

Guidelines For Estimating Barley & Corn Silage Costs

Date: March, 2009

This guide is designed to provide you with planning information and a format for calculating the cost of producing barley & corn silage.

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.

Producers are encouraged to calculate their own costs of production. Each farm has a different set of costs and yields due to varying soil types, climatic conditions and agronomic practices.

Disclaimer: This budget is only a guide and is not intended as an in depth study of this industry. Interpretation and utilization of this information is the responsibility of the user. If you require assistance with developing your individual budget, please contact your local MAFRI Farm Management Specialist or Regional Forage Specialist.

Barley & Corn Silage Cost Summary - March, 2009

	<u>Barley Silage</u>		<u>Corn Silage</u>		<u>Your Cost</u>
	<u>Cost/ Acre</u>	<u>Cost/ Ton Wet</u>	<u>Cost/ Acre</u>	<u>Cost/ Ton Wet</u>	
A. Operating Costs					
1.01 Seed	\$19.13	\$3.19	\$55.25	\$4.42	
1.02 Fertilizer	\$62.26	\$10.38	\$99.62	\$7.97	
1.03 Chemicals	\$5.00	\$0.83	\$29.50	\$2.36	
1.04 Field Fuel Costs	\$15.31	\$2.55	\$29.12	\$2.33	
1.05 Moving Fuel Costs	\$1.84	\$0.31	\$4.43	\$0.35	
1.06 Packing Fuel Costs	\$1.80	\$0.30	\$4.33	\$0.35	
1.07 Repair & Maintenance	\$13.73	\$2.29	\$13.47	\$1.08	
1.08 Insurance	\$6.58	\$1.10	\$10.34	\$0.83	
1.09 Miscellaneous	\$7.50	\$1.25	\$8.50	\$0.68	
1.10 Land Taxes	<u>\$4.00</u>	<u>\$0.67</u>	<u>\$4.00</u>	<u>\$0.32</u>	
Subtotal Operating	\$137.15	\$22.86	\$258.56	\$20.68	
1.11 Interest on Operating	<u>\$4.46</u>	<u>\$0.74</u>	<u>\$8.40</u>	<u>\$0.67</u>	
Total Operating Costs	\$141.61	\$23.60	\$266.96	21.36	
B. Fixed Costs					
2. Depreciation					
2.01 Cropping Equipment	\$18.00	\$3.00	\$16.50	\$1.32	
2.02 Silage Equipment	\$12.00	\$2.00	\$12.00	\$0.96	
2.03 Bunker Storage	\$1.00	\$0.17	\$2.00	\$0.16	
3. Investment					
3.01 Land	\$21.88	\$3.65	\$21.88	\$1.75	
3.02 Cropping Equipment	\$3.85	\$0.64	\$3.53	\$0.28	
3.03 Silage Equipment	\$2.57	\$0.43	\$2.57	\$0.21	
3.04 Bunker Storage	<u>\$0.18</u>	<u>\$0.03</u>	<u>\$0.35</u>	<u>\$0.03</u>	
Total Fixed Costs	\$59.47	\$9.91	\$58.82	\$4.71	
C. Labour					
4.01 Cropping	\$10.50	\$1.75	\$13.57	\$1.09	
4.02 Swathing	\$1.50	\$0.25	\$0.00	\$0.00	
4.03 Harvesting	\$1.60	\$0.27	\$2.40	\$0.19	
4.04 Trucking	\$3.19	\$0.53	\$7.68	\$0.61	
4.05 Bunker	<u>\$1.60</u>	<u>\$0.27</u>	<u>\$3.84</u>	<u>\$0.31</u>	
Total Labour Costs	\$18.38	\$3.06	\$27.49	\$2.20	
Total Cost of Production	\$219.46	\$36.58	\$353.28	\$28.26	
Estimated yield per acre					
Wet ton		6.0		12.5	

Disclaimer: 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.

Barley Silage - Input

Assumptions:

1. This budget outlines the cost of production for barley silage.
2. Assumes use of bunker silo.

Table 1. Operation Profile

	<u>TOTAL</u>
Number of acres	1,500
Total acres	1,500
Value per acre	625
Yield per acre (wet tons)	6.00
Moisture content %	65.0
Price of fuel (\$/litre)	\$0.90

A. Operating Costs

Seed

Seeding rate bu/acre	2.25
Seed Cost (\$/bu)	\$8.50

			Barley
Fertilizer	<u>Fertilizer</u>	<u>Cost</u>	<u>Rate (lbs)</u>
	Nitrogen	\$0.55	70
	Phosphate	\$0.72	33
	Potash	\$0.243	0
	Sulfur	\$0.26	0
	Zinc	\$1.50	0

Chemicals

	<u>Cost/Acre</u>
Weed control/Burn Off	\$5.00
Disease control	\$0.00
Insect control	\$0.00

Fuel Costs

Diesel Fuel Cost \$/litre **\$0.90**

Field Operation	Times Over	Width Feet	Speed MPH	Tractor HP
Cultivate Fall	1	48	5	250
Spray - Burn Off	1	80	10	150
Plant	1	40	5	250
Windrow	1	24	5	150
Forage Harvester	1	24	3	250

Moving costs

Truck Capacity (tons)	20
Fuel Consumption (miles/gal)	2
Distance to storage (miles)	3
Truck Fuel Cost (\$/litre)	\$0.90

Packing costs

Tons per hour	45
Fuel Consumption litres/hour	15

Repairs & Maintenance

Estimated % of investment (includes annual cost of silage cover)	4.0%
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Insurance (\$/acre)

Crop Insurance Risk area 11	\$4.70
Hail 1.5 % x \$125	\$1.88

Miscellaneous (\$/acre)

\$7.50

Land Taxes (\$/acre) **\$4.00**

Interest on Operating **6.5%**

Interest on Investment **3.5%**

Capital Costs	<u>Total Cost</u>	<u>Cost/Acre</u>	<u>Useful Life</u>	<u>Salvage Value</u>
Land Market Value	\$937,500	\$625.00		
Cropping Equipment	\$300,000	\$200.00	10	10
Silage Equipment	\$200,000	\$133.33	10	10
Bunker Storage	\$15,000	\$10.00	10	0
Total	\$515,000	\$343.33		
Labour Costs (hours/acre)				
Cropping			0.875	
Swathing			0.125	
Harvesting			0.133	
Trucking			0.266	
Bunker			0.133	
Total hours per acre			1.532	
Rate per hour			\$12.00	

Silage (Barley) Cost of Production Worksheet Assumptions

1. This budget provides a guideline to determine the cost of production for a silage enterprise.

2. Investment in machinery, equipment and storage is \$343.33 /acre. It was assumed that the machinery complement was similar to a grain enterprise, except for the combine and the addition of a forage harvester, a windrower and a packer.

3. A yield of 6 tons (wet) per acre was assumed.

4. A land value of \$625 per acre was assumed.

A. Operating Costs

Your Farm

1.01 Seed

	2.25	bushels/acre	
x	<u>\$8.50</u>	<u>seed cost (\$/bu)</u>	
=	\$19.13	\$/acre	

1.02 Fertilizer

Nitrogen	70	lbs/acre	
x	<u>\$0.55</u>	<u>cost/lb</u>	
=	\$38.50	\$/acre	

P ₂ O ₅	33	lbs/acre	
x	<u>\$0.72</u>	<u>cost/lb</u>	
=	\$23.76	\$/acre	

K ₂ O	0	lbs/acre	
x	<u>\$0.243</u>	<u>cost/lb</u>	
=	\$0.00	\$/acre	

Sulfur	0	lbs/acre	
x	<u>\$0.26</u>	<u>cost/lb</u>	
=	\$0.00	\$/acre	

Zinc		0	lbs/acre	_____
	x	<u>\$1.50</u>	<u>cost/lb</u>	_____
	=	\$0.00	\$ /acre	_____
Total	=	\$62.26	\$ /acre	_____

1.03 Chemicals

		\$5.00	weed control	_____
	+	\$0.00	disease control	_____
	+	<u>\$0.00</u>	<u>insect control</u>	_____
	=	\$5.00	\$ /acre	_____

1.04 Field Fuel Costs

<u>Operation</u>	<u>Times Over</u>	<u>Width feet</u>	<u>Speed mph</u>	<u>Fuel \$/ac.</u>	_____
Cultivate Fall	1	48	5	\$2.21	_____
Spray - Burn Off	1	80	10	\$0.40	_____
Plant	1	40	5	\$2.66	_____
Windrow	1	24	5	\$2.66	_____
Forage Harvester	1	24	3	<u>\$7.38</u>	_____
Total				\$15.31	_____

1.05 Moving Fuel Costs

		6.00	gross yield tons/acre	_____
	÷	20.0	truck capacity (tons)	_____
	=	0.3	trips/acre	_____
	x	3	miles/trip	_____
	=	0.9	total miles/acre	_____
	÷	2.0	fuel consumption (miles/gal)	_____
	=	2.046	litres/acre (4.546 litres/gal)	_____
	x	<u>\$0.90</u>	<u>fuel cost (\$/litre)</u>	_____
Total	=	\$1.84	\$ /acre	_____

1.06 Packing Fuel Costs

	1,500	acres	_____
x	<u>6.00</u>	tons average yield	_____
=	9000	tons total yield	_____
÷	<u>45</u>	tons/hour	_____
=	200.00	hours	_____
x	<u>15</u>	litres/hour	_____
=	3000	litres	_____
x	<u>\$0.90</u>	\$/litre	_____
=	\$2,700	total cost	_____
÷	<u>1,500</u>	acres	_____
=	\$1.80	\$/acre	_____

1.07 Repair & Maintenance (includes annual cost of silage cover)

	0.04	% repair rate	_____
x	<u>\$343</u>	investment/acre	_____
=	\$13.73	\$/acre	_____

1.08 Insurance

	\$4.70	crop insurance	_____
+	<u>\$1.88</u>	hail insurance	_____
=	\$6.58	\$/acre	_____

1.09 Miscellaneous

=	\$7.50	\$/acre	_____
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1.10 Land Taxes

=	\$4.00	\$/acre	_____
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1.11 Interest on Operating

	\$137.15	subtotal operating	_____
÷	2	average	_____
x	<u>0.065</u>	% interest rate	_____
=	\$4.46	\$/acre	_____

Capital Costs

	<u>Total</u>	<u>Per Acre</u>	
Land Market Value	\$937,500	\$625.00	_____
Cropping Equipment (does not include combine)	\$300,000	\$200.00	_____
Silage Equipment (includes forage harvester, windrower, trucks and packer)	\$200,000	\$133.33	_____
Bunker Storage	\$15,000	\$10.00	_____
Total Investment	\$1,452,500		_____
Total Machinery & Bunker Investment/acre		\$343.33	_____

B. Fixed Costs

2. Depreciation

$$\frac{\text{Original Value} - \text{Salvage Value}}{\text{Useful Life}}$$

2.01 Cropping Equipment

	\$200.00	cost/acre	_____
-	\$20.00	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$18.00	\$ /acre	_____

2.02 Silage Equipment

	\$133.33	cost/acre	_____
-	\$13.33	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$12.00	\$ /acre	_____

2.03 Bunker Storage

	\$10.00	cost/acre	_____
-	\$0.00	salvage value	_____
÷	10	<u>useful life</u>	_____
=	\$1.00	\$ /acre	_____

3. Investment

$$\frac{\text{Original Value} + \text{Salvage Value}}{2} \times \text{Investment Rate}$$

3.01 Land

	\$625.00	cost/acre	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$21.88	\$ /acre	_____

3.02 Cropping Equipment

	\$200.00	cost/acre	_____
+	\$20.00	salvage value	_____
÷	2	average	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$3.85	\$ /acre	_____

3.03 Silage Equipment

	\$133.33	cost/acre	_____
+	\$13.33	salvage value	_____
÷	2	average	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$2.57	\$ /acre	_____

3.04 Bunker Storage

	\$10.00	cost/acre	_____
+	\$0	salvage value	_____
÷	2	average	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$0.18	\$ /acre	_____

C. Labour

Cropping		0.875	cropping hours/acre	_____
	<u>x</u>	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$10.50	\$ /acre	_____
Swathing		0.125	swathing hours/acre	_____
	<u>x</u>	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$1.50	\$ /acre	_____
Harvesting		0.133	harvesting hours/acre	_____
	<u>x</u>	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$1.60	\$ /acre	_____
Trucking		0.266	trucking hours/acre	_____
	<u>x</u>	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$3.19	\$ /acre	_____
Packing		0.133	bunker hours/acre	_____
	<u>x</u>	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$1.60	\$ /acre	_____
Total	=	\$18.38	\$ /acre	

Corn Silage - Input

Assumptions:

1. This budget outlines the cost of production for corn silage.
2. Assumes use of bunker silo.

Table 1. Operation Profile

	<u>TOTAL</u>
Number of acres	1,500
Total acres	1,500
Value per Acre	\$625
Yield per acre (wet tons)	12.5
Moisture content %	65.0
Price of fuel (\$/litre)	\$1.04

A. Operating Costs

Seed

Seeding rate plants/acre	25,000
Seed Cost (\$/plant)	\$0.0022

		Corn	
Fertilizer	<u>Fertilizer</u>	<u>Cost</u>	<u>Rate (lbs)</u>
	Nitrogen	\$0.60	90
	Phosphate	\$0.80	40
	Potash	\$0.243	40
	Sulfur	\$0.260	15
	Zinc	\$1.50	0

Chemicals

	<u>Cost/Acre</u>
Custom Weed control	\$29.50
Disease control	\$0.00
Insect control	\$0.00

Fuel Costs

Diesel Fuel Cost \$/litre **\$1.04**

Field Operation	Times Over	Width Feet	Speed MPH	Tractor HP
Fall HD Disc	1	24	5	250
Cultivate	1	48	6	250
Cultivate & Fertilize	1	60	7	150
Plant	1	24	5	250
Spray	2	80	6	150
Windrow	0	0	0	0
Forage Harvester	1	20	3	350

Moving costs

Truck Capacity (tons)	20
Fuel Consumption (miles/gal)	2
Distance to storage (miles)	3
Truck Fuel Cost (\$/litre)	\$1.04

Packing costs

Tons per hour	45
Fuel Consumption litres/hour	15

Repairs & Maintenance

Estimated % of investment (includes annual cost of silage cover)	4%
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Insurance (\$/acre)

Crop Insurance Risk area 11	\$8.46
Hail 1.5 x \$125	\$1.88

Miscellaneous (\$/acre)

\$8.50

Land Taxes (\$/acre) **\$4.00**

Interest on Operating **6.5%**

Interest on Investment **3.5%**

Capital Costs	<u>Total Cost</u>	<u>Cost/Acre</u>	<u>Useful Life</u>	<u>Salvage Value</u>
Land Market Value	\$937,500	\$625.00		
Cropping Equipment	\$275,000	\$183.33	10	10
Silage Equipment	\$200,000	\$133.33	10	10
Bunker Storage	\$30,000	\$20.00	10	0
	\$505,000	\$336.67		
Labour Costs (\$/acre)				
Cropping hours/acre			1.131	
Swathing			0.000	
Harvesting hours/acre			0.200	
Trucking hours/acre			0.640	
Bunker hours/acre			0.320	
Total hours			2.291	
Rate per hour			\$12.00	

Silage (Corn) Cost of Production Worksheet Assumptions

1. This budget provides a guideline to determine the cost of production for a silage enterprise.

2. Investment in machinery, equipment and storage is \$336.67 /acre. It was assumed that the machinery complement was similar to a grain enterprise, except for the combine and the addition of a forage harvester, a windrower and a packer.

3. A yield of 12.5 tons (wet) per acre was assumed.

4. A land value of \$625 per acre was assumed.

A. Operating Costs

Your Farm

1.01 Seed

	25,000	plants/acre
x	<u>\$0.0022</u>	<u>seed cost (\$/plant)</u>
=	\$55.25	\$ /acre

1.02 Fertilizer

Nitrogen	90	lbs/acre
x	<u>\$0.60</u>	<u>cost/lb</u>
=	\$54.00	\$ /acre

P ₂ O ₅	40	lbs/acre
x	<u>\$0.80</u>	<u>cost/lb</u>
=	\$32.00	\$ /acre

K ₂ O	40	lbs/acre
x	<u>\$0.243</u>	<u>cost/lb</u>
=	\$9.72	\$ /acre

Sulfur	15	lbs/acre
x	<u>\$0.26</u>	<u>cost/lb</u>
=	\$3.90	\$ /acre

Zinc		0	lbs/acre	_____
	x	<u>\$1.50</u>	<u>cost/lb</u>	_____
	=	\$0.00	\$ /acre	_____
Total	=	\$99.62	\$ /acre	_____

1.03 Chemicals

		\$29.50	weed control	_____
	+	\$0.00	disease control	_____
	+	<u>\$0.00</u>	<u>insect control</u>	_____
	=	\$29.50	\$ /acre	_____

1.04 Field Fuel Costs

<u>Operation</u>	<u>Times Over</u>	<u>Width feet</u>	<u>Speed mph</u>	<u>Fuel \$/ac.</u>
Fall HD Disc	1	24	5	\$5.12
Cultivate	1	48	6	\$2.13
Cultivate & Fertilizer	1	60	7	\$0.88
Plant	1	24	5	\$5.12
Spray	2	80	6	\$1.54
Windrow	0	0	0	\$0.00
Forage Harvester	1	20	3	<u>\$14.33</u>
Total				\$29.12

1.05 Moving Fuel Costs

		12.50	gross yield tons/acre	_____
	÷	20.0	truck capacity (tons)	_____
	=	0.625	trips/acre	_____
	x	3	miles/trip	_____
	=	1.875	total miles/acre	_____
	÷	2.0	fuel consumption (miles/gal)	_____
	=	4.262	litres/acre (4.546 litres/gal)	_____
	x	<u>\$1.04</u>	<u>fuel cost (\$/litre)</u>	_____
Total	=	\$4.43	\$ /acre	_____

1.06 Packing Fuel Costs

	1,500	acres	_____
x	<u>12.50</u>	tons average yield	_____
=	18750	tons total yield	_____
÷	<u>45</u>	tons/hour	_____
=	416.67	hours	_____
x	<u>15</u>	litres/hour	_____
=	6250	litres	_____
x	<u>\$1.04</u>	\$/litre	_____
=	\$6,500	total cost	_____
÷	<u>1,500</u>	acres	_____
=	\$4.33	\$ /acre	_____

1.07 Repair & Maintenance (includes annual cost of silage cover)

	0.04	% repair rate	_____
x	<u>\$337</u>	<u>investment/acre</u>	_____
=	\$13.47	\$ /acre	_____

1.08 Insurance

	\$8.46	crop insurance	_____
+	<u>\$1.88</u>	<u>hail insurance</u>	_____
=	\$10.34	\$ /acre	_____

1.09 Miscellaneous

=	\$8.50	\$ /acre	_____
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1.10 Land Taxes

=	\$4.00	\$ /acre	_____
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1.11 Interest on Operating

	\$258.56	subtotal operating	_____
÷	2	average	_____
x	<u>0.065</u>	<u>% interest rate</u>	_____
=	\$8.40	\$ /acre	_____

Capital Costs

	<u>Total</u>	<u>Per Acre</u>	
Land Market Value	\$937,500	\$625.00	_____
Cropping Equipment (does not include combine)	\$275,000	\$183.33	_____
Silage Equipment (includes,forage harvester,corn header, trucks and packer)	\$200,000	\$133.33	_____
Bunker Storage	\$30,000	\$20.00	_____
Total Investment	\$1,442,500		_____
Total Machinery & Bunker Investment/acre		\$336.67	_____

B. Fixed Costs

2. Depreciation Original Value - Salvage Value
Useful Life

2.01 Cropping Equipment

	\$183.33	cost/acre	_____
-	\$18.33	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$16.50	\$ /acre	_____

2.02 Silage Equipment

	\$133.33	cost/acre	_____
-	\$13.33	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$12.00	\$ /acre	_____

2.03 Bunker Storage

	\$20.00	cost/acre	_____
-	\$0.00	salvage value	_____
÷	<u>10</u>	<u>useful life</u>	_____
=	\$2.00	\$ /acre	_____

3. Investment **Original Value + Salvage Value x Investment Rate**
2

3.01 Land

	\$625.00	cost/acre	_____
x	<u>0.04</u>	<u>% investment rate</u>	_____
=	\$21.88	\$ /acre	_____

3.02 Cropping Equipment

	\$183.33	cost/acre	_____
+	\$18.33	salvage value	_____
÷	2	average	_____
x	<u>0.04</u>	<u>% investment rate</u>	_____
=	\$3.53	\$ /acre	_____

3.03 Silage Equipment

	\$133.33	cost/acre	_____
+	\$13.33	salvage value	_____
÷	2	average	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$2.57	\$ /acre	_____

3.04 Bunker Storage

	\$20.00	cost/acre	_____
+	\$0	salvage value	_____
÷	2	average	_____
x	<u>0.035</u>	<u>% investment rate</u>	_____
=	\$0.35	\$ /acre	_____

C. Labour

Cropping		1.131	cropping hours/acre	_____
	x	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$13.57	\$/acre	_____
Swathing		0.000	swathing hours/acre	_____
	x	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$0.00	\$/acre	_____
Harvesting		0.200	harvesting hours/acre	_____
	x	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$2.40	\$/acre	_____
Trucking		0.640	trucking hours/acre	_____
	x	<u>12.00</u>	<u>\$/hour</u>	_____
	=	\$7.68	\$/acre	_____
Packing		0.320	bunker hours/acre	_____
	x	<u>\$12.00</u>	<u>\$/hour</u>	_____
	=	\$3.84	\$/acre	_____
Total	=	\$27.49	\$/acre	_____

For further information contact your local Manitoba Agriculture, Food and Rural Initiatives office.

Prepared by:
 Peter Blawat
 Policy Economist

Keith Kyle
 Business Development Specialist

Glenn Friesen
 Forage Specialist