					<b>\$50.48</b>
Total Investment (\$/acre)		<b>\$50</b>		<b>Total Land, Machinery &amp; Storage Debt (\$/acre)</b>			
Residual Value (End of Useful Life)		<b>20%</b>					<b>\$514</b>
Useful Life (years)		<b>20</b>					
Owned Silage Storage Equity		<b>85%</b>					
Silage Storage Financed (\$8 per acre)		<b>15%</b>					
Silage Storage Opp. Cost (Investment Rate)		<b>1.50%</b>					
<b>Silage Storage Cost (\$/acre)</b>							
Finance Rate & Term	<b>4.500%</b>	<b>7</b>	Years				
Principle & Interest Cost		<b>\$1.27</b>					
Storage Depreciation Cost		<b>\$2.00</b>					
Owned Storage Opportunity Cost		<b>\$0.64</b>					
<b>Total Cost</b>		<b>\$3.91</b>					

**Owned Equipment Inventory and Current Values**

	Market Value	Silage Usage %	Silage Allocation		Market Value	Silage Usage %	Silage Allocation
<b>Power &amp; Misc. Equipment</b>				<b>Harvest Equipment</b>			
4WD Tractor 300HP	\$150,000	10%	\$15,000	Swather 25ft	\$25,000	10%	\$2,500
MFD Tractor 175HP	\$50,000	10%	\$5,000	PT Forage Harvester	\$35,000	100%	\$35,000
	\$0	0%	\$0	PT Forage pickup header	\$5,000	100%	\$5,000
	\$0	0%	\$0	PT Forage corn header	\$10,000	100%	\$10,000
	\$0	0%	\$0	Dump wagon	\$10,000	100%	\$10,000
	\$0	0%	\$0		\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
<b>Total</b>			<b>\$20,000</b>	<b>Total</b>			<b>\$62,500</b>
<b>Seeding, Tillage, Spraying</b>				<b>Trucks &amp; Trailers</b>			
Cultivator	\$25,000	10%	\$2,500	Diesel tandem w/silage box	\$50,000	10%	\$5,000
Harrow 70ft	\$25,000	10%	\$2,500		\$0	0%	\$0
Air tank	\$15,000	10%	\$1,500		\$0	0%	\$0
Air drill 50ft	\$60,000	10%	\$6,000		\$0	0%	\$0
SP sprayer	\$75,000	10%	\$7,500		\$0	0%	\$0
Corn Planter	\$10,000	50%	\$5,000		\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
<b>Total</b>	<b>\$210,000</b>		<b>\$25,000</b>	<b>Total</b>			<b>\$5,000</b>

<b>Owned Equipment TOTAL</b>	<b>\$112,500</b>	<b>\$375.00 per acre</b>
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**Leased Equipment Inventory**

	Annual Lease	Silage Usage %	Silage Allocation		Annual Lease	Silage Usage %	Silage Allocation
<b>Power &amp; Misc. Equipment</b>				<b>Harvest Equipment</b>			
enter equipment here	\$0	0%	\$0	enter equipment here	\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
<b>Total</b>			<b>\$0</b>	<b>Total</b>			<b>\$0</b>
<b>Seeding, Tillage, Spraying</b>				<b>Trucks &amp; Trailers</b>			
enter equipment here	\$0	0%	\$0	1/2 ton pickup	\$9,600	15%	\$1,440
	\$0	0%	\$0		\$0	0%	\$0
	\$0	0%	\$0		\$0	0%	\$0
<b>Total</b>	<b>\$0</b>		<b>\$0</b>	<b>Total</b>			<b>\$1,440</b>

<b>Leased Equipment TOTAL</b>	<b>\$1,440</b>	<b>\$4.80 per acre</b>
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\* Leased equipment costs are listed under Operating Costs on the Summary Page.

## Other Assumptions

### **Fuel Costs:**

Includes fuel used for field work, and trucking in inputs.

### **Machinery Operating Costs:**

Includes costs for maintenance, repairs, licenses and insurance.

### **Crop Insurance: (2020 rates)**

Forage Region 6 - Establishment Insurance at \$80/ac coverage and annual Select Hay insurance at 80% coverage. Risk Area 14 - Greenfeed Silage and Corn Silage Insurance at 80% coverage.

### **Miscellaneous Costs:**

Includes overhead expenses: silage plastic, hydro, telephone, accounting, buildings, supplies and insurance, etc.

### **Land Taxes:**

The average for the province was based on land tax assessment and mill rates of a sample of municipalities growing crops.

### **Interest On Operating:**

Interest charges on operating costs are calculated at 4.5% for six months.

### **Land Cost:**

Based on approximate average land values. Budget assumed 15% financed at 4% for 25 years, plus 1.5% land equity opportunity cost. Budget can be used to estimate cashflow by removing investment cost.

P&I Cost (based on \$101,250 Mortgage) = \$6,481 payments per year / 300 acres = \$21.60/acre)

Investment = (Total Investment x Owned Equity %) x Investment Rate % (eg. ((\$2,250 x 85%) x 1.5%) = \$28.69/acre)

### **Machinery Cost:**

Based on approximate average machinery values. Budget assumed 45% financed at 4.5% for 7 years, depreciation costs over 15 years with a 25% residual value, plus 1.5% machinery equity opportunity cost. Budget can be used to estimate cashflow by removing depreciation and investment cost.

P&I Cost (based on \$50,625 Loan) = \$8,591 payment per year / 300 acres = \$28.64/acre)

Depreciation (Useage Cost) = (Total Investment - Residual Value) / Years Useful Life (eg. (\$375 - (\$375 x 25%)) / 15 = \$18.75/acre)

Investment = (Total Investment x Owned Equity %) x Investment Rate % (eg. (\$375 x 55%) x 1.5%) = \$3.09/acre)

### **Estimated Farmgate Values:**

Silage prices are based on estimated prices for fall/winter 2020/21.

### **Profitability & Breakeven Analysis:**

Gross Revenue = Price per unit x Yield per acre (eg. barley silage: \$49.80/ton x 7.5 ton/ac = \$373.50/ac)

Net Profit = Gross Revenue - Total Cost

(eg. barley silage: \$373.50 gross revenue - \$291.13 total cost = \$82.37 per acre)

Operating Expense Ratio = (Operating Cost / Gross Revenue) x 100

(eg. barley silage: \$149.68 operating expense / \$373.50 gross revenue = 40.1%)

Breakeven Price = Cost / Target Yield (eg. barley silage cost \$291.13 / 7.5 ton = \$38.82 per ton)

Breakeven Yield = Cost / Price per Unit (eg. barley silage cost \$291.13 / \$49.80 ton = 5.85 ton)

Cost of TDN (\$/lb DM) Silage = Total Cost Per Ton / (2000 x silage dry matter% x silage TDN%)

(eg. barley silage cost \$38.82 per ton / (2000 x 36.8% DM x 62.8% TDN) = \$.084 per pound)

Cost of CP (\$/lb DM) Silage = Total Cost Per Ton / (2000 x silage dry matter% x silage CP%)

(eg. barley silage cost \$38.82 per ton / (2000 x 36.8% DM x 11.1% CP) = \$.475 per pound)

Equivalent Dry Hay Value (TDN Basis \$/ton) of silage = 2000 x Hay dry matter% x Hay TDN% x Silage Cost of TDN(\$/lb DM)  
(eg. alfalfa grass hay (\$/ton) = 2000 x 87.4% DM x 60% TDN x \$.084 per pound TDN barley silage (total cost @ \$38.82 per ton) = \$88.08 per ton) If dry hay costs less than \$88.08 per ton, it is a lower cost feed source.)

Equivalent Dry Hay Value (CP Basis \$/ton) of silage = 2000 x Hay dry matter% x Hay CP% x Silage Cost of CP(\$/lb DM)  
(eg. alfalfa grass hay (\$/ton) = 2000 x 87.4% DM x 14% CP x \$.4751 per pound TDN barley silage (total cost @ \$38.82 per ton) = \$116.28 per ton) If dry hay costs less than \$116.28 per ton, it is a lower cost feed source.)

Created and maintained by [Manitoba Farm Management](#)

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For more information, contact your local [Manitoba Agriculture and Resource Development Office](#) or:

[Benjamin Hamm](#)

Farm Management Specialist

[Greg Fedak](#)

Farm Management Specialist

[Roy Arnott](#)

A/Manager-Farm Management

[Tod Wallace](#)

Industry Development Specialist, Beef



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## Contact us

- Go to [manitoba.ca/agriculture](http://manitoba.ca/agriculture)
- Toll free at 1-844-769-6224
- Email us at [mbfarmbusiness@gov.mb.ca](mailto:mbfarmbusiness@gov.mb.ca)
- Follow us on Twitter @MBGovAg
- Visit your local Manitoba Agriculture Office