Agriculture By the Numbers

September 2024

NDSU Extension Agribusiness and Applied Economics

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2024 Early Season North Dakota Custom Farm Work Rates Released

Ron Haugen, Farm Management Specialist

The results of the North Dakota 2024 early season custom farm work rates survey have been released.

This survey is conducted by USDA's National Agricultural Statistics Service North Dakota Field Office and contains state-level custom work rates for land tillage, planting, fertilizer and pesticide application, haying operations and other custom work.

The survey is done in two parts: early season operations and late-season operations. The early season operations survey is for spring and summer activities, such as planting, tillage, pesticide application and haying. The late-season operations survey includes fall work, such as harvest, grain drying and hauling. The late-season survey will be conducted in the fall of 2024, and results are set to be released late 2024.

These surveys are done every four years and are funded by the North Dakota Agricultural Experiment Station and NDSU Extension. Appreciation is given to these agencies and all survey participants.

The 2024 early season operations survey summarized about 1,420 reports from farmers, ranchers, aerial sprayers, elevators and custom operators. The survey shows the number of reports for each operation, the range in rates, the most frequently reported rates and the average rate for each operation. It also compares the current rates to the 2020 rates, which is the last time the survey was conducted. Custom rates include charges for machines and equipment, tractor and power units, fuel, repairs and operator labor.

In comparing the 2024 early season rates with 2020, rates for 2024 were much higher, as expected, with the inflation pattern the economy is in. In comparing all early season operations, rates increased almost 30% from 2020. Increases varied by type of operation. Historic rates are shown in these three charts.

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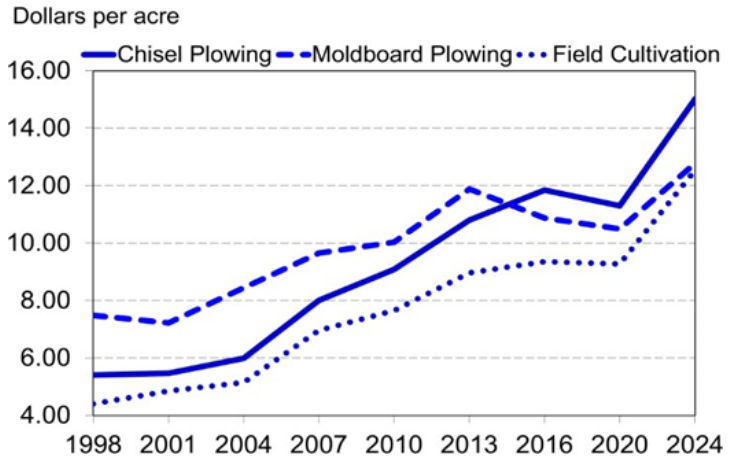
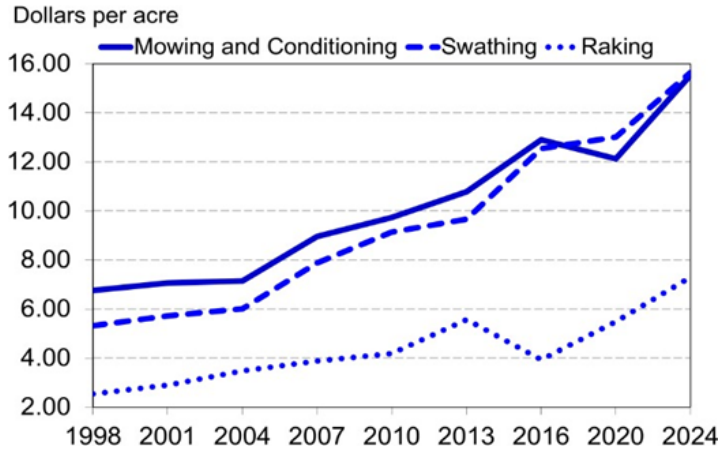
2024 Early Season North Dakota Custom Farm Work Rates Released — continued from page 1

Land Tillage — Average Rate: 1998-2024



USDA National Agricultural Statisics Service

Haying Operations — Average Rate: 1998-2024



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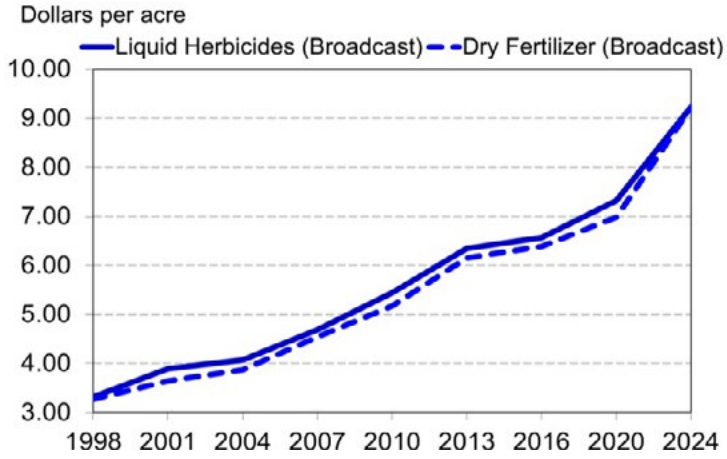
Chemical Applications — Average Rate: 1998-2024



USDA National Agricultural Statisics Service

The early season operations survey results can be found on the NDSU Extension farm management page at www.ndsu.edu/agriculture/ag-hub/ag-topics/farm-management/north-dakota-custom-rates.

Beef Cow Herd Restocking Hurdles

Tim Petry, Extension Livestock Marketing Specialist

The semiannual USDA National Agricultural Statistics Service (NASS) Cattle inventory report is usually released at the end of July. Unfortunately, NASS did not release the report this year due to budgetary constraints. The report would have helped answer several important questions that are critical to predict cattle prices at this stage of the cattle cycle.

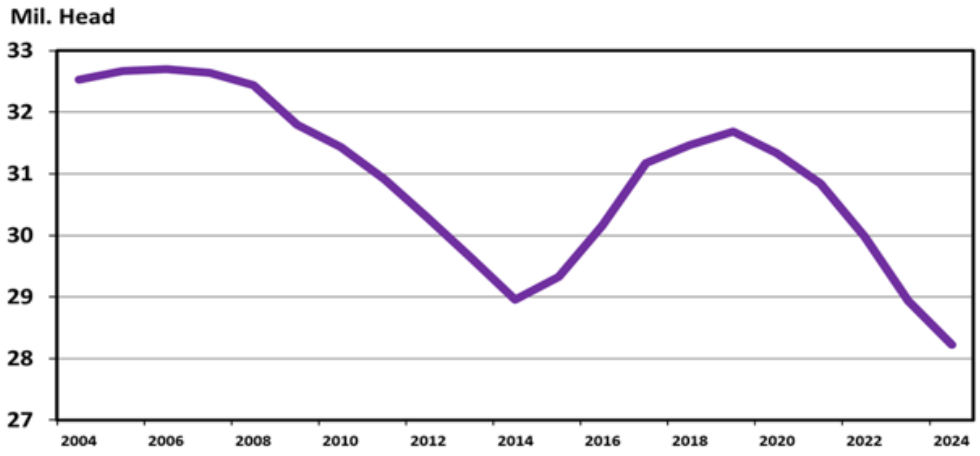
Usually when cattle numbers are cyclically low and cattle prices are record high, and pasture and range conditions have improved, there are early signs of beef cow herd restocking. An increased number of beef replacement heifers compared to a year ago could be an early signal. Also, the July report would be the first NASS estimate of the size of the 2024 calf crop.

So, we will have to wait until January 2025 to see what the NASS official estimate of the U.S. cattle inventory is. That report will be at https://usda.library.cornell.edu/concern/publications/h702q636h.

We do know that the latest Cattle report released Jan. 31, 2024, reported the Jan. 1 U.S. beef cow herd at 28.2 million head. That was the fifth straight year of beef cow liquidation from the cyclical peak in 2019. 2024 will likely be the sixth year of declining numbers.

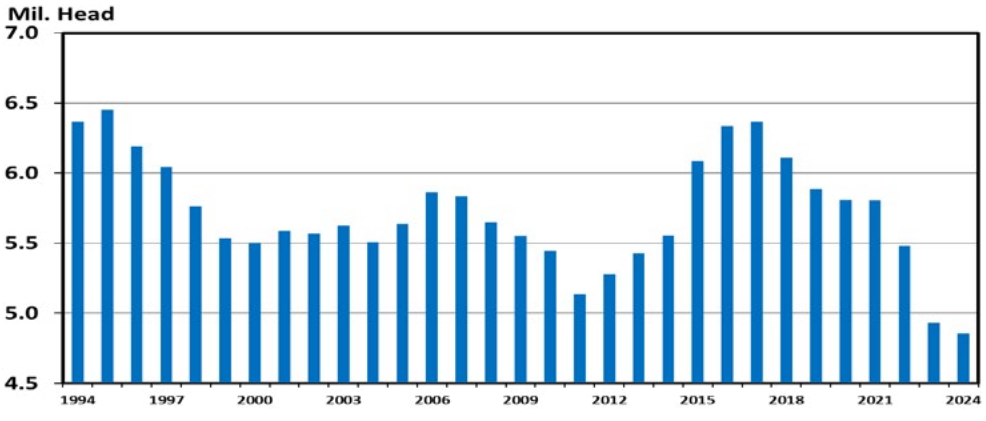
NASS reported the Jan. 1, 2024, U.S. beef replacement heifer inventory at 4.86 million head, a decline of 71,300 head (1.5%) from the 4.93 million head in 2023 and the lowest number since 1950. So, the availability of heifers for herd rebuilding is a hurdle.

January 1 Beef Cow Inventory — U.S., Annual



Source: USDA NASS

Heifers Held as Beef Cow Replacements — January 1, U.S.



Source: USDA NASS

After the last cyclical low in beef cow numbers on Jan. 1, 2014, much-improved moisture conditions allowed herd rebuilding to start in earnest. But, there were more replacement heifers available then than now. Compared to the 4.86 million heifers available to begin 2024, there were 5.56 million heifers available to begin 2014 and 6.09 million available in 2015.

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Beef Cow Herd Restocking Hurdles

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Drought-forced liquidation likely has stalled, and the beef cow herd has stabilized. USDA reports 21% of cattle currently are in drought-impacted areas, up from 8% in early June. That compares to 76% of cattle in drought at the worst of the drought in October 2022.

Beef cow slaughter is down 16% year over year.

But there are few, if any, signs to indicate that measurable herd expansion has occurred yet.

NASS releases a monthly Cattle on Feed report that on a quarterly basis also reports the number of heifers on feed. This report can give another indication if heifers are being held for beef herd expansion. The July report is the latest with heifer numbers and is at https://usda.library.cornell.edu/concern/publications/m326m174z.

The report indicated that the percentage of heifers on feed was still historically high at 39.6% of cattle on feed. During the last cyclical beef cow herd expansion, the percentage of heifers on feed in the July report was 32.5% in 2015, 33.7% in 2016, 35.6% in 2017 and 36.8% in 2018.

On Jan. 1, 2024, the Northern Plains states of North Dakota, South Dakota, Montana, Minnesota and Nebraska all showed increases in beef replacement heifers from last year, which may be an early sign of optimism.

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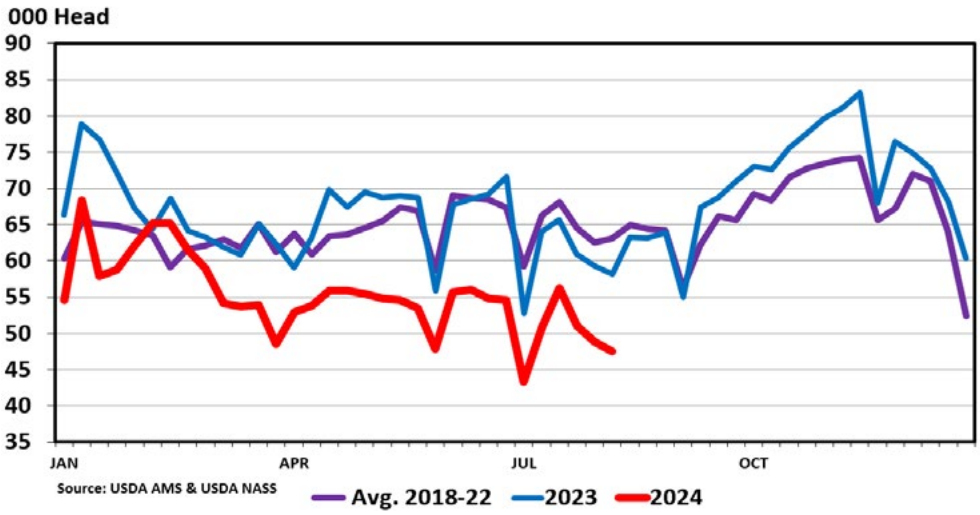
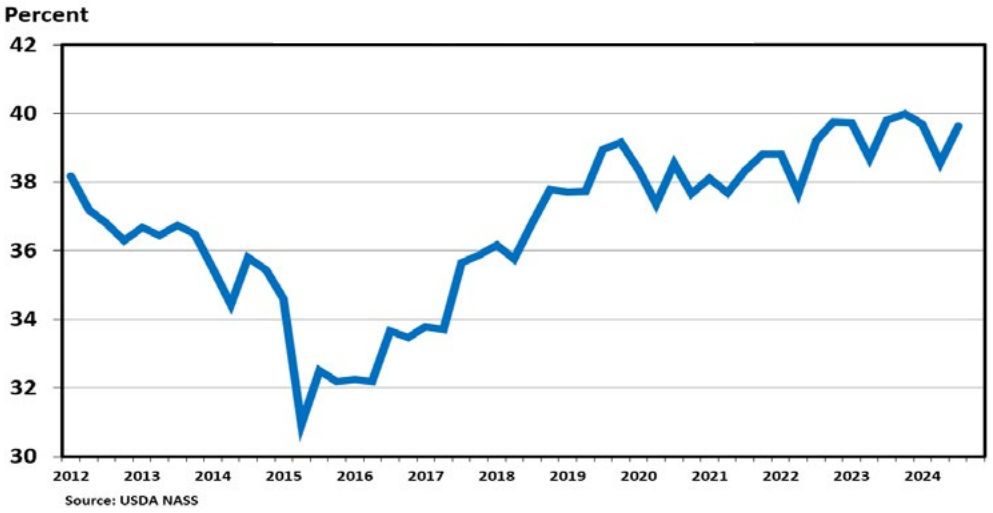
Beef Cow Slaughter — Federally Inspected, Weekly



Heifers On Feed as a Percent of Total Cattle On Feed — U.S., Beginning of Quarter



Beef Cow Herd Restocking Hurdles

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Beef replacement heifers in North Dakota were at 163,000 head, increased from the 157,000 in 2023.

More beef replacement heifers are expected to be retained in the U.S. this fall, but regional drought conditions will dictate to what extent. Production cost inflation, elevated interest rates, remembering the rather abrupt decline in cattle prices after the last cyclical cattle price peak in 2014-15 and labor availability also may be hurdles.

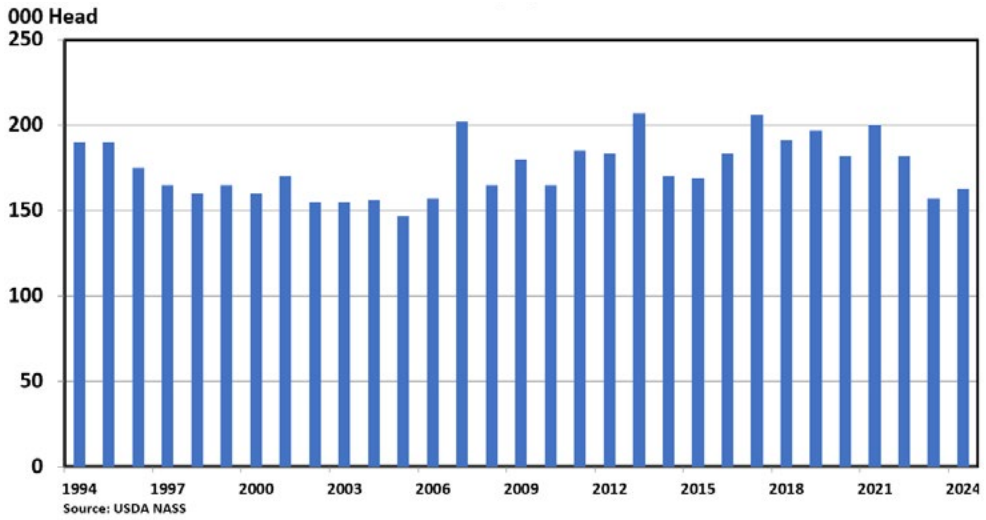
The highest cyclical cattle prices occur when beef cow herd rebuilding is in full swing. Increased heifer retention, reduced cow slaughter and lower beef production will buoy prices.

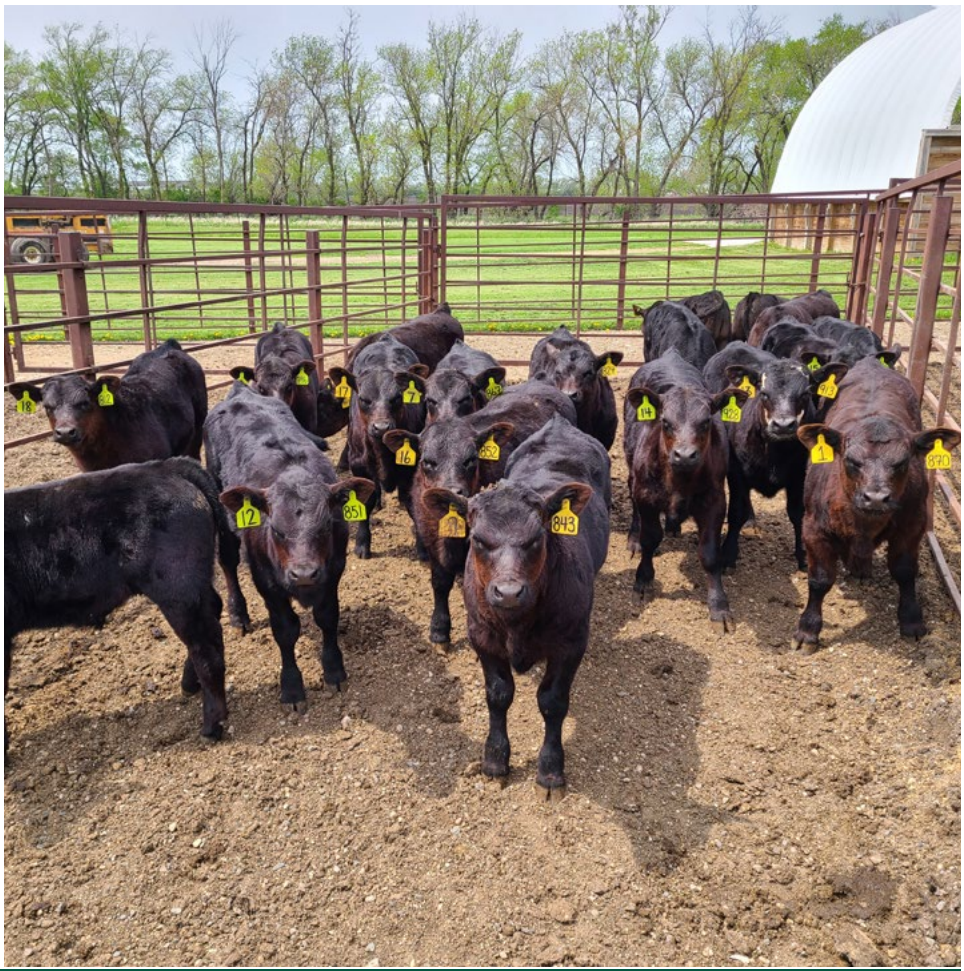
So, high cattle prices are expected for the next couple years.

Even though cyclical higher prices are expected, seasonal price patterns still occur during the year. So, for example, calf and cull cow prices likely will be lower in October and November than they were in midsummer.

Price volatility, especially in the futures market, likely will continue. Drought conditions linger in a few areas, the size of the 2024 corn crop is yet to be determined, domestic and export beef demand face headwinds, and geopolitical tensions continue around the world.

Heifers Held as Beef Cow Replacements — January 1, N.D.





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What is the value of the feed needed to support the two Riverview dairies?

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

On July 9, 2024, Jeff Beach of the *North Dakota Monitor* reported that Riverview Dairy, LLC plans to build two very large modern confined dairies in North Dakota, including a 25,000-head dairy near the community of Hillsboro in Trail County and a 12,500-head dairy near the community of Wahpeton in Richland County. Total investment in the Trail County dairy is expected to be $180 million and will create about 100 jobs, while the investment in the Richland dairy is expected to be $90 million and require about 45 jobs. The full article can be found 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 and regional farmers that 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 to show how much feed will be needed each year to support both dairies, and an estimate of the value the feed might be worth.

Table 1. reports the expected feed requirements by ingredient on a pounds-per-cow-per-year basis for a modern confined dairy that manages cows that are expected to produce an average of 24,000 pounds of milk per cow per year, which is typical for such diaries. For my calculations, I used the quantities of individual feed ingredients for a typical ration for cows in a conventional confined dairy published by the University of Missouri's Cooperative Extension Service, which can be found at: https://extension.missouri.edu/publications/g676.

Riverview's diets may in fact vary some from those reported in Missouri, but this data will suffice to give us a good idea about the magnitude of the total quantities of feed ingredients needed each year for a typical dairy ration used in a confined dairy. Note the data include quantities of individual ingredients for the period of time in the 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 very large

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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].

What is the value of the feed needed to support the two Riverview dairies? — continued from page 6

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 obtained from various USDA market reports for August of 2024. Suffice it to say, the magnitude of these values is incredible and provide useful information to farmers about the sheer scale of the amount of feed these two large dairies will require annually. It is important to emphasize that 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, I can say when prices are higher than average, the values of feed will also being higher and, incases when prices are lower than average, the values will be lower. In either case, the magnitude of the value will be significant.

It is also worth pointing out that a good deal of co-product 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 produce and market their feed directly (or, in some cases, indirectly) to these two large dairies, there is also 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

Note, the Hillsboro dairy plans to have a 25,000-cow herd and the Wahpeton dairy will have milk 12,500 cows. 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 August 25, 2024.

Are Farmland Prices Softening?

Bryon Parman, Assistant Professor/Agricultural Finance Specialist

Over the last four years, farmland values across North Dakota and nationally have soared. The USDA reports that in 2020, the national average cropland price was $4,060 per acre. The latest report for August 2024 shows that cropland values have increased to $5,570 per acre, which is a nearly 37% increase in just four years. This increase in cropland values follows six years where national-average cropland values remained flat, mainly due to tight margins for crop farmers during that period. Pastureland values across the U.S. also have increased sharply during that time, rising from $1,400 per acre in 2020 to $1,830 per acre in 2024. While not quite as big of a jump as cropland values, the four-year increase is still nearly 31%.

Cash rental rates during the recent land-price spike have increased but at a more subdued pace. American Farm Bureau's data on national farmland values reports that from 2020 to 2024, cropland cash rents increased from an average of approximately $140 per acre to nearly $160 per acre. Meanwhile, pastureland values increased from a national average of $13 per acre to $15.50 per acre. Those increases are 14.3% and 19% respectively, leaving rental rates for cropland and pastureland increasing far less than that of their market values.

Average Cropland Value — United States: 2010-2024

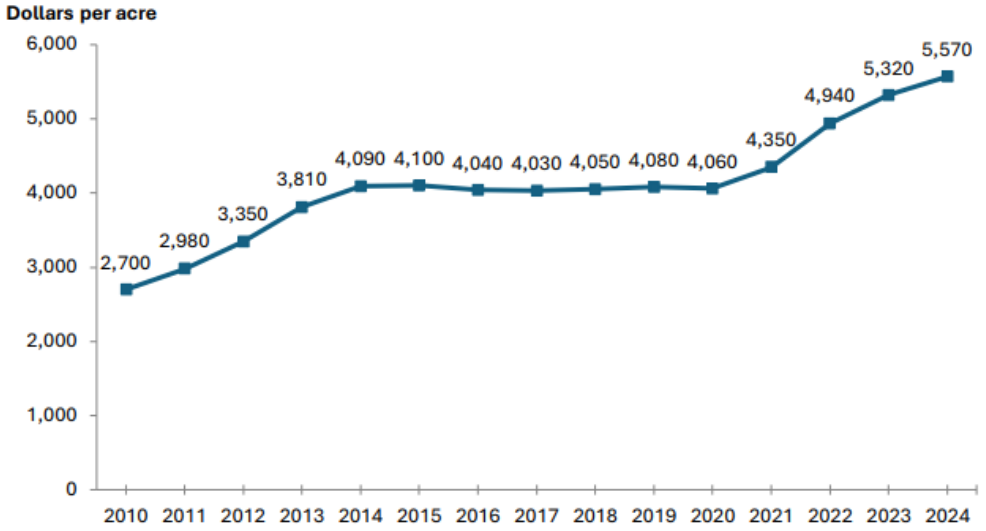

Chart from USDA National Agricultural Statistics Service: www.nass.usda.gov/Charts_and_Maps/Land_Values/crop_value_hist_chart.php

Average Pasture Value — United States: 2010-2024

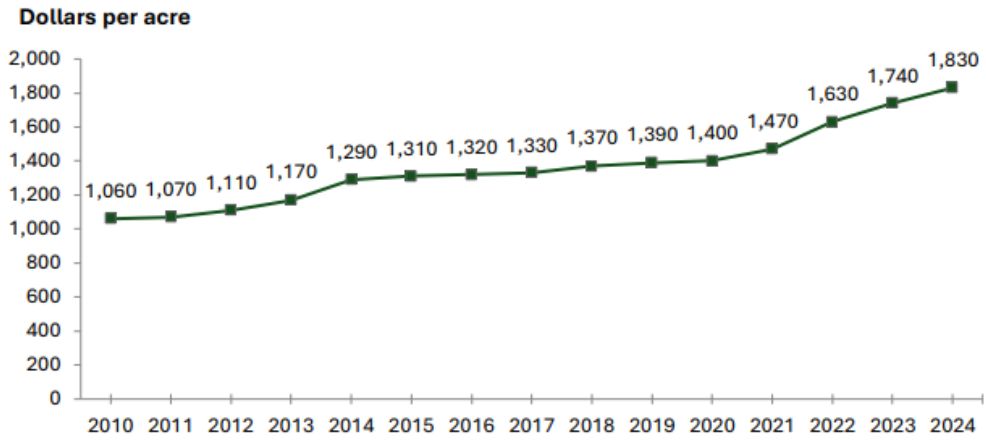

Chart from USDA National Agricultural Statistics Service: www.nass.usda.gov/Charts_and_Maps/Land_Values/past_value_hist_chart.php

However, the fundamentals of farmland prices are about to be tested as 2024 closes and we move into 2025. Net farm incomes are widely expected to be depressed in 2024, and the expectation for 2025 does not contain a significant expected increase. This is coming off 2023 where national net farm incomes were down over 20% relative to 2022.

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Are Farmland Prices Softening?

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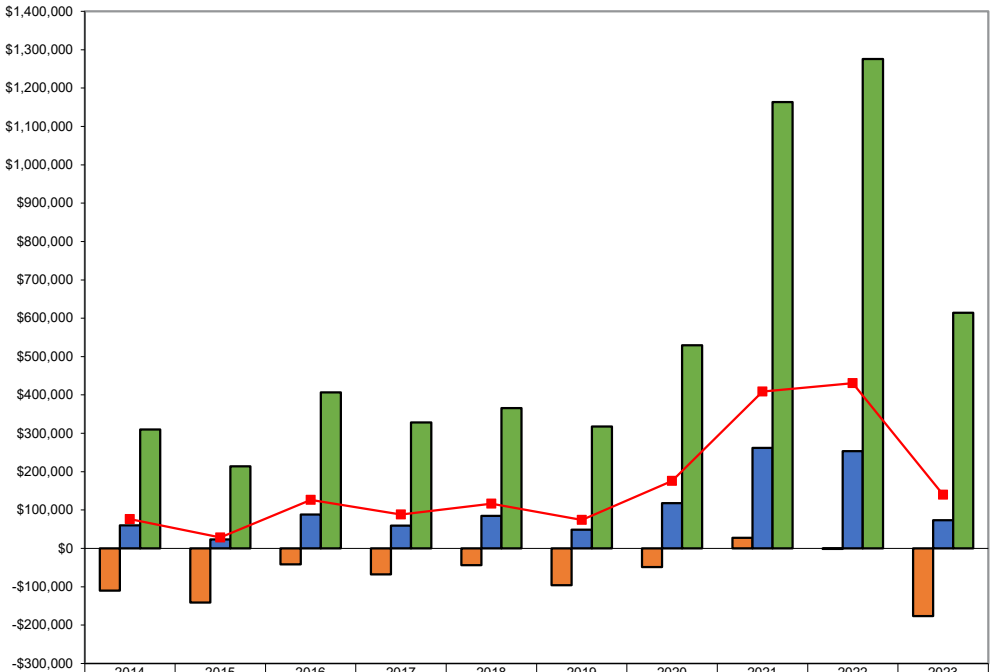
According to the North Dakota Farm Business Management Program, net farm incomes in North Dakota fell from $253,784 to $73,462 on average, which is less than 2018 or 2016, and neither was considered a strong year across the state. If expectations hold, 2024 records will show in North Dakota that net farm incomes fell further with no immediate reason to suspect that 2025 will be significantly stronger.

North Dakota Net Farm Income



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
20% Low Profit	(110,282)	(141,049)	(41,364)	(68,031)	(43,700)	(96,157)	(48,488)	27,671	(1,409)	(176,257)
Middle 60% Profit	60,113	23,278	88,621	59,071	85,076	48,615	118,208	262,188	253,784	73,462
20% High Profit	310,010	214,214	406,621	328,621	365,638	317,478	529,298	1,163,679	1,275,659	613,924
Average All Farms	76,404	28,600	126,752	88,026	116,227	74,100	176,038	408,835	430,678	139,574

Data from the North Dakota Adult Farm Management Education Program. www.ndfarmmanagement.com/

While the data show that farmland prices increased from 2023 to 2024, much of the increase was cash and momentum gained in 2021, 2022 and early 2023. However, much of the change in incomes from the latter half of 2023 and 2024 have not been reflected in land prices and rents yet. It will instead be next year where the back end of 2023 and 2024's incomes will be reflected.

A potential warning with all of this has been the reluctance of cash rents to increase at or near the same rate that land values have increased. While the divergence of rents and land prices began decades ago, right now rents, as a percentage of market prices, are the lowest they have been since the Great Depression (generally less than 2.5%). In fact, movements in cash rental rates may be a much better indicator of farm financial health since rents are based almost entirely on yearly net income, while market values for land contain, to a large extent, a growth factor and resale potential making them much more speculative.

The speculative aspect of land prices may prevent, or at least minimize, any negative impact low net farm incomes could have on land prices. However, it is likely to impact rental rates. This could in turn further increase the gap between market values and cash rental rates should the latter decline in the coming years while values hold steady. However, there have been anecdotal reports in North Dakota that some recent land sales are happening at values well below expectation. This doesn't necessarily mean that land market values are falling but does indicate there is some real weakness in the market. In any case, what happens moving forward will depend largely on how long net farm income margins remain low.

Lower Global Wheat Inventories and Quality Problems Supporting Prices

Frayne Olson, Crop Economist/Marketing Specialist

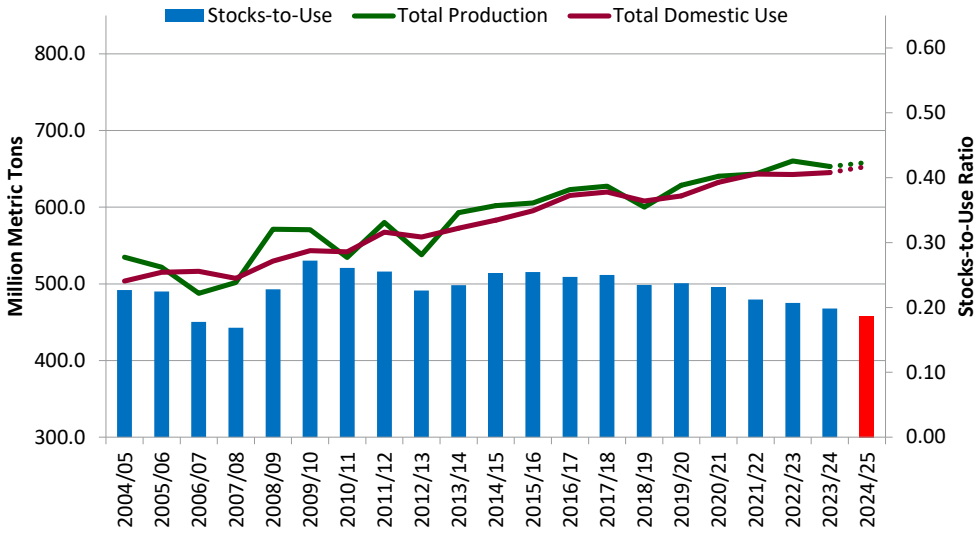
NDSU

As spring wheat harvest comes to an end, farm managers are counting bushels and evaluating the quality of this year's wheat crop. They are also looking at wheat market prices and asking if there is any potential for improvement. The short answer is "maybe".

Before everyone rolls their eyes and says, "here we go again, another marketing specialist who can't give a straight answer," let me explain. First, no one can predict the future. We are all looking at current conditions and trying to figure out the most likely path forward. Second, both the U.S. and global wheat markets are very complex because of different wheat classes with varying qualities. Wheat is primarily a food grain where seed quality has a huge impact on the quality of the finished product. Different types of breads, cookies, crackers, pastries and noodles all require different types of flour, wheat types and quality specifications. Third, wheat is a global grain. There are more bushels of wheat traded in the world market than corn bushels, about 10% more, even though there is 55% more corn produced globally compared to wheat. In other words, there are a lot of moving parts.

Let's first look at some factors impacting global wheat markets. Global wheat inventories have been falling for the past five years. Figure 1 shows world wheat production, use and stocks-to-use ratio, excluding Chinese wheat values, since the 2004/05 marketing year. China is the world's largest single producer and consumer of wheat and holds just over 50% of the global wheat inventories. China is considered a major wheat importer but exports very little. Since it's primarily used for domestic food security, including Chinese wheat inventory in an analysis of global wheat trade misrepresents the conditions impacting international wheat markets.

Figure 1 – World Wheat Production, Use and Stocks-to-Use Ratio Excluding Chinese Wheat



USDA August 12, 2024, World Agricultural Supply and Demand Estimates and PSD Online Custom Query

Based on the USDA's August World Agricultural Supply and Demand Estimates (WASDE), the current global wheat stocks-to-use ratio is 18.7%. This is not as low as the 2007/08 marketing year value of 16.9%, but inventories have been trending downward for five years. As a reminder, the 2007/08 marketing year saw a significant worldwide commodity price rally due to poor harvests, low stocks, rising oil prices, agricultural export bans and trade restrictions, and lower import tariffs.

World wheat trade is different today than in 2007/08, but tighter ending stocks usually result in more price sensitivity, especially

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Lower Global Wheat Inventories and Quality Problems Supporting Prices — continued from page 10

when supply chains are threatened. The Ukraine-Russia and Israel-Gaza wars are impacting global politics and trade flows, and must be watched closely. Any additional disruption in trade relations or increases in political tensions could easily lead to large price swings.

Next, let's take a closer look at the conditions in a few key wheat-exporting countries. Figure 2 shows historical wheat export levels from the largest exporting countries.

Russia has been the single largest wheat exporting country since the 2017/18 marketing year. The August USDA WASDE forecasts 2024 Russian wheat production at 83 million metric tons, down from 91.5 million metric tons last year, primarily due to very dry growing conditions. The lower production estimates have led to a reduction in projected export levels, from a record 55.5 million metric tons last year to 48 million metric tons this year.

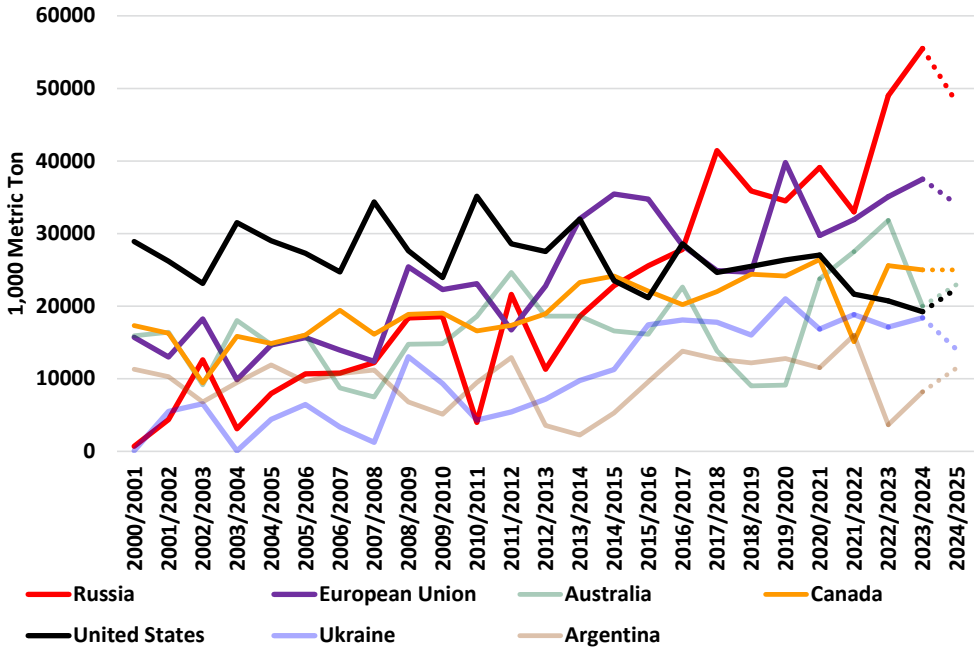
The Russian grain industry has gone through dramatic changes since the "special military operation" started in Ukraine in 2022. A wide range of economic sanctions have been placed on Russian trading and banking systems by Western countries. However, agricultural products like grain and fertilizer have not been included in these sanctions because of humanitarian concerns.

However, the economic sanctions are having an impact. Most of the current grain trading infrastructure has been taken over by the Russian government, after Western trading countries stopped operations and left the country. The value of the Russian ruble has stabilized relative to the U.S. dollar, but financing trading operations remains difficult. A recent Reuters report discussed Chinese state banks slowing or stopping transactions with Russian companies because of economic sanction compliance issues.

Russian wheat exports to major wheat-importing countries like Egypt, Turkey, Iran and Bangladesh have not yet been dramatically impacted. In addition, Russian wheat shipments through the Black Sea have not seen any significant disruptions. However, recent rains in Siberia have delayed their spring wheat harvest and will likely create quality problems in late-harvested fields.

French soft wheat production and quality have been dramatically impacted by wet harvest conditions. France is the largest wheat producer and exporter in the European Union (EU). FranceAgriMer, the National Agency for Agriculture and Sea Products, recently reported that the 2024 French wheat crop will be the smallest since the 1980s, and the milling quality has been damaged. Low test weights and below-average protein levels are the biggest concerns, with slightly above-average falling numbers reported. One private agricultural forecasting firm is estimating French exports outside of the EU to fall as much as 60%.

Figure 2 – Wheat Exports by Major Exporting Country



USDA August 12, 2024, World Agricultural Supply and Demand Estimates and PSD Online Custom Query

Germany, another major EU wheat producing and exporting country, has also reported yield losses and damage from excess rains. The German Federal Ministry of Food and Agriculture is forecasting wheat production to be down 12.7% from last year at 18.8 million metric tons. No specific wheat quality information is currently available.

In contrast, Australian wheat production is projected to rebound to 31.8 million metric tons based on estimates from

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Lower Global Wheat Inventories and Quality Problems Supporting Prices — continued from page 11

the Australian Bureau of Agricultural Resource Economics and Sciences . This is up from last year's production of 26 million metric tons, which was damaged by drought. Western Australia is projected to have above-average production, while South Australia and Victoria are expected to have below-average yields from continuing dry conditions.

Statistics Canada is forecasting Canadian spring wheat production to be 25.4 million metric tons in 2024, almost identical to the 25.5 million metric tons produced last year. It is still too early to get a clear idea of wheat quality in Canada, but early harvest reports suggest typical test weights and protein content.

The U.S. soft red winter wheat harvest is finished, and hard red winter wheat harvest is nearly complete. U.S. Wheat Associates prepares a Weekly Harvest Report during the harvest season. This report summarizes the wheat quality factors from samples submitted each week. The August 30, 2024, report shows that U.S. soft red winter wheat has slightly above average protein at 9.7%, test weight at 59.1 lbs./bu. and falling numbers at 316 seconds.. Hard red winter wheat protein and test weights are slightly above average at 12% and 61.1 lbs./bu., but falling numbers are slightly below average at 361 seconds.

Only a few hard red spring wheat samples have been tested so far. The early samples show below average protein at 14%, average test weight at 61.5 lbs./bu. and above average falling numbers at 408 seconds. However, recent rains have dramatically slowed harvest progress and are creating quality concerns. Reports from farm managers and grain dealers talk about high levels for fusarium head blight and deoxynivalenol (DON), and low falling numbers.

It looks like the 2024 spring wheat crop will be large but have a lot of quality variation. The futures market is mainly concerned with the overall supply and demand conditions, while the cash market must ensure the correct quantity and quality is delivered to the correct place at the correct time. The cash market uses basis and quality premiums and discounts to regulate the flow of grain in the supply chain.

History suggests that spring wheat quality premiums and discounts don't change much within a marketing year. The price premiums and discounts typically don't adjust again until after the next year's crop is harvested. So, "storing your way out of a quality problem" normally does not work. The interest costs on the stored grain are higher than the reduction, or change, in discounts.

However, low world wheat ending stocks have the potential to add price volatility, increasing the chances of price rallies. Any price rallies are likely to be rapid and short lived because there are a lot of farm managers looking for a selling opportunity. An effective strategy will be to watch the futures markets closely, make a larger number of smaller sales and don't wait for an extended price rally.

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