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Considerations for Increasing Corn Silage to Support a Large Dairy

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News that a large dairy is being built in Richland County near the community of Abercrombie has crop producers interested in how it might impact the crops they produce and the prices they receive for them. Many producers have questions about the new dairy's expected demand for the significant quantities of corn silage required. Rough estimates suggest that the 12,500-head dairy will require about 80,000 tons of corn silage yearly.

There are economic opportunities for supplying corn silage to the new dairy, but these opportunities will primarily be limited to farmers operating within a few miles of the new dairy. Farmers interested in providing corn silage to the new dairy should spend some time up front to do the necessary financial planning and budgeting before agreeing to supply the new dairy with corn silage.

Corn silage is a high-energy feed commonly used by beef, dairy and sheep operations. Table 1 reports the average number of acres harvested, total production and average yield of corn silage and corn grain produced in Richland County and seven adjacent counties (USDA, 2024). On average, Richland County farmers produced 44,673 tons of silage per year between 2012 and 2022, and the eight-county region produced a total of 324,220 tons per year.

Table 1. Average (2012 - 2022) Number Acres Harvested, Total Production, and Yield of Corn Silage and Corn Grain in Richland County and Adjacent Counties

County, State, County Seat	Silage Acres Harvested	Silage Production (tons/year)	Silage Yield (tons/acre)	Corn Acres Harvested	Corn Production (bu/year)	Corn Yield (bu/acre)
Richland, North Dakota, Wahpeton	2,588	44,673	17.30	272,786	46,171,714	170
Cass, North Dakota, Fargo	1,492	18,014	14.61	278,271	45,379,714	163
Ransom, North Dakota, Lisbon	4,466	63,411	14.18	92,183	16,001,500	174
Sargent, North Dakota, Forman	1,436	22,141	16.35	122,614	20,617,714	168
Big Stone, Minnesota, Ortonville	1,474	15,148	14.21	85,286	23,616,000	180
Traverse, Minnesota, Wheaton	4,078	83,123	19.46	134,043	23,779,857	177
Wilkin, Minnesota, Breckenridge	1,043	19,208	17.85	122,467	19,760,000	161
Roberts, South Dakota, Sisseton	3,873	58,503	15.45	145,250	24,985,167	172
8-county region total/average	20,450	324,220	16.17	1,252,900	220,311,667	171

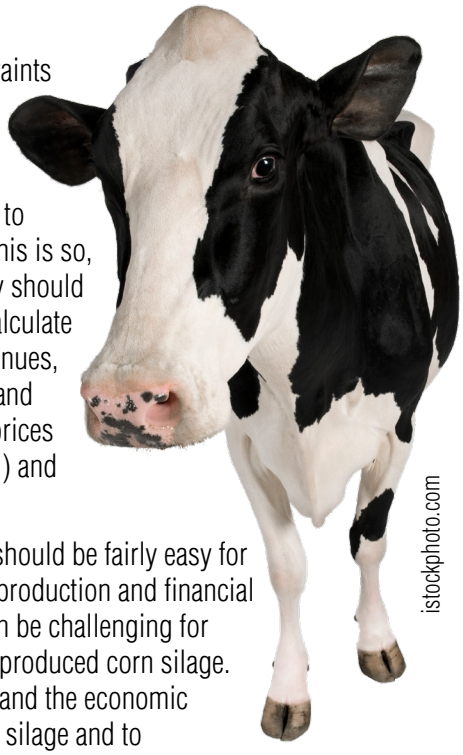
Source: https://quickstats.nass.usda.gov/

Unlike corn grain, which is more cost-effective to transport longer distances, the economics of corn silage falls apart when it must be transported longer distances. As a result, the entire quantity of silage produced in each county reported in Table 1 is presumably used by beef, dairy and sheep producers operating in their respective counties. Of course, there can be trade of silage between silage producers and livestock producers that reside near each other on a county line, but I suspect the total quantity of this trade is small relative to the total supply produced in each county. As a result, the new expected demand of silage of 80,000 tons per year is how much additional silage farmers in Richland County will need to produce for the new dairy.

Using the average yield and quantity of silage production in Richland County (Table 1), it will require about 4,624 acres of cropland currently used to produce corn for grain to produce corn silage to supply the new dairy (i.e., 80,000/17.3). Of course, the expected acres needed will vary depending on the yield and quality of corn silage produced each year. For example, if there is a 20% variation in yield from one year to the next, then the number of corn acres needed for silage would range between 3,700 and 5,550 acres. This variation will need to be considered when deciding upon a price of the silage farmers will need.

Conversely, increasing the quantity of silage to meet the new demand for the dairy is expected to result in a loss of some of the corn grain typically produced and used in the county, assuming other crops like wheat and soybeans are not displaced to grow the silage. If the cropland used to produce crops other than corn (outside of a rotation) are not used to produce silage, then using the past five-year county average corn yield of 170 bushels per acre, Richland County can expect a reduction in the average corn grain produced in the state by 786,127 bushels (170 bushels on 4,624 acres). This reduction will not impact the price of corn in Richland County because agribusinesses and livestock producers already use more corn grain each year than what is produced in the county, and corn farmers in neighboring counties are supplying the shortfall. The neighboring counties will easily be able to supply the anticipated additional shortfall when farmers shift away from producing corn for grain to produce corn silage for the new dairy.

Providing an exact, generalized estimate of the added benefit on a price-per-acre basis to farmers interested in producing corn silage for the new dairy is difficult, mostly because each farm has a different set of constraints and access to scarce resources such as farm size, growing conditions, access to labor and access to financial capital. Because this is so, farmers in Richland County should do their due diligence to calculate estimates for expected revenues, costs, net returns ($/acre) and corresponding breakeven prices for corn for grain ($/bushel) and silage ($/ton).



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Calculating corn for grain should be fairly easy for producers who keep good production and financial records. Corn for silage can be challenging for producers who have never produced corn silage. Both are needed to understand the economic tradeoffs between corn and silage and to determine the price needed ($/ton) for corn silage in order to pencil in a reasonable return necessary to make the adjustments on the farm (such as changes in management, labor, machinery and risk management) that will be required to shift from producing grain to silage.

Farmers who do not have historical records might consider using the Projected Crops Budget for corn grain developed by North Dakota State University Extension economists. Such a budget can help a producer understand the type of information needed to calculate net margins and breakeven prices for corn grain or any other kind of crop enterprise. The downloadable Projected Crops Budgets can be found at www.ndsu.edu/agriculture/ag-hub/ag-topics/farm-management/crop-economics/projected-crop-budgets.

Calculating expected net returns, breakeven prices and yields for corn silage can be more challenging. In this case, the Corn Silage Decision Tool can help develop estimates for revenues, costs, and net returns ($/acre) for their specific farm. This resource is found at www.ndsu.edu/agriculture/ag-hub/corn-silage-decision-tool.

Feel free to contact me with additional questions at jon.biermacher@ndsu.edu.

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