

Pricing Corn Silage

Silage is the harvest of whole corn plants at 60% to 70% moisture. Optimal harvest occurs when kernels are between the ½ milk line and the black layer.

Corn silage can be made from corn planted for silage or as a grain crop. Farmers have several reasons for reconsidering their harvest method. For example, they or a neighbor may have a need for silage that was not anticipated at planting time, or drought may have reduced grain yields substantially so that the value of the crop is greater as silage than as grain.

Silage and other forage crops remove more phosphorus and potassium from the soil than grain crops. In soil with low levels of these nutrients, the cost of replacing them through fertilization can be a substantial expense. In fields where manure is heavily applied, silage can be used as a tool in a nutrient management plan. By raising corn for silage continuously or frequently in a crop rotation, higher quantities of manure can be applied with less risk of nutrient runoff or leeching into groundwater.

Farmers have generally priced silage based on a valuation of 8 to 10 times the price of a bushel of corn. A factor of 8 to 9 times is used to price silage in the field, and 9 to 10 times to price it in storage. A higher factor is used for lower-priced corn and a lower factor for higher-priced corn. This pricing method needs to be reconsidered given current corn and input prices. Currently, silage priced in the field may be closer to 7 times the price of a bushel of corn.

In addition, this pricing method may err in valuing silage because it does not take into account the dry matter percent of the silage. Dry matter percentage has a large effect on the silage value and is the preferred way to price silage for the livestock producer considering a purchase. A silage with a lower moisture content, or higher dry matter, carries more feed value per ton and could be more valuable to a livestock producer.

This publication is intended to help farmers estimate the minimum price needed to justify harvesting a corn crop as silage rather than for grain. This price should



Figure 1. Agricultural producers should consider the current price of corn and inputs for pricing corn silage.

serve as a starting point in negotiations with a livestock producer seeking to purchase and harvest the field as silage. The value of silage delivered to storage includes the costs of harvesting and transportation, which are incurred by either the crop farmer or livestock farmer.

Livestock farmers calculate the cost of silage on a dry matter basis, including delivery to the feed bunk and accounting for storage losses and shrink. This cost per ton is then compared to the costs of other feed options.

Important factors affecting the break-even price of silage are the price of corn, the expected grain yield of the growing crop, and who incurs the costs of harvesting and transporting the silage. Download the [Silage Cost Analyzer workbook \(XLSX\)](#)¹ to customize a silage value estimation.

This publication focuses on the wet basis price of silage. Determining the break-even price of silage on a wet basis — as it stands in the field — is standard for grain farmers and for estimating handling and storage costs.

Livestock producers price feed and balance rations on a dry matter basis. This publication shows how to convert the wet basis value to a dry matter value.

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Pricing silage in the field

Crop farmer perspective: *The value calculated is the break-even price for harvesting as grain or as silage. Negotiate a price for a standing field of grain greater than or equal to this price.*

Livestock farmer perspective: *Recognize that this is the lowest price at which a crop producer is willing to sell a standing field of grain. Consider the costs of the harvest, transport, storage and use to determine whether this price makes sense for a feedstuff.*

The basic principle of pricing a crop harvested as silage rather than grain is to estimate the value of the grain in the field, and make additions and subtractions to the value depending on the impact of changing the harvest method. Negotiations between crop and livestock farmers can proceed with this break-even price in mind.

Silage harvesting requires specialized equipment. Because silage choppers and wagons are not found on many grain farms, livestock producers who purchase

standing corn crops for making silage may harvest the crop themselves with their own equipment. In this situation, because the crop farmer does not incur a harvest cost, the break-even price of the standing crop is reduced by the cost of grain harvest.

Silage also removes most of the corn fodder as well as the grain — removing more phosphorus and potassium from the soil than harvesting only the grain. The value of the standing crop is increased by the value of nutrients removed by the whole plant versus just the grain. Some silage purchase agreements between a grain farmer and a livestock feeder may include spreading manure where the silage was harvested. In this case, the livestock producer should be credited for value provided beyond the extra nutrients removed when the corn was harvested for silage.

Begin calculating the value of the standing grain by first estimating bushels of grain per acre. Yield per acre can be estimated from harvesting a sample area of the field. A few rows can be left throughout the field for later grain harvest or crop insurance assessment to determine grain yield per acre. Alternatively, harvesting by hand the grain from 174 feet of corn planted in 30-inch rows gives an estimate of the grain yield of one one-hundredth of an acre. Multiply the grain yield from the sample by 100 to estimate the yield per acre.

Table 1. Calculation of silage price for corn standing in field using estimated yield.

Description	Example	Units	Your farm
A. Estimated yield ¹	170	Bushels per acre	
B. Harvest time price of #2 yellow corn	4.20	Dollars per bushel of corn	
C. Less: Combining/harvest cost ²	0.235	Dollars per bushel of corn	
D. Less: Drying	0.20	Dollars per bushel of corn	
E. Less: Hauling	0.29	Dollars per bushel of corn	
F. Add: Fertilizer removal value ³	0.38	Dollars per bushel of corn	
G. Break-even corn grain price (B – C – D – E + F)	3.86	Dollars per bushel of corn	
H. Value of standing crop (A × G)	656.20	Dollars per acre	
I. Estimated silage yield, wet basis	23	Tons per acre	
J. Silage price standing in field, wet basis (H ÷ I)	28.53	Dollars per ton	
K. Dry matter in silage	35	Percent	
L. Silage price standing in field, dry matter basis [(J ÷ K) × 100]	81.51	Dollars per ton	

1. From harvest of test rows (or from harvest of plots minus 1% to 4% estimated harvest loss).
2. Divide custom charge per acre by expected yield to obtain a per bushel cost.
3. Value of phosphorus and potassium removed in forage portion of plant.

If small plots are harvested by hand with no yield loss, a 1% to 4% allowance for harvest loss should be deducted from the calculated yield. Choose an estimate that fits your experience in harvest loss.

Table 1 presents a process for valuing a growing crop that may be harvested as silage. A break-even price between harvesting corn for grain or silage is needed. Start by estimating the harvest-time market price likely to be received if the corn is harvested as grain. Decrease this price by subtracting the costs such as combining, trucking and drying that will not be incurred by the crop farmer if the crop is harvested as silage by the livestock farmer. Convert any per-acre costs, such as grain combining, to a per-bushel basis. Increase the price by the cost of additional nutrients that will be extracted in the corn fodder.

Multiply this break-even corn grain price by the estimated yield to get a value per acre of the standing crop.

Two conversions of the value per acre may be important to the livestock producer. First, the value per ton of silage can be obtained by dividing the value

per acre by the expected number of tons of silage to be harvested. Information from Table 2 can be used to estimate the tons of silage expected for various grain yields.

The livestock producer may also benefit by knowing the value of the silage on a dry matter basis. To obtain a dry matter value, divide the wet basis price value by the percent dry matter in the silage. Silage moisture content can vary considerably, and that variability can affect the dry matter value of silage.

Pricing silage delivered to storage

Crop farmer perspective: *If the crop farmer harvests and delivers the silage to the livestock farmer's storage structure, the value calculated is the break-even price for harvested and delivered silage. Negotiate a price for harvested and delivered silage greater than or equal to this price.*

Livestock farmer perspective: *If the livestock farmer harvests and transports the silage from a standing corn crop, this step is an intermediate step to determine what can be paid for the silage. Variable costs of storage, shrink and transport to the feed bunk are still needed to determine whether this price makes sense for a feedstuff.*

When estimating the break-even price of chopped silage delivered to silage storage, costs of chopping and hauling must be added to the value of the standing crop. Relevant units change from bushels of grain to tons of silage per acre. It is simplest to compute a wet basis price of silage delivered to the storage structure.

Table 3 presents steps needed to take the results of Table 1 and estimate the value of silage delivered to

Table 2. Relationship between grain and silage yield.

Grain yield (bushels per acre)	Silage yield (wet tons per acre)	Silage yield (dry tons per acre)
45	9	3
76	11	4
104	14	5
128	17	6
150	20	7
169	23	8
185	26	9

Source: Lauer, J. and Undersander, D. (2004).

Table 3. Calculation of silage price delivered to storage.

Description	Example	Units	Your farm
A. Price of silage in the field, wet basis (Table 1, row J)	28.53	Dollars per ton	
B. Add: Silage harvest charge, wet basis	8.00	Dollars per ton	
C. Add: Silage delivery and fill charge, wet basis	4.50	Dollars per ton	
D. Silage price delivered to storage, wet basis (A + B + C)	41.03	Dollars per ton	
E. Dry matter in silage	35	Percent	
F. Silage price delivered to storage, dry matter basis $[(D \div E) \times 100]$	117.23	Dollars per ton	

storage. Custom silage harvest and transportation are usually priced on wet basis dollars per ton. The costs of harvest and delivery vary substantially depending on hauling distance, type of equipment and volume of silage.

Pricing silage delivered to feed bunk

Crop farmer perspective: *This information is not normally used by a crop farmer whose typical interest stops at delivering a product to a user.*

Livestock farmer perspective: *Estimated price of silage, converted to a dry matter basis, provides the point of comparison to other available feedstuffs. The livestock producer needs to estimate the dry matter price of silage to make wise feeding decisions.*

Livestock farmers are interested in the cost of silage as a feed delivered to their animals. To estimate the cost of silage delivered to the feed bunk, several additional costs need to be considered. The process is summarized in Table 4. All added costs are made on a wet basis because that is a more common way to estimate silage cost.

The variable costs associated with storage — for example, silage bags, bale wrap or silage cover — are added to the price of silage initially delivered to storage. Cost of permanent storage is not added as it is already a sunk cost that does not change with the decision to buy additional silage.

The costs of dry matter loss and shrink during storage need to be considered. Table 5 contains research estimates of dry matter loss for various storage types. Although permanent storage structure costs are not considered in Table 4 computations, it is obvious that different storage structures have varied storage losses and are an important decision for livestock producers wishing to feed silage to their animals.

Handling cost of removing silage from storage and delivering to the feed bunk needs to be added. Handling costs will vary with type of storage structure. Estimate only the additional costs of handling the silage relative to using other feedstuffs.

Livestock producers compare feedstuffs on a dry matter basis. Once a wet basis cost of procuring and using silage is estimated, convert it into a dry matter cost by dividing by the percent of dry matter in the silage.

Table 4 begins with the estimated silage value from Table 3 and adjusts for storage losses and handling costs. Dry matter silage value is of greater significance at this step because the livestock producer needs to compare it to the cost of other feed stuffs available.

Fertility opportunities

This guide recognizes that silage removes more phosphorus and potassium from the field than does corn grain harvest. Table 1 suggests that the corn farmer add the value of nutrients removed to the break-even price of silage. Some purchase agreements between a grain farmer selling silage and a livestock feeder may include spreading manure where the silage was harvested. In this case, the livestock producer should be credited the value of the phosphorus and potassium beyond the extra

Table 4. Calculation of silage value delivered to the feed bunk.

Description	Example	Units	Your farm
A. Price of silage delivered to storage, wet basis (Table 3, row D)	41.03	Dollars per ton	
B. Add: Annual supplies (bags, covers, etc.)	5.00	Dollars per ton	
C. Estimated losses in storage, wet basis (see Table 5)	14.5	Percent	
D. Feedable percentage (100 – C)	85.5	Percent	
E. Add: Cost of storage losses, wet basis $\{[A \div (D \div 100)] - A\}$	6.95	Dollars per ton	
F. Add: Cost of removing from storage and delivering to feed bunk, wet basis	1.50	Dollars per ton	
G. Silage price delivered to feed bunk, wet basis (A + B + E + F)	54.48	Dollars per ton	
H. Dry matter in silage	35	Percent	
I. Silage price delivered to the feed bunk, dry matter basis $[(G \div H) \times 100]$	155.66	Dollars per ton	

Table 5. Estimate of silage losses during filling, storage and feed out.

Silo type	Moisture (percent)	Dry matter loss percentage					Total
		Filling	Seepage	Gaseous	Top surface	Feed out	
Conventional tower	50	2 to 4	0	5	3	1 to 5	11 to 17
	60	1 to 3	0	6	3	1 to 5	11 to 17
	65	1 to 3	0	8	3	1 to 5	13 to 19
	70	1 to 2	1	8	4	1 to 5	15 to 20
	80	1 to 2	7	9	3	1 to 5	21 to 26
Gas-tight tower	40	2 to 4	0	4	0	0 to 3	6 to 13
	50	2 to 3	0	4	0	0 to 3	6 to 12
	60	1 to 2	0	5	0	0 to 3	6 to 11
	70	0 to 1	1	7	0	0 to 3	8 to 12
Silage bags	60 to 70	1 to 2	0	5	2	1 to 5	9 to 14
	80	1 to 2	2	6	2	1 to 5	12 to 17
Stack, covered	60	4 to 7	0	6	6	5 to 15	21 to 34
	70	3 to 6	0	7	4	3 to 10	17 to 27
	80	3 to 6	5	8	2	3 to 10	21 to 31
Stack, no cover	60	4 to 7	0	12	24	5 to 15	45 to 58
	70	3 to 6	1	11	19	3 to 10	37 to 47
	80	3 to 6	7	10	11	3 to 10	34 to 44
Trench or bunker, covered	60	3 to 6	0	6	4	5 to 15	18 to 31
	70	2 to 5	1	7	3	3 to 10	16 to 23
	80	2 to 5	4	9	2	3 to 10	20 to 30
Trench or bunker, no cover	60	3 to 6	0	10	12	5 to 15	30 to 43
	70	2 to 5	1	9	9	3 to 10	24 to 34
	80	2 to 5	6	10	6	3 to 10	27 to 37
Wrapped silage bales	50 to 60	2 to 3	0	6	6	1 to 5	15 to 20
	60 to 70	1 to 2	0	8	5	1 to 5	15 to 20

Source: Holmes, B. and Muck, R. (2000).

nutrients removed when the corn was harvested for silage. This credit is not calculated in this guide but can be a part of the negotiation process.

Drought-damaged corn

Drought-damaged silage results when the growth of corn plants is stopped at an immature stage and grain yield is drastically reduced. Drought-damaged silage usually has 80% to 90% of the feed value of high-grain corn silage per unit of dry matter if the moisture content of the crop is 70% or less when harvested. If moisture content is much above 70%, silage tends to be unpalatable and to have lower feed value.

When drought causes yield reduction of 20% to 40% below normal, the silage produced appears to be equal to much higher yielding corn, but tons per acre are reduced proportionally.

Drought stressed corn silage may contain aflatoxin or other mycotoxins that can become worse with improper moisture at ensilaging or lack of proper packing. Dairy producers need to avoid aflatoxin-contaminated silage as aflatoxin detection in milk can lead to milk rejected by processors. Segregating suspect silage supplies for further quality control sampling before feeding is a good practice in drought years.

Silage value to the crop producer versus livestock feeder

This publication has looked at break-even silage prices at three stages. The break-even price of the standing crop is important information for the crop farmer choosing between harvesting as a grain crop or allowing a livestock producer to harvest as silage. The break-even price of silage delivered to storage is important information for whoever incurs the costs of silage harvest

and transportation to storage. Each of these estimates is probably best understood on a wet basis value.

The livestock farmer will be interested in the cost of silage delivered to livestock, which can be compared to other feedstuffs. Cost of silage delivered to livestock estimated in this publications does not value the silage on its nutrient content; it is simply an estimate of its cost relative to harvesting the crop as grain — an estimate of an opportunity before the livestock farmer. The feed value of silage would be established by comparing it to alternative feedstuffs and rations that provide similar nutrients.

This guide estimates the break-even price of silage for a midseason opportunity to switch from harvesting corn as grain to harvesting corn as silage. Because this is a short-term decision, only additional and reduced costs associated with harvesting as silage are important.

A crop farmer wanting to build a longer-term business as a corn silage supplier to a livestock farmer faces a different set of concerns. Selection of silage corn varieties, optimal harvest maturity, and ownership of silage harvest equipment can add feed value to silage. Livestock farmers may be interested in contracting with crop farmers who will regularly supply them with silage.

For the livestock farmer, the fact that the silage decision under consideration in this publication is short

term means that the cost of owning silage storage is not a factor in estimating silage cost; only the incremental costs of acquiring, storing and feeding silage are important at this time.

Use MU Extension publication G664, [Corn Silage Planning Budget](#),² to estimate costs for growing corn silage.

Sources

- Holmes, B.J. and R.E. Muck. 2000. Preventing Silage Storage Losses. University of Wisconsin.
- Lauer, J. and D. Undersander. 2004. Pricing corn silage for sale. In Proceedings and Joint Meeting of the Professional Nutrient Applicators of Wisconsin, Wisconsin Custom Operators and Wisconsin Forage Council. Eau Claire, WI. p. 87–91.

Web addresses

1. extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/SilageCostAnalyzer.xlsx
2. extension.missouri.edu/g664

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