

Contracting Corn Silage Acres

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Situation

As dairy farms expand in terms of cow numbers, a concurrent expansion of crop acres must also occur to meet feed needs. Additional land is usually rented or purchased. Both of these situations require increased capital and input expenses and higher demands on time and labor for producing the crop. Most large dairy operations utilize a significant amount of corn silage. Corn silage is a crop that lends itself easily to a contractual arrangement with neighboring farm units. The canning industry has successfully used contractual crop production arrangements with farmers for many years. The basic premise of the corn silage contract between two producers is that an agreed upon price would be paid per ton of corn silage produced. All tillage, planting, and weed control operations would be done by the landowner/grower. In addition, the grower would be responsible for all input costs up to the point when the crop is harvested. The dairy producer offering the contract would most often be the party responsible for harvesting the crop. This paper will address the feasibility of such arrangements for corn silage.

Advantages of a Corn Silage Contract

For the grower:

Unlike a land rental arrangement, the landowner/grower is still given the opportunity to farm his or her land and offered a competitive return for their labor and management. In addition, corn silage is a

Given that the grower is offered a competitive price based on expected yield of corn silage versus an alternative crop enterprise, there really are few disadvantages. If the alternative crop is a commodity like corn or soybeans, the grower will not be able to take advantage of unanticipated price increases between planting and harvest. This could be overcome if a contract was structured to float the corn silage price

relatively low-risk crop compared to many other vegetable and field crops. Corn silage yields are much less sensitive to extreme environmental conditions than yields of vegetable crops (e.g. sweet corn, canning peas, etc.). If the alternative is growing field corn for grain, corn silage yields follow closely to that of grain and are less sensitive to conditions that impact plant maturity such as a late planting date, a cool summer, or an early fall frost. With a corn silage contract, the harvest price is known at the beginning of the growing season and not subject to the volatility of the grain market. Also, the crop is harvested earlier in the fall (usually by the dairy producer offering the contract) to allow more time for fall tillage.

For the dairy producer:

In areas where land for rent or sale is limited, a contractual arrangement may offer the only alternative for meeting forage needs on acreage that is within a reasonable proximity to storage facilities. A corn silage contract also enables the dairy producer to acquire additional feed without expending time, labor, and machinery inputs during the planting season when timeliness to plant other owned or rented crop acres is critical. In some years, corn planting may interfere with first crop hay harvesting efforts as well. Knowing what will be paid for corn silage in advance of the growing season will be beneficial for enterprise budgeting.

Disadvantages of a Corn Silage Contract

For the grower:

with that of the alternative commodity. However, an agreement by both parties is needed and the grower must also realize there is the risk of price decline from planting to harvest. Another disadvantage is that the grower will be on his or her own to insure payment in accordance with the contract terms. Effectively, the grower will be serving as an unsecured creditor.

For the dairy producer:

Two primary disadvantages exist for the dairy producer. Each is variable in scope depending upon the individual situation. First, the dairy producer loses some control over the production of utilized feed in terms of planting, fertilizing, and weed control. This is why it is important to know the management skills of the grower and perhaps incorporate into the contract specific production expectations with reasonable allowances for uncooperative weather. Most growers realize that poor management will translate into fewer dollars returned from reduced yield. Secondly, there is the realization that renting bare crop land and being responsible for all production inputs will often result in cheaper feed being produced per ton than entering into a contractual arrangement. However, we need to be mindful that corn silage contracts are not meant to replace other production alternatives but rather offer an opportunity to meet forage needs where land, time, and labor resources on the dairy farm are limited. An additional disadvantage is that time must be taken to weigh production off the field.

Contract Considerations

As noted previously, the first important consideration is that a trusting dairy producer - grower relationship be formed and each party enters the contract in good faith. A written contract is binding and cannot be broken without mutual consent from both individuals. The dairy producer must be confident in the grower's management skills to produce high yields of a quality product. The grower must be sure that he or she will be paid in accordance with the contract terms from the standpoint of amount and time. A letter from the dairy producer's credit institution reassuring the grower that payment has been budgeted in a line of credit or cash placed in escrow for payment of a corn silage contract can be used to reduce the risk of non-payment.

Once these criteria are established, details of the contract can be formulated. The contract can be relatively simple but should include some general expectations in terms of seeding rate, planting date, fertilizer application, and weed control. The dairy producer may want to stipulate the hybrid to be planted

given the variation in silage performance. This should not be considered an unreasonable request and has long been practiced by the canning industry. The contract must also contain payment terms to include both time and amount.

Determining a Fair Price

The grower of the corn silage will need to realize a return equal to or greater than the alternative enterprise being considered. For this reason, full or partial crop enterprise budgets must be developed for both corn silage and the alternative crop to arrive at a competitive price for the corn silage. Agricultural Budget Calculation Software (ABCS) developed by Gary Frank, UW Extension Farm Management Specialist, can be used for this purpose. If the alternative crop is corn for grain, obviously the input costs will be identical unless a more expensive hybrid is selected for growing silage. In this case, the price paid for silage will have to be competitive with the expected return for grain less the harvesting, storage, and marketing costs. To further understand this method, let's take a look at two examples.

In the first scenario, assume the alternative enterprise is growing corn for cash grain. The dairy producer will be doing the harvesting. First, determine a base price you expect to receive for the cash corn. We'll use \$2.50 per bushel. From this price, subtract off those costs that you will not incur if corn silage is grown. This is done as follows:

Base Price:	\$2.50* / bu
- Harvesting	\$0.15*
- Drying (8 points@\$0.02/point)	\$0.16*
- Storage (6 months) and Hauling	<u>\$0.15*</u>
ADJUSTED NET PRICE	\$2.04*

**Note: These figures are used as an example only. Each farm situation will be different and must be calculated accordingly*

Next, estimate a realistic yield level. In our example, we'll assume 140 bushels per acre resulting in a per acre return of \$285.60 (\$2.04 x 140). We'll also assume that a premium corn silage hybrid will be grown at an additional cost of \$20 per bag or \$8.70 per acre (assumes 2.3 acres planted per bag). Consider that corn silage removes an additional 90 lbs. of potassium (as K₂O) from crop fields compared to corn for grain. Valued at \$0.14 per pound, this amounts to an additional expense of \$12.60 per acre. Add these additional costs to the expected per acre cash return for a total of about \$307 (285.60 + 8.70 + 12.60). This is the amount per acre that must be exceeded by the gross return from contracting corn silage. Or, looking at it another way, \$307 divided by the expected corn silage yield (corrected to 65% moisture) results in the break-even price needed for corn silage to match net returns from growing cash grain (e.g. if we expect 20 tons per acre, the break-even price needed would be \$15.30 per ton).

In a second example, let's assume the dairy producer has contacted his neighbor and would like to contract corn silage acreage. The neighbor is willing to give-up some sweet corn acres if the price is right. The canning company is offering \$51 per ton for sweet corn and the neighbor's five-year average yield is about 5 tons per acre for an expected gross return of \$255.00 per acre. Tillage, planting, and weed control field operations for the two crops are essentially the same. Thus, most cost differences will come from the variable

input side in the form of fertilizer, seed, and herbicide. The ABCS program will also calculate input interest differences, however, these will typically not be large. Based on output from the ABCS budget analysis using 1997 actual costs, the expenses for these various inputs are presented in Table 1.

In this example, it will cost \$20.53 more to produce an acre of corn silage compared to sweet corn (Table 1). Adding this amount to the \$255.00 of expected gross revenue for sweet corn results in a total of \$275.53. The two parties agree that an equivalent corn silage yield to 5 tons per acre of sweet corn would be about 15 tons of silage per acre (as fed). Dividing \$275.53 by 15 results in a comparable corn silage price of \$18.37 per ton.

In addition to the obvious cost differences of inputs, also consider other factors that might influence both the final decision and price. In the second example, there may be the need for additional sweet corn insecticide expenses not usually incurred for field corn. Also, herbicide options are greater with field corn versus sweet corn. There is also less risk of large sweet corn harvesting equipment rutting fields and causing compaction problems if soils are wet when the crop is ready to harvest. Lastly, sweet corn is more yield sensitive to adverse weather conditions than is corn for silage.

Table 1. Variable input cost differences for the production of sweet corn and corn silage for example farm			
Input	Cost (\$) / acre		Difference
	Sweet Corn	Corn Silage	
Seed	34.10	31.33	2.77
Nitrogen fertilizer	31.25	40.63	(9.38)
Starter fertilizer	13.95	16.27	(2.32)
K removal (90 lbs.)	---	12.60	12.60
Herbicide	33.94	32.15	1.79
Input interest	7.40	8.19	(0.79)
TOTAL	\$120.64	\$141.17	\$(20.53)

Although some of these factors may be difficult to assign an actual dollar value, they should be included when making a final price decision. Such factors will vary depending on the alternative crop enterprise. Also, when the final price is determined, the dairy producer must be sure the price is competitive with other feed procurement alternatives (e.g. buy more hay and grow more corn silage on owned acres).

Both grower and dairy producer must also consider any ramifications related to the federal farm program. Perhaps the grower may benefit from additional government program payments by growing field corn versus sweet corn. Conversely, the dairy producer may lose some government program benefits by not growing field corn on the farm's full base acreage. Remember, however, the grower must remain the primary risk-taker in growing the crop to receive payments under the current federal farm program. Check with your local Farm Service Agency office to verify your obligations.

Making Adjustments for Moisture

The price for corn silage agreed upon by the two contracting farm units must be based on a benchmark forage moisture content. In the situation where the dairy producer will do the harvesting, the risk is entirely on him or her to harvest at the desired moisture level. The grower must receive the same gross payment regardless of whether the silage comes off the field at 70% or 60% moisture. Table 2 can be used make adjustments in price for varying moisture levels once a set price for 65% moisture corn silage is agreed upon. For example, corn silage valued at \$18.00 per ton (65% moisture) changes in value from \$15.43 per ton if harvested at 70% moisture to \$20.57 per ton if harvested at 60% moisture. The impact of moisture on price is too great to be simply disregarded.

If a situation exists where the grower will also do the harvesting, it is the grower's responsibility to deliver a quality product. In this case, price discounts are established when whole plant moisture falls outside of an acceptable range.

Accurate moisture estimates must be made throughout the harvest process and be done on a field by field basis. Samples can be taken and sent to any accredited Wisconsin forage testing laboratory or done by the individuals using a gram scale and microwave oven (a bulletin is available from your UW-Extension office outlining the protocol for this relatively easy on-farm method). Most importantly, take multiple samples on a field by field basis to acquire an accurate estimate.

Get an Accurate Yield Estimate

In a contractual arrangement where the grower is paid based on yield per acre, reasonably accurate estimates of yield are critical. To do this, some or all loads of silage will need to be weighed across a scale. In some situations this may cause an inconvenience but it is clearly necessary to be fair for both parties. No commodity or vegetable crop is bought or sold without being weighed. In the case of corn silage, representative strips across a field can be measured and weighed to determine a whole field yield per acre average. Another alternative is to only weigh representative loads if all loads are filled to about the same capacity. Of course the most accurate method is to weigh all silage coming off the field. Whatever system is used, it should be agreed upon by both the grower and dairy producer.

Summary

Contracting corn silage acres may prove to be a useful arrangement for some Wisconsin dairy managers. This type of arrangement holds benefits for both the grower and dairy producer, especially in areas where land for sale or rent is scarce and time or labor resources are limited on the dairy farm. The price paid for corn silage needs to be competitive with alternative crop enterprises. Accurate estimates of forage yield and moisture are important to be fair to both the grower and dairy producer.

Table 2. Pricing Corn Silage at Different Moisture Levels

Silage Moisture	Base Price per Wet Ton @ 65% Moisture													
	\$10.00	\$11.00	\$12.00	\$13.00	\$14.00	\$15.00	\$16.00	\$17.00	\$18.00	\$19.00	\$20.00	\$21.00	\$22.00	\$23.00
75	\$7.14	\$7.86	\$8.57	\$9.29	\$10.00	\$10.71	\$11.43	\$12.14	\$12.86	\$13.57	\$14.29	\$15.00	\$15.71	\$16.43
74	\$7.43	\$8.17	\$8.91	\$9.66	\$10.40	\$11.14	\$11.89	\$12.63	\$13.37	\$14.11	\$14.86	\$15.60	\$16.34	\$17.09
73	\$7.71	\$8.49	\$9.26	\$10.03	\$10.80	\$11.57	\$12.34	\$13.11	\$13.89	\$14.66	\$15.43	\$16.20	\$16.97	\$17.74
72	\$8.00	\$8.80	\$9.60	\$10.40	\$11.20	\$12.00	\$12.80	\$13.60	\$14.40	\$15.20	\$16.00	\$16.80	\$17.60	\$18.40
71	\$8.29	\$9.11	\$9.94	\$10.77	\$11.60	\$12.43	\$13.26	\$14.09	\$14.91	\$15.74	\$16.57	\$17.40	\$18.23	\$19.06
70	\$8.57	\$9.43	\$10.29	\$11.14	\$12.00	\$12.86	\$13.71	\$14.57	\$15.43	\$16.29	\$17.14	\$18.00	\$18.86	\$19.71
69	\$8.86	\$9.74	\$10.63	\$11.51	\$12.40	\$13.29	\$14.17	\$15.06	\$15.94	\$16.83	\$17.71	\$18.60	\$19.49	\$20.37
68	\$9.14	\$10.06	\$10.97	\$11.89	\$12.80	\$13.71	\$14.63	\$15.54	\$16.46	\$17.37	\$18.29	\$19.20	\$20.11	\$21.03
67	\$9.43	\$10.37	\$11.31	\$12.26	\$13.20	\$14.14	\$15.09	\$16.03	\$16.97	\$17.91	\$18.86	\$19.80	\$20.74	\$21.69
66	\$9.71	\$10.69	\$11.66	\$12.63	\$13.60	\$14.57	\$15.54	\$16.51	\$17.49	\$18.46	\$19.43	\$20.40	\$21.37	\$22.34
65	\$10.00	\$11.00	\$12.00	\$13.00	\$14.00	\$15.00	\$16.00	\$17.00	\$18.00	\$19.00	\$20.00	\$21.00	\$22.00	\$23.00
64	\$10.29	\$11.31	\$12.34	\$13.37	\$14.40	\$15.43	\$16.46	\$17.49	\$18.51	\$19.54	\$20.57	\$21.60	\$22.63	\$23.66
63	\$10.57	\$11.63	\$12.69	\$13.74	\$14.80	\$15.86	\$16.91	\$17.97	\$19.03	\$20.09	\$21.14	\$22.20	\$23.26	\$24.31
62	\$10.86	\$11.94	\$13.03	\$14.11	\$15.20	\$16.29	\$17.37	\$18.46	\$19.54	\$20.63	\$21.71	\$22.80	\$23.89	\$24.97
61	\$11.14	\$12.26	\$13.37	\$14.49	\$15.60	\$16.71	\$17.83	\$18.94	\$20.06	\$21.17	\$22.29	\$23.40	\$24.51	\$25.63
60	\$11.43	\$12.57	\$13.71	\$14.86	\$16.00	\$17.14	\$18.29	\$19.43	\$20.57	\$21.71	\$22.86	\$24.00	\$25.14	\$26.29
59	\$11.71	\$12.89	\$14.06	\$15.23	\$16.40	\$17.57	\$18.74	\$19.91	\$21.09	\$22.26	\$23.43	\$24.60	\$25.77	\$26.94
58	\$12.00	\$13.20	\$14.40	\$15.60	\$16.80	\$18.00	\$19.20	\$20.40	\$21.60	\$22.80	\$24.00	\$25.20	\$26.40	\$27.60
57	\$12.29	\$13.51	\$14.74	\$15.97	\$17.20	\$18.43	\$19.66	\$20.89	\$22.11	\$23.34	\$24.57	\$25.80	\$27.03	\$28.26
56	\$12.57	\$13.83	\$15.09	\$16.34	\$17.60	\$18.86	\$20.11	\$21.37	\$22.63	\$23.89	\$25.14	\$26.40	\$27.66	\$28.91
55	\$12.86	\$14.14	\$15.43	\$16.71	\$18.00	\$19.29	\$20.57	\$21.86	\$23.14	\$24.43	\$25.71	\$27.00	\$28.29	\$29.57
	Equivalent Price per Ton of Dry Matter													
	\$28.57	\$31.43	\$34.29	\$37.14	\$40.00	\$42.86	\$45.71	\$48.57	\$51.43	\$54.29	\$57.14	\$60.00	\$62.86	\$65.71