

Agriculture By the Numbers

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NDSU Extension Agribusiness and Applied Economics

The Most Important
Market You've Never
Heard Of

Cattle Feeders and
Finishers Will Find 2021
More Challenging With
Higher Feed Costs

Wings Not Just for the
Super Bowl Anymore

How Tight Will Old-crop
Soybean Supplies Get?

The Most Important Market You've Never Heard Of

By David Ripplinger, NDSU Extension Bioproducts/Bioenergy Economist

While many North Dakota farmers closely follow futures markets in Chicago, Ill., and Minneapolis, Minn., and cash prices at their local elevator, a market based in Sacramento, Calif., few are familiar with its growing importance to Midwestern agriculture.

The market is for carbon credits created as part of California's Low Carbon Fuel Standard, commonly referred to as the LCFS. The LCFS is a cap-and-trade system that mandates the average carbon footprint of transportation fuel marketed in California each year.

The system allows businesses that have a more difficult time marketing low-carbon fuel to trade for credits from other businesses that find it easier. The resulting price for these traded credits serves roles that prices do in market economies: They measure the opportunity cost of marketing the next unit of low-carbon fuel, incentivize current supplies of low-carbon fuels, and incentivize current and potential future suppliers to make investments to provide more low-carbon fuel in the future.

One of the strengths of cap and trade is that it allows the market to determine how to best achieve a goal rather than having policymakers prescribe what they think is best. Sacramento doesn't require that regular gasoline be used less or that biofuels, or electric or hydrogen vehicles are the answer. It wants less carbon in transportation and that's what is capped.

Even prior to a recent run-up of credit prices, corn ethanol refineries, including those in North Dakota, looked for ways to reduce their carbon score to create additional value for the ethanol they sold into California. Some corn ethanol refineries were able to reduce their carbon score by 20% or more, creating credits worth more than a dime per gallon of ethanol.

Of course, not all of the value created by the LCFS is captured by the refinery, but the system surely has supported the use of ethanol. In fact, California has been the fastest growing E85 market

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Continued on page 2.

The Most Important Market You've Never Heard Of — continued from page 1

in the country for some time, with annual volumes increasing roughly 20% year-over-year for the last decade and more than 40 million gallons sold in 2019.

Work is being done to get the incentive back to farmers who grow biofuel crops. Unfortunately, a pretty big obstacle is in the way today. Sacramento wants precise field-level data and accountability that our existing knowledge and technology can't provide. As a consequence, all corn used by refineries in the Midwest has the same carbon footprint and no incentive exists to decarbonize corn production even though it would help California achieve its goals.

That will change when policymakers are convinced that proper systems for measuring and validating carbon use at the field level are in place. California also is concerned with farmers changing practices that may release carbon previously captured in the soil.

The fully built-out system would incentivize more carbon-efficient biofuel feedstock production, possibly increasing nitrogen fertilizer efficiency and adoption of low- or no-tillage practices. Or maybe it's in the form of blue or green fertilizer, the former being produced from fossil fuels where carbon is captured, the latter when fertilizer is made with renewable energy. Again, California doesn't care how the goal is achieved and we have many possibilities.

The long-term implications of the LCFS are much larger because it is serving as a model for other states, regions and nations that would dramatically increase the market for low-carbon fuels such as corn ethanol.



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Cattle Feeders and Finishers Will Find 2021 More Challenging With Higher Feed Costs

By Bryon Parman, NDSU Extension Agricultural Finance Specialist



In the spring of 2020, during the escalation of the COVID-19 pandemic, crop and livestock producers experienced some of the lowest commodity prices in recent memory. Markets were reeling from extreme uncertainty, a massive second-quarter recession with record weekly unemployment numbers, and COVID-19 causing shutdowns of meat packing plants, disrupting the supply chain.

This prompted government action for agriculture where direct payments were issued under two rounds of the Coronavirus Food Assistance Program (CFAP). Unlike the first two Market Facilitation Program (MFP) payments, a large share of CFAP went to beef cattle and lamb producers in North Dakota and the rest of the U.S. As far as livestock, the MFP focused on dairy and hog producers due to the impact of ongoing trade disputes, while beef and lamb producers were deemed mostly unaffected.

For crop producers, the recovery from the spring of 2020 has been swift and dramatic. In the last few

weeks of April 2020, corn reached a near 10-year low at \$3.03 per bushel. By the end of October 2020, the spot price for corn had crept above \$4 and by Jan. 13, 2020, corn had reached \$5.25 per bushel.

As corn prices rise, animal feed closely related to corn such as silage and dried distillers grains (DDGs) increased in price as well. According to the U.S. Department of Agriculture (USDA), DDGs increased in price from \$169 per ton in October 2020 to around \$230 per ton as of Jan. 22, 2021. This also has driven the silage price up from approximately \$35 per ton in the fall to nearly \$60 per ton in late January 2021.

Looking at six different cattle feeding scenarios, the impact of higher feed costs from the fall heading into the spring is revealed. Table 1 shows three different scenarios for feeding steers and three scenarios for feeding heifers, each with different daily rates

Continued on page 4.

Cattle Feeders and Finishers Will Find 2021 More Challenging With Higher Feed Costs — continued from page 3

Table 1: Feeding Cost and Calf Price Comparison November 2020 vs. January 2021.

	Wt	ADG	Projected Sale Price/ CWT	Feeder Calf Cost/CWT	Feed Cost /Day Nov. 15, 2020	Feed Cost/ Day Jan. 18, 2021
Steers	525-850	1.8	\$125 (\$139)	\$163 (\$167)	\$0.88	\$1.19
Steers	500-800	2.8	\$126 (\$139)	\$169 (\$167)	\$1.06	\$1.56
Steers	575-1,270	3.6	\$126 (\$127)	\$163 (\$156)	\$1.53	\$2.19
Heifers	450-750	1.8	\$121 (\$113)	\$143 (\$126)	\$0.83	\$1.12
Heifers	525-800	1.8	\$121 (\$113)	\$143 (\$126)	\$0.90	\$1.26
Heifers	550-850	2.8	\$121 (\$113)	\$141 (\$126)	\$1.08	\$1.55

Note: Projected Sale Prices and Feeder Calf Costs in parenthesis are January values, with the others being November 2020.

of gain, different starting or sales weights, and modified rations of silage, DDGs, corn and minerals.

The feed costs per day shown in the two columns on the right side of the table illustrate much higher feed costs in January vs. November, while the feeder calf and fed cattle costs remained somewhat close to where they were a few months ago.

Table 2 shows the profit or loss for the same six scenarios shown in Table 1 with the adjustments made for higher feed costs and different calf prices in November vs. January. The impact of the higher feed costs is obvious, reducing the profit per head in every scenario. In fact, all but one scenario in November was profitable; however, with the higher feed costs, only one scenario, the finished steer scenario with a higher 3.6 pound average daily gain, is notably above zero.

However, a theme emerges regarding average daily gain. Regardless of feed costs, putting on more weight per day (higher average daily gain, or ADG) tends to yield greater profits, or in the case of January, lower losses than lower average daily gains.

This tends to be due to the yardage fees (35 cents per day) and other overhead eating into profits for animals gaining less than 2.8 pounds per day. In other words, it pays to put on weight quickly, even in an environment of rising feed costs.

Table 2: Profit and Loss Breakdown for Six Cattle Feeding Scenarios.

	Wt	ADG	Days on Feed	Profit/Loss Nov. 15, 2020	Profit/Loss Jan. 18, 2021
Steers	525-850	1.8	180	\$13.28	-\$136.13
Steers	500-800	2.8	108	\$72.03	-\$130.95
Steers	575-1,270	3.6	193	\$249	\$97.96
Heifers	450-750	1.8	165	\$27.93	-\$93
Heifers	525-800	1.8	155	-\$2.00	-\$95.34
Heifers	550-850	2.8	107	\$62.33	\$6.27

The other point to consider is that in these scenarios, a conservative cost model is used where many producers may be able to reduce overhead. Furthermore, 800- to 900-pound weight cattle have been the most greatly impacted because cattle finishers have discounted them due to higher feed costs. Having pre-priced the feed for the cattle to be fed and some sort of hedge on 800- to 900-pound weight cattle would have locked in the potential gains shown in the November scenario.

Locking in sales prices has been made easier recently with the ability for farmers to use Livestock Revenue Protection (LRP) than traditional futures contracts or options. The recent movement in feed costs and 800-pound weight cattle prices again have emphasized the advantage of using hedging strategies for cattle marketing and feed, while the six scenarios show that putting on weight faster is more profitable than using a lower ration and keeping cattle on feed longer.



Wings Not Just for the Super Bowl Anymore

By Tim Petry, NDSU Extension Livestock Economist

Specific meat products often are associated with traditional holidays and events. Examples include turkey on Thanksgiving, beef for Father's Day, lamb on Easter and Passover, and hot dogs at baseball games.

Super Bowl 2021, the National Football League's championship game, will be held on Feb. 7. A very popular meat item for this highly touted sports event is chicken wings. According to the National Chicken Council's 2020 Wing Report, more than 1.4 billion wings were consumed during the Super Bowl 2020 weekend. We even heard a rumor prior to the big game that we might have a shortage of wings.

The rising popularity of chicken wings is an interesting success story and also an interesting lesson in economics. Economists discuss how changing supply and demand fundamentals affects prices. As with many other agricultural commodities, wing prices have been volatile.

We have several rumors about how the chicken wing craze started. Credit often is given to the Anchor Bar in Buffalo, N.Y. After closing one night, the owner, Teressa Bellissimo, realized that she had quite a few leftover chicken wings.

At that time, wings were the least desirable cut of chicken, hard to sell, and sometimes thrown out or used to make stock for soup. Her son warned her that he invited some hungry college friends over for a late-night snack. So she decided that might be a good way to get rid of the ill-favored wings.

She is rumored to have deep fried the wings, then added her homemade hot sauce. The young men liked the wings so well that she added them to the regular menu and the rest is history.

That is where the name "Buffalo wings" came from. And "Buffalo" is now a recognized sauce flavor used to flavor many other food products. Several national restaurant chains, including

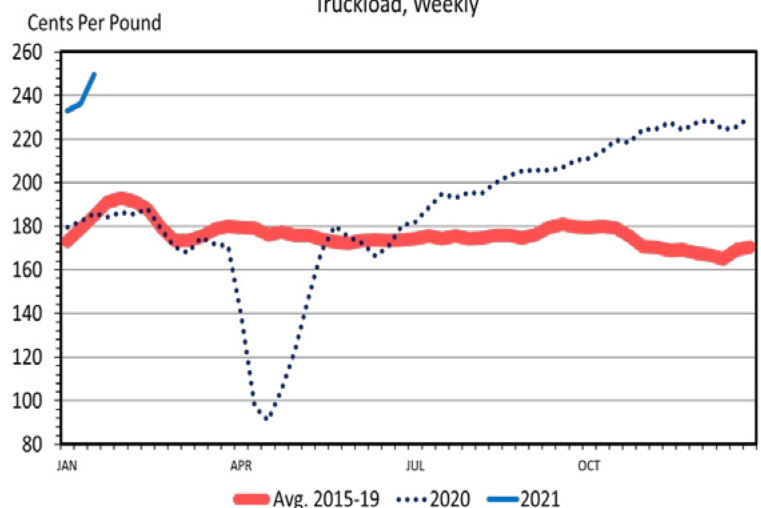
Buffalo Wild Wings, have menus centered around the once hard-to-sell wings. Buffalo, N.Y. even hosts an annual National Buffalo Chicken Wings Festival in August each year.

The popularity of wings grew nationwide during the past several decades. That increased demand caused prices for wings to generally increase through time. Wings even have become popular menu items at pizza shops, fast-food restaurants, sports bars and casual dining establishments.

Wholesale chicken wing prices reported by the U.S. Department of Agriculture (USDA) Agricultural Marketing Service averaged around 50 cents per pound in the late 1990s. Prices increased to a record high of \$2.50 per pound in January 2021. Interestingly, the once hard-to-sell, lowest-priced wings were the highest priced wholesale chicken cut; wholesale skinless, boneless chicken breast are priced much lower at \$1.13/pound.

Continued on page 6.

WHOLESALE CHICKEN WING PRICES
Truckload, Weekly



Wings Not Just for the Super Bowl Anymore

— continued from page 5

Chicken processors are sourcing additional wing-type products to satisfy the increasing demand. That's why boneless wings made from breast meat recently became popular with retailers and consumers. Some innovative restaurants and retail food stores are featuring "all-new thigh wings."

Many agricultural commodities exhibit distinct seasonal price patterns as supply and demand fundamentals change throughout the year. Wings are no exception, with the Super Bowl demand usually causing seasonally high prices in January (see 2015-19 average price on wing chart).

The COVID-19 pandemic certainly impacted chicken wing supply and demand and prices. A quite dramatic price decline occurred in March and April 2020 from \$1.70 to 90 cents per pound. The mandatory stay-at-home and social distancing orders meant that food service wing demand declined significantly with restaurants closing and recreational events canceled.

The V-shaped, relatively quick price recovery is evident with supply and demand factors at play. It is a testament to the resiliency of the U.S. meat production, processing and retailing industry, even during catastrophic times.

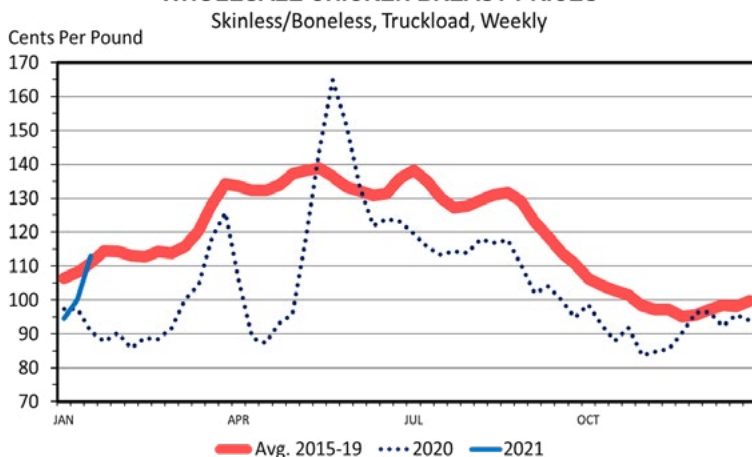
Initially the supply of wings, whole chickens and other chicken parts fell. Processing plants were forced to shut down to clean and disinfect premises, test employees for the virus and implement Centers for Disease Control and Prevention and Occupational Safety and Health Administration guidelines. The reduced supply helped start the price recovery.

Restaurants quickly began adapting and promoting take-out ordering. Retail food supermarkets began providing pre-cooked wings with price specials and furnished information on how to prepare uncooked wings at home. Soon stay-at-home consumers found they easily could have their "comfort food" wings at home. Then gradually some restaurants were allowed to re-open under new local and state guidelines.

That increase in wing demand fueled the contra-seasonal price increase throughout 2020 to current record levels.

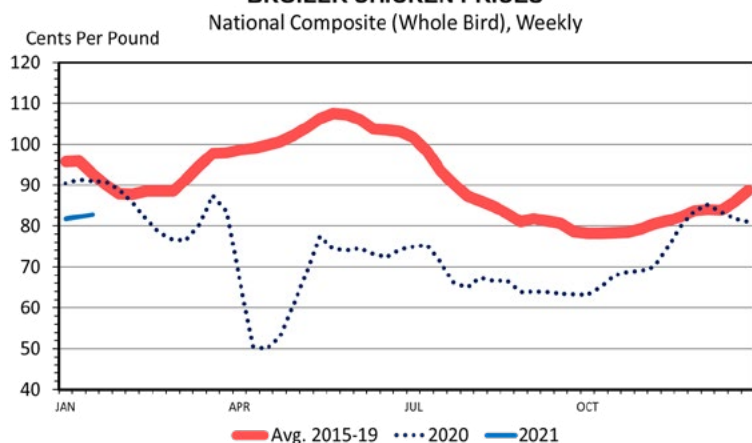
Whole broiler chicken and some other chicken parts prices struggled throughout 2020 with the continued loss of food service and record high chicken production.

WHOLESALE CHICKEN BREAST PRICES



— Avg. 2015-19 — 2020 — 2021

BROILER CHICKEN PRICES



— Avg. 2015-19 — 2020 — 2021

In the latest Cold Storage report issued by the USDA National Agricultural Statistics Service, stocks of breast meat and thigh quarters were higher than last year. But in spite of record production, wings in storage warehouses were 25% below last year.

Even though wholesale wing prices are higher than last year, that does not necessarily mean prices will be higher at restaurants. Restaurants cannot change menu prices as quickly as wholesale prices change. Some restaurants and food retailers advertise special wing prices for the Super Bowl to lure in customers. They hope to sell more higher-margin beverages and other food products.

Economists are famous for their predictions. While I won't predict the outcome of the game, I will predict we will have plenty of wings and other delicious food for Super Bowl fans. Enjoy the game!

How Tight Will Old-crop Soybean Supplies Get?

By Frayne Olson, NDSU Extension Crop Economist/Marketing Specialist

Crop market analysts, farm managers and soybean end users are beginning to ask more questions about shrinking old-crop, or 2020-21 marketing year, soybean supplies. They are comparing 2020 soybean production with the current export and domestic crushing pace and projecting some exceptionally tight supplies by late summer.

Tight supplies normally lead to higher prices and increased price volatility. I recently have heard some analysts forecasting futures market prices similar to the record levels seen in August 2012. I'm not saying this could not happen.

However, I am reminded of a phrase one of my professional mentors taught me: Economics is much like physics; for every action, there is a reaction. So let's review some of the recent actions and lay out some possible reactions.

On Jan. 12, 2021, the U.S. Department of Agriculture (USDA) released its monthly update of the World Agricultural Supply and Demand Estimates (WASDE). The USDA is projecting the second smallest U.S. soybean stocks-to-use ratio in modern history. Even though total 2020 soybean production was strong, record large domestic crushing, combined with a near record export pace, is raising concerns about soybean supplies as we move into the second half of the marketing year.

We have reached the time of year when total production is known and attention focuses on how quickly supplies are being consumed. The two largest users of U.S. soybeans are domestic oilseed crushers and exports. Seed use and residual, or spoilage and waste, are very low by comparison.

Historically, domestic crushing has been the largest consumer of soybeans. But beginning in the 2015-16 marketing year, total export sales equaled or exceeded crushing levels, except for the 2018-19 and 2019-20 marketing years, when the U.S.-China trade war dramatically cut exports.

Domestic crushing levels are relatively stable from month to month, with a small seasonal decrease during the summer. However, soybean export sales are extremely seasonal. Historically, 75% to 80% of total soybean export commitments are recorded between Sept. 1, the start of the soybean marketing year, and the end of February.

Export commitments are sales contracts for the delivery of soybeans in the future. Export commitments represent the amount of grain under contract, but it may or may not have been delivered yet.

The main reason for the extremely seasonal nature of U.S. soybean exports is the Brazilian soybean harvest and deliveries typically start in mid-February. Brazilian export bids fall below U.S. bids as its harvest begins and most international soybean buyers begin purchasing Brazilian soybeans.

In October, as the U.S. soybean harvest accelerates, the opposite occurs. U.S. export bids fall below Brazilian bids and international buyers begin purchasing U.S. soybeans.

The core question facing the U.S. soybean market is whether the current market prices are high enough to ration use until the 2021 soybeans can be harvested and reach the market. This is where the "action and reaction" part of the marketplace unfolds.

The Brazilian soybean harvest is just beginning. Even though early yield reports are disappointing, yields are expected to improve as the harvest moves south. Total Brazilian production is forecast to be between 128 million and 135 million metric tons, compared with 126 million metric tons last year. Current U.S. soybean export bids for March delivery to north Asia are 77 cents/bushel higher than the comparable bid for shipment from Brazil. North Asia includes China, Japan and South Korea.

U.S. export sales are expected to drop off, but how quickly will this happen and how many new export sales will the U.S. be able to secure? In other words, are U.S. soybean prices high enough to ration export sales?

Estimating domestic soybean crush demand is more complex because soybean meal and soybean oil prices, as well as differing cost structures across companies, impact the profit margins for soybean processing. However, the "board crush margin" is a rough proxy for crushing profitability.

The board crush margin is calculated using the futures market prices for soybeans, soybean meal and soybean oil, along with typical processing rates,

Continued on page 8.

How Tight Will Old-crop Soybean Supplies Get?

— continued from page 7

to estimate a gross margin. The gross margin is used to pay for the operating and overhead costs for running the processing plant.

Board crush margins can change quickly, based on relative prices. However, on Jan. 29, 2021, the calculated board crush margin was 69 cents per bushel, which is at the low end of the typical range. Crush margins can increase due to lower soybean prices, higher soybean meal prices and/or higher soybean oil prices.

Soybean meal futures prices are at the highest levels since June 2014. Soybean oil futures prices are the highest since June 2013.

Are soybean meal and oil prices high enough to slow domestic consumption and exports? How high do soybean meal prices need to go before U.S. livestock producers begin adjusting rations and reducing soybean meal inclusion rates?

Another key component to old-crop soybean prices is the potential size of the 2021 crop. This includes the soybean planted acreage levels and the yield potential.

If the 2021 soybean crop is expected to be large and planting is early, soybean processors and exporters will need to ration use long enough for the new crop harvest to begin. However, if the 2021 soybean crop is smaller than expected or harvest is delayed, rationing will need to be more aggressive and higher prices will be used to accomplish this rationing.

This is what happened in 2012 and resulted in a price spike to more than \$17 per bushel on the Chicago Board of Trade soybean futures. Figure 1 is a continuation chart of historic nearby soybean futures

Figure 1. Historic Chicago Board of Trade Nearby Soybean Futures Prices



DTN ProphetX – Jan. 31, 2021

market prices. Please note the current nearby price levels relative to the price ranges in 2011 to 2014.

Ending stocks from the 2011-12 marketing year were low but not critical. Planted acreage increased from 75 million acres in 2011 to 77.2 million acres in 2012. November 2012 soybean futures market prices were \$13 to \$14 per bushel during spring planting and had fallen to \$12.50 per bushel by early June.

However, the weather turned hot and dry in late June and July. November 2012 soybean futures prices spiked to \$17.89 per bushel on Aug. 4, 2012. However, rains returned in early August and November, and soybean futures dropped to \$15.58 per bushel by Nov. 1.

Reaching the \$17 levels in 2012 took a unique combination of low beginning stocks, very strong demand and the threat of a major yield loss. Will we see a return to these levels in the near future? No one knows for sure. However, we likely will need some type of surprise or shock to see significantly higher prices.