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What is the Expected Value of Feed for Two Large Dairies?

Jon T. Biermacher, Professor of Practice and Extension Livestock Development Specialist

On July 9, 2024, the North Dakota Monitor reported that Riverview plans to build two large confined dairies in North Dakota: a 25,000-head dairy near Hillsboro in Traill County and a 12,500-head dairy near Wahpeton in Richland County. Total investment in the Traill County dairy is expected to be $180 million and will create about 100 jobs, while the investment in the Richland County dairy is expected to be $90 million and require about 45 jobs. The full article is at https://northdakotamonitor.com/2024/07/09/huge-dairy-farms-planned-for-eastern-north-dakota/.

Needless to say, these investments will provide incredible opportunities for these communities, especially for local farmers who will be providing most of the feed needed to support them. To provide some perspective about the scale of the feed requirements of these two dairies, I have made some rudimentary calculations of how much feed will be needed each year to support both dairies and an estimate of the feed value.

Table 1 reports the expected feed requirements by ingredient on a pounds-per-cow-per-year basis for a modern confined dairy managing cows expected to produce an average of 24,000 lbs. of milk per cow per year (typical for such dairies). For my calculations, I used the quantities of individual feed ingredients for a typical ration for cows in a conventional confined dairy published by University of Missouri Extension, which is at https://extension.missouri.edu/publications/g676.

Table 1. Expected Feed Requirements by Ingredient for a Conventional Dairy that Produces an Average of 24,000 Pounds of Milk Per Cow per Year

	Lactatating Cow Diet		Dry Cow Diet		Total
Ingredient*	**Quantity** (lb/day)	**Quantity** (lb/cow/yr)	**Quantity** (lb/day)	**Quantity** (lb/cow/yr)	**Quantity** (lb/cow/yr)
Corn silage	40.25	12,357	17.25	1,001	13,357
Alfalfa baleage	17.25	5,296	0	0	5,296
Alfalfa hay	6.30	1,934	0	0	1,934
Grass hay	0.00	0	15.75	914	914
Corn, ground	11.33	3,478	3.09	179	3,658
Soybean meal	4.12	1,265	1.545	90	1,354
Dry distillers grain	3.09	949	0	0	949
Soybean hulls	2.06	632	2.06	119	752
Whole cotton seed	6.18	1,897	0	0	1,897
Minerals/vitamins	2.04	626	0.51	30	656

* Ingredients and quantities of ingredients were obtained from University of Missouri Extension. Found at: https://extension.missouri.edu/publications/g676 [accessed Aug. 25, 2024].

Riverview's diets may vary some from those reported in Missouri. For example, Riverview might use barley silage instead of whole cottonseed. Nonetheless, this data will give us a good idea about the magnitude of the total feed ingredients needed each year for a typical dairy ration used in a confined dairy. The data include quantities of individual ingredients for the time of year when cows are lactating and for the period when cows are dry. Also, I do not include feed requirements for replacement heifers being developed in-house because large dairies typically have their heifer calves developed off-farm, which is the practice that Riverview follows, as I understand it.

In Table 2, I report for each location total quantities of each feed ingredient on a tons-per-year basis and the corresponding values of each feed ingredient based on prices from various USDA market reports for August 2024. The magnitude of these values is incredible and provides useful information to farmers about the sheer scale of the feed these two large dairies will require. These values are based on one set of prices for the various feed ingredients. Without a more detailed evaluation, it is difficult to say if this set of prices reflects a long-term average. However, in any case, when prices are higher than average, the values of feed will also be higher, and in instances when prices are lower than average, the values will be lower. Either way, the magnitude of the value will be significant.

A good deal of coproduct feed from corn ethanol and soybean crush plants will be needed (i.e., 8,893 tons of DDGS, 12,698 tons soybean meal and 7,049 tons of pelleted soybean hulls), providing for a new alternative market for those products that have a value somewhere in the neighborhood of $4.3 million annually.

In addition to the opportunity for local producers to market their feed directly (or, in some cases, indirectly) to these two large dairies, there is potential benefit for local producers to obtain nutrients in the form of cow manure to put back on some of their cropland acres. In an upcoming article, I will attempt to calculate the quantity of manure that will be available and provide an estimate for how many acres the annual supply of manure can be applied to each year.

Please feel free to contact me with any questions at jon.biermacher@ndsu.edu.

Table 2. Quantity and Value of Feed Required by Feed Ingredient and Location of Dairy

Ingredient	Quantity (lb/cow/year)	Quantity Hillsboro (tons/year)	Quantity Wahpeton (tons/year)	Price* ($/ton)	Value Hillsboro ($/year)	Value Wahpeton ($/year)	Total value ($/year)
Corn silage	13,357	166,966	83,483	60	10,017,938	5,008,969	15,026,906
Alfalfa baleage	5,296	66,197	33,098	110	7,281,656	3,640,828	10,922,484
Alfalfa hay	1,934	24,176	12,088	250	6,044,063	3,022,031	9,066,094
Grass hay	914	11,419	5,709	90	1,027,688	513,844	1,541,531
Corn, ground	3,658	45,719	22,860	160	7,315,060	3,657,530	10,972,590
Soybean meal	1,354	16,931	8,465	325	5,502,453	2,751,227	8,253,680
Dry distillers grain	949	11,858	5,929	150	1,778,681	889,341	2,668,022
Soybean hulls	752	9,399	4,699	130	1,221,838	610,919	1,832,756
Whole cotton seed	1,897	23,716	11,858	375	8,893,406	4,446,703	13,340,109
Minerals/vitamins	656	8,198	4,099	1,000	8,198,250	4,099,125	12,297,375
Total	—	—	—	—	57,281,032	28,640,516	85,921,548

The Hillsboro dairy plans to have a 25,000-cow herd and the Wahpeton dairy will have a 12,500-cow herd. Quantities reflect cows that are expected to produce, on average, 24,000 pounds of milk per head per year.

* Prices of feed were obtained from various USDA market reports on Aug. 25, 2024.