Agriculture By the Numbers

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NDSU Extension Agribusiness and Applied Economics

Shifting Global Grain Transportation Flows

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The recent drone attacks on commercial ocean shipping in the Red Sea are creating logistical challenges for crude oil, container and bulk freight shipping. While these challenges are not directly impacting U.S. grain movements and crop prices, there are indirect impacts.

Figure 1 shows the location of ocean vessels carrying bulk freight, like coal, iron ore and agricultural products, on January 28, 2024. This map helps visualize the major shipping routes across the world. Note the high volume of bulk shipping traffic through the Mediterranean Sea, Suez Canal, Red Sea and Indian Ocean. An alternative high-volume route between the Pacific and Indian Oceans goes around the southern tip of Africa, past the Cape of Good Hope.

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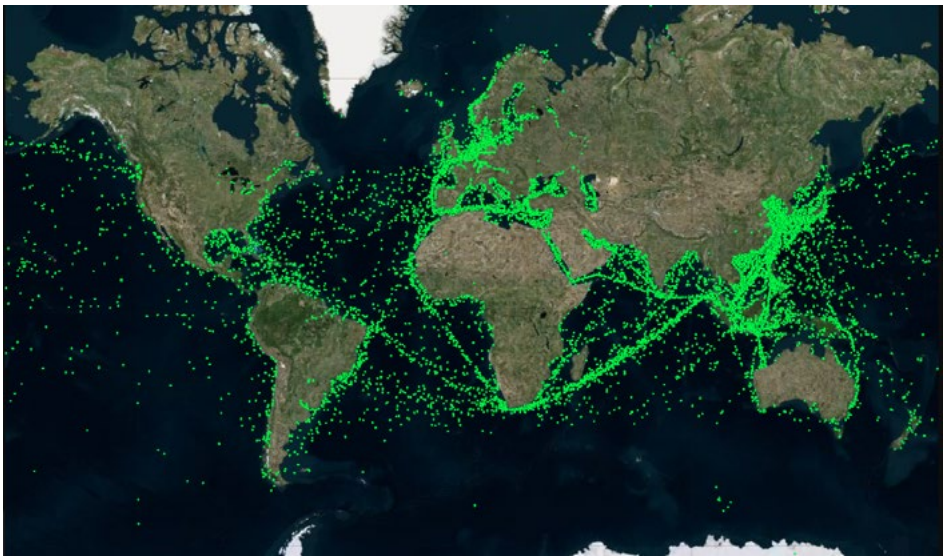
Figure 1 – Ocean Vessels Carrying Bulk Freight
(Coal, Iron Ore, Agriculture and Other Bulk Products)



Reuters Eikon – 01-28-24

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Shifting Global Grain Transportation Flows

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Several large shipping companies have stopped sending vessels through the Red Sea and instead have diverted vessels around southern Africa because of the drone attacks. This has added significant shipping costs due to the extra distance and time required for deliveries. The added distance and slower delivery times also have increased the competition for the existing bulk freight vessels.

Agricultural products, like grain and fertilizer, must compete with other bulk shipments for the use of vessels. Figure 2 shows the location of ocean vessels loaded specifically with grain. Once again, note the volume of vessels located in the Mediterranean Sea, Suez Canal and Red Sea route. The Suez Canal and Red Sea route is especially important for Russian grain shipped from the Black Sea to China. In contrast, almost all the grain shipped from Brazil and Argentina to China use the route past southern Africa. U.S. grain shipments from the Louisiana or Texas Gulf ports also often go past southern Africa to China. However, some grain is shipped through the Panama Canal or into the Mediterranean Sea, Suez Canal and Red Sea route.

Delayed delivery times and higher ocean shipping costs are creating problems for some international buyers. International companies that purchase grain in the global grain markets try to schedule grain deliveries to match their processing or consumption needs. Many buyers have limited on-site storage capacity so the timing of deliveries is critical for their efficiency and profitability. There is evidence that some international buyers are beginning to source grain from countries that do not rely on the Mediterranean Sea, Suez Canal and Red Sea route, like the U.S.

Figure 3 shows daily ocean freight rates from different loading ports and delivered to Northeast Asia. This includes countries like China, Japan and South Korea. Note that the rates for all the shipping routes, except for the Black Sea, tend to move together. This is because most ocean freight rates are calculated on a cost-per-day or cost-per-nautical-mile basis. The rates for the Black Sea routes include an insurance surcharge due to the risks from the Ukraine – Russia war.

The big unanswered question is whether international buyers will shift more of their grain purchases to U.S. origin due to the shipping disruptions and delivery uncertainties. If this happens, U.S. export sales will increase and lift domestic grain prices. Shipping disruptions also may make the U.S. Pacific Northwest (PNW) ports more attractive for deliveries to North Asia because of the shorter distance and faster delivery times. If shipments through the PNW ports increase, there may be an increase in grain basis levels in North Dakota, South Dakota, Minnesota and Nebraska.

Figure 2 – Ocean Vessels Carrying Agricultural Grain Products

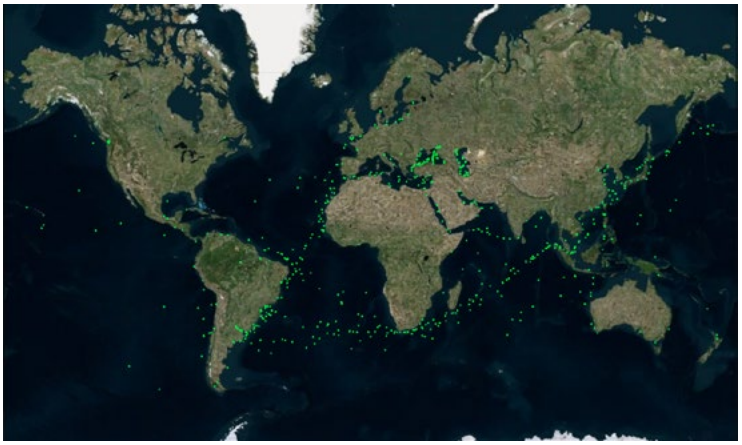

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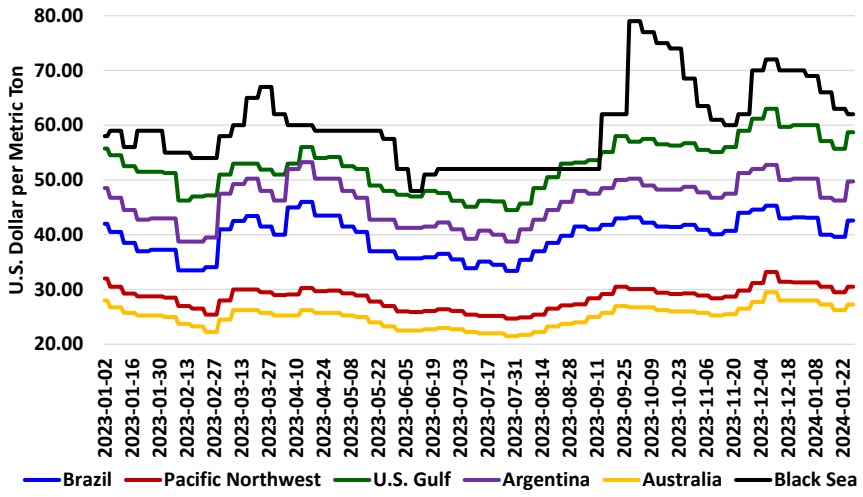
Figure 3 – Daily Ocean Freight Rates to Northeast Asia (01/02/23 to 01/26/24)



Agricensus – Fastmarkets – 01-26/24

Beef Cull Cow Prices Move Cyclically Higher

Tim Petry, NDSU Extension Livestock Marketing Specialist

Beef cull cow prices in 2023 continued their normal seasonal roller-coaster ride but at historical cyclically high levels. Cow prices typically increase seasonally from January through late summer. Prices then decline seasonally as spring-born calves are weaned, cows are pregnancy checked and cows that need to be culled are marketed.

The USDA Agricultural Marketing Service (AMS) does not collect and publish cow prices in North Dakota. But AMS does report cow prices received at cattle auction markets in South Dakota and Montana. So, I compile a weekly "Northern Plains" price, which is a South Dakota and Montana average price for 85% to 90% lean beef cows.

These are typically broken mouth cows that have nursed a calf all summer. Prices for them tend to be lower compared to the higher-quality boner, breaker and premium white grades that AMS reports. But the seasonal and cyclical patterns tend to be similar for all grades.

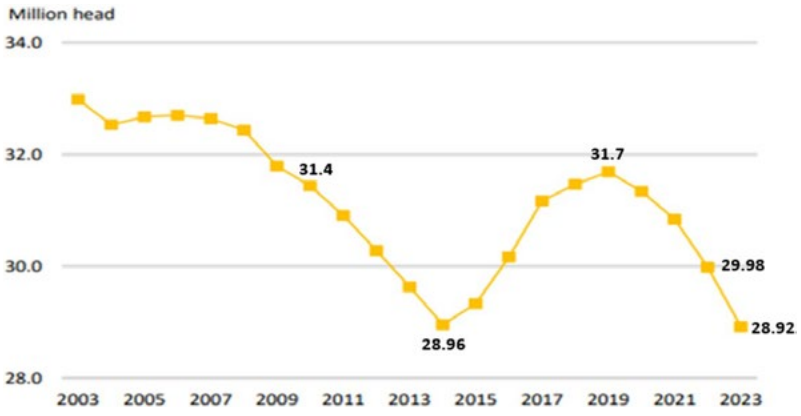
Beef cow prices were cyclically record high in 2014, the last time U.S. beef cow numbers were cyclically low, and declined to a cyclically price low in 2020.

Five straight years of beef cow liquidation from 2019 through 2023, mainly due to severe drought conditions, has resulted in even lower U.S. beef cow numbers than in 2014. Lower numbers have supported beef cow prices at new historically high levels.

Beef cow slaughter was historically high in 2022 as drought conditions impacted most of the important cow-calf states from Texas to North Dakota. In late 2022, USDA reported that 76% of the U.S. beef cow herd was experiencing various levels of drought conditions.

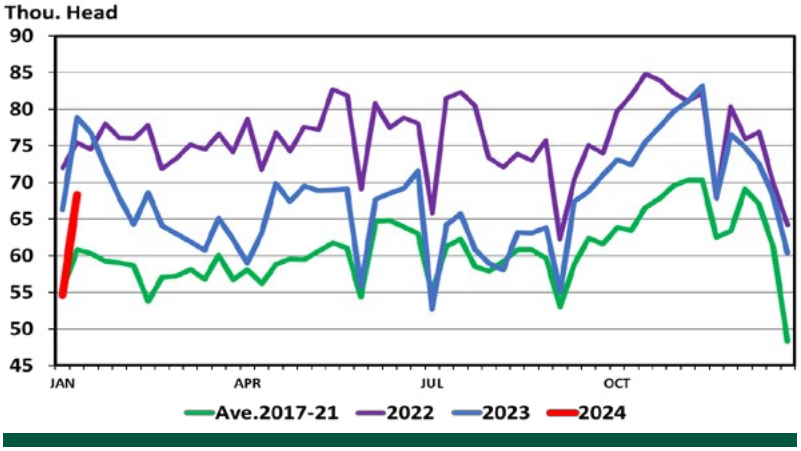
Beef cow slaughter in 2023, while still historically high, declined 11% year over year as drought conditions improved.

U.S. Beef Cows — January 1



Source: USDA National Agricultural Statistics Service

Beef Cow Slaughter — Federally Inspected, Weekly



Weekly U.S. beef cow slaughter in 2023 hit a yearly high of 83,200 head in mid-November, even slightly higher than that same week in 2022. There were reports from North Dakota and other important cattle-producing states of higher-than-normal open cows and heifers occurring and being marketed, which may have been partially due to the several previous year's drought conditions impacting forage availability and quality.

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Beef Cull Cow Prices Move Cyclically Higher

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Both western North Dakota and South Dakota saw nice improvement in moisture conditions in 2023. By the end of the year, USDA reported 35% of U.S. beef cows were still in some level of drought.

A year-over-year decline in U.S. beef cow slaughter will likely occur again in 2024.

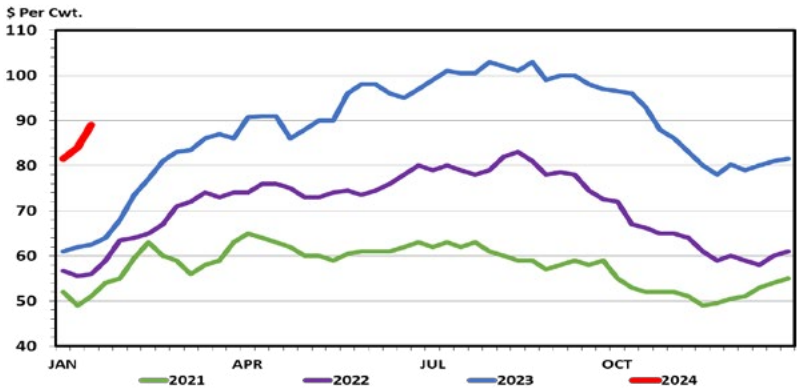
The Northern Plains beef cow price chart shows the recurring annual seasonal price pattern and the year-over-year cyclically increasing prices.

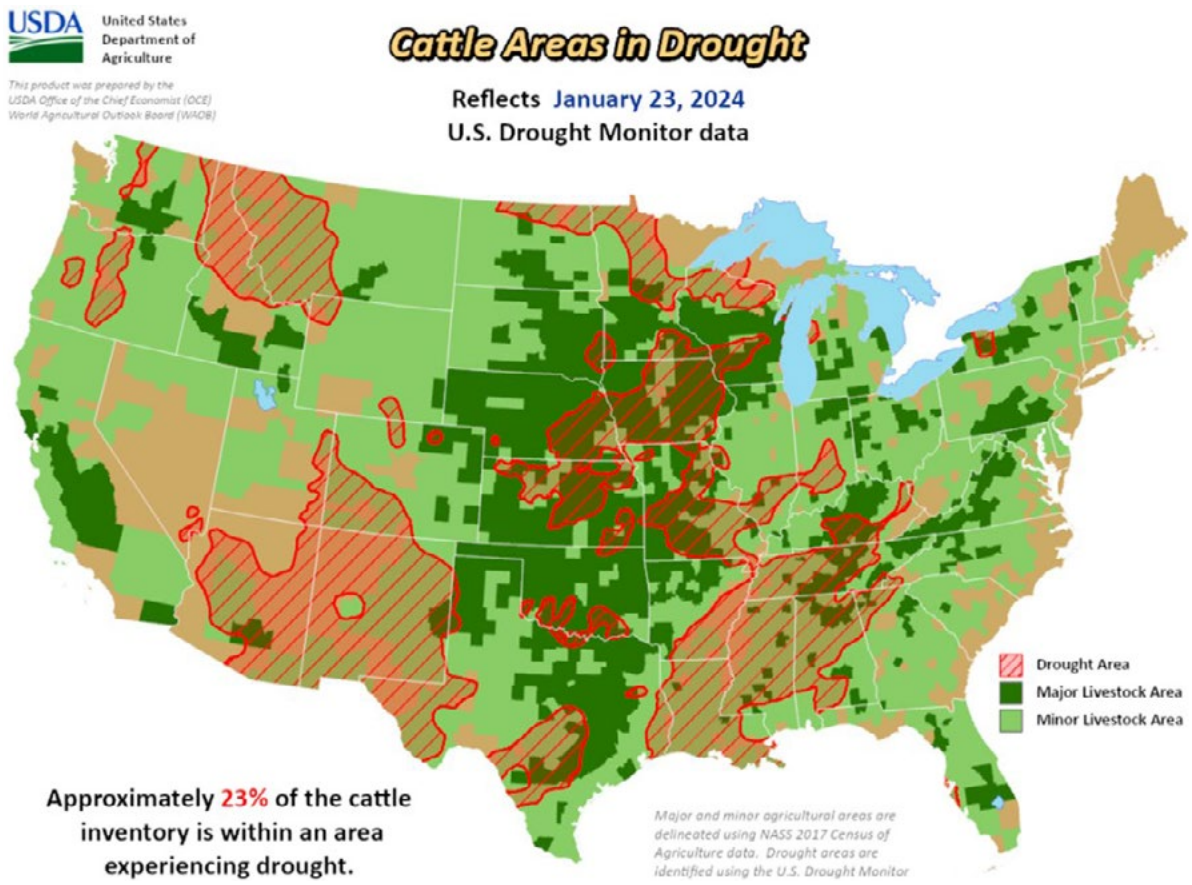
After reaching a cyclical low in 2020, beef cow prices have averaged $15/cwt. to $20/cwt. higher in each subsequent year. Cow prices are starting 2024 about $20/cwt. higher than last year, and a normal seasonal price pattern is expected.

The highest cow prices likely will occur when beef cow herd rebuilding is in full swing. Heifer retention, reduced cow slaughter and lower beef production will buoy prices.

The wild card in when herd rebuilding will start in earnest is U.S. pasture and range conditions. While drought conditions continue to improve, drought does persist in some beef cow regions with USDA reporting 23% of the U.S. cattle area experiencing drought.

Beef Cull Cow Prices
Average 85-90% Lean, Weekly — Northern Plains Average



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2023 Beef Exports Declined and Face Similar Headwinds in 2024

Tim Petry, NDSU Extension Livestock Marketing Specialist

U.S. beef exports in 2023 at 3.02 billion pounds, while at historically high levels, were off the record 3.54 billion pounds set in 2022. A number of headwinds impacted 2023 beef exports.

Record beef exports in 2022 were buoyed by record high beef production at 28.4 billion pounds, spurred by drought-induced high beef cow and heifer slaughter (www.usda.gov/oce/commodity/wasde).

2023 beef supplies continued to tighten throughout the year with beef production falling to 27 billion pounds. Cattle slaughter was down 5%. Beef cow slaughter declined 11% as U.S. drought conditions improved with only 36% of the beef herd in drought areas by the end of the year, compared to 76% last year.

Smaller beef supplies supported cattle and beef prices to record high levels, which negatively impacted beef exports.

The 2023 choice boxed beef cutout value steadily increased and was 20% higher than last year. The cutout is at a historic high level, only outdone by the temporary big spike during the peak of the 2020 COVID-19 market disruption.

Fed steer prices also increased to historically cyclical high levels.

Fed steers averaged a record high $175.54 per hundredweight (cwt.) in 2023 compared to $144.40/cwt. in 2022.

The strength of the U.S. dollar, impacts of exchange rates, and consumers trading down to lower-priced beef cuts and other proteins also negatively impacted 2023 beef exports, especially in Southeast Asia.

Beef exports to Japan declined 20% in 2023, reflecting the weak yen, higher U.S. beef prices and Japan's tariff on beef imports.

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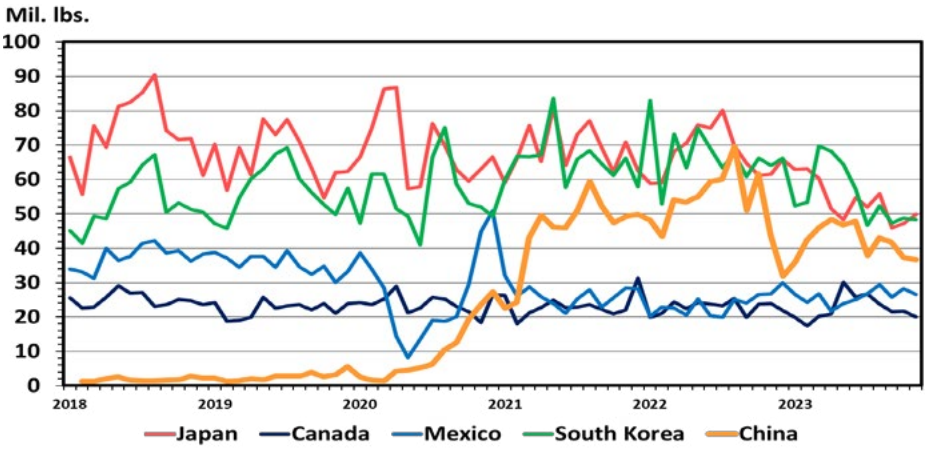
U.S. Beef Exports to Major Markets
Carcass Weight, Monthly



2023 Beef Exports Declined and Face Similar Headwinds in 2024 — continued from page 5

Historically, the top U.S. beef export markets were Japan, South Korea, Mexico and Canada. In 2021, China quickly emerged as the third best market after the U.S.-China Phase One trade agreement became effective in March 2020. Exports to South Korea have been steadily increasing, which allowed it to pass Japan for the top spot in 2023.

While U.S. beef exports to four of the top five export customers — South Korea, Japan, China and Canada — declined in 2023, there were some bright spots.

Mexico, the U.S.'s fourth best beef export customer, recorded a 14% increase in U.S. beef imports in 2023. Demand for cuts from the round, chuck and ribs, as well as variety meats was strong.

Beef exports to Hong Kong, Central America, the European Union and United Kingdom also increased.

Even though beef exports declined in 2023, they were still the third highest ever, only behind 2021 and 2022.

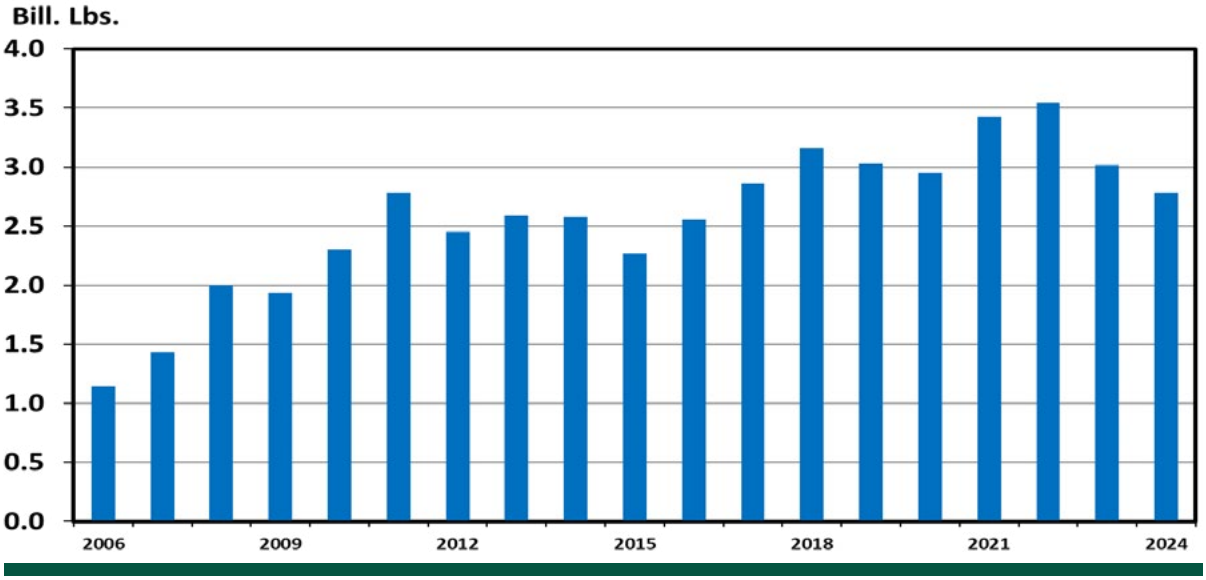
The USDA Economic Research Service publishes monthly and annual U.S. livestock and meat trade data by country. That report with historic data back to 1989 is available at www.ers.usda.gov/data-products/livestock-and-meat-international-trade-data.

Similar headwinds to U.S. beef exports that occurred in 2023 are expected for 2024. USDA is forecasting beef exports to decline to 2.79 billion pounds in 2024 compared to 3.02 billion last year.

USDA is predicting 2024 beef production to continue to fall to 26.11 billion pounds and fed cattle prices to continue increasing cyclically to a record high $178.25/cwt.

Maintaining a strong export market in spite of headwinds is important. The U.S. Meat Export Federation estimates that beef exports contributed $395.40 per head to fed cattle sold in 2023 (www.usmef.org).

U.S. Beef and Veal Exports — Carcass Weight, Annual



The U.S. Labor Supply Shortage Being Felt in Agriculture

Bryon Parman, NDSU Extension Ag Finance Specialist

For approximately the last six years, U.S. employers have been facing a labor shortage to varying degrees. While the shortage has allowed unemployment rates in the U.S. to remain historically low, businesses in many industries across the country have had problems with staffing to the extent that some have simply shut down. With the exception of the period during and immediately after the pandemic, there have been more job openings than there have been unemployed people looking for work. Figure 1 shows the number of unemployed workers per job opening. If that ratio falls below 1.0, then there are more open jobs than unemployed workers looking for a job. The most recent data for the end of 2023 had a ratio of 0.7, meaning that for every 10 job openings, there are only seven unemployed workers. While there are certain frictions, such as location, industry and fit, that can make matching workers to jobs challenging, if every unemployed worker was matched with an open job right now, there would still be approximately 2.5 million open nonfarm jobs (data from U.S. Census Bureau).

Figure 1: Number of Unemployed People Per Job Opening, August 2015 to November 2023, Seasonally Adjusted

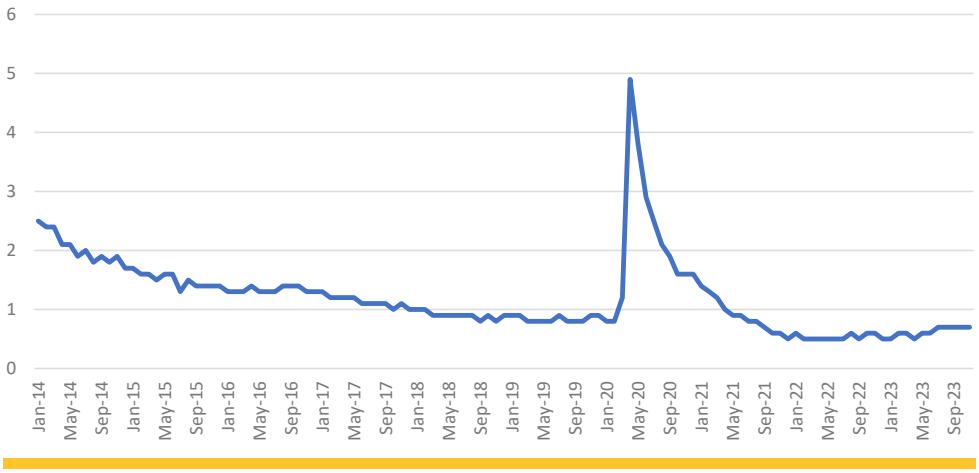


Figure 1 Chart data U.S. Bureau of Labor Statistics

The tight labor market has driven wages across the U.S. higher. In December 2013, the average hourly wage in the U.S. was approximately $24/hour. By December 2023, average hourly wages in the U.S. have grown to over $34/hour. This has been a real challenge for businesses that are not only struggling to find employees but also must pay considerably more to those they currently have as well as new hires. This also has led to a turnover problem where new workers might require considerable time training for the position but might also leave rather soon for higher wages.

This situation has certainly impacted agricultural labor. It has historically been the case that farm-worker wages were considerably lower than nonfarm average wages. In 2000, the average farm wage was approximately 59% of the average

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The U.S. Labor Supply Shortage Being Felt in Agriculture — continued from page 7

nonfarm hourly wage. However, by 2023, the farm-labor average hourly wage has grown to over 65% of the average nonfarm hourly wage. This implies that not only are farm wages increasing, but they are increasing faster than nonfarm wages. This further implies that farm and ranch owners/managers are having to close the gap between farm and nonfarm wages to both attract and keep workers who might have more lucrative opportunities available. Additionally, farm and ranch labor requirements are often seasonal, and most employees would prefer permanent positions. Furthermore, the skill requirements for agricultural jobs have increased considerably from 20 or 30 years ago.

Given the current demographic situation in the U.S., the current labor situation for agriculture and the U.S. economy as a whole does not appear to have a short-run solution. Some have suggested that there has been a dramatic increase in those aged 16 to 65 who are not working or looking for work. However, from 2012 – 2022, the U.S. Bureau of Labor Statistics (BLS) reports that the only age demographic with a decline in the labor participation rate was individuals aged 65 – 74 years. However, the BLS does project that adults aged 25 – 54 years old from 2022 – 2032 will experience a nearly 1% decline in labor participation, 16- to 24-year-old adults will experience a 4.3% decline in participation and there will be a decline of 1.4% in labor force participation from those aged 55 and older. In total, the expectation is that the labor-force participation rate in the next 10 years will decline by 1.8%. So

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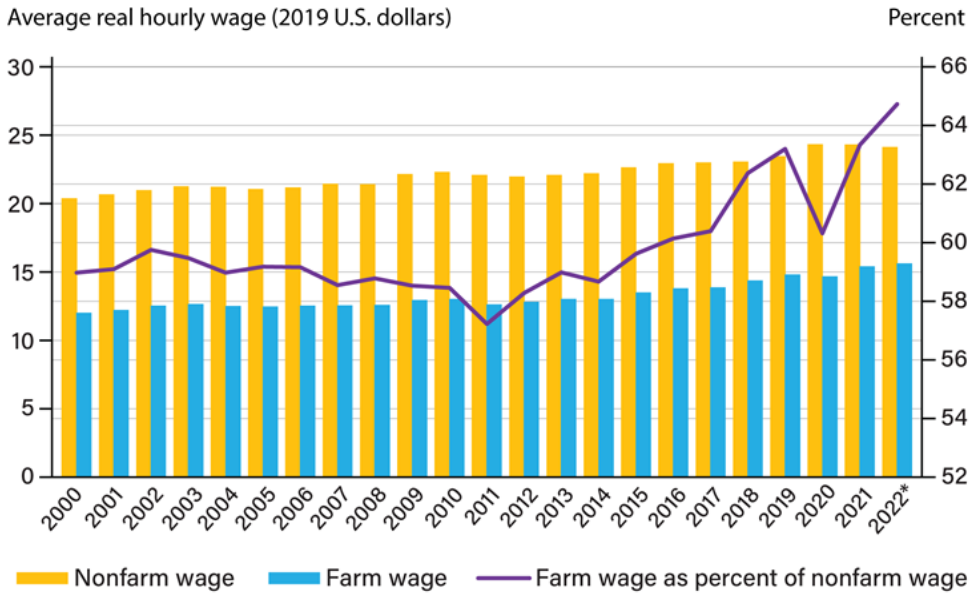
Figure 2: U.S. Farm and Nonfarm Wage Statistics, 2000-22



Note: * = Annual values for 2022 were predicted using incomplete data and year-to-date comparisons with 2021. **Real wages** are adjusted for inflation and pegged to 2019 values.

Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service's Farm Labor Survey and U.S. Department of Labor, Bureau of Labor Statistics' Current Employment Statistics.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The U.S. Labor Supply Shortage Being Felt in Agriculture — continued from page 8

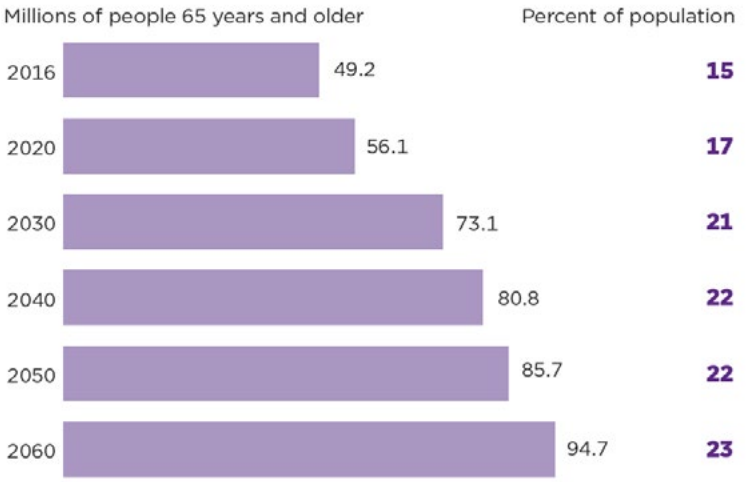
while the current situation wasn't due to younger adults not participating in the labor force, it may be a factor moving forward.

It is also the case that the U.S. population is aging. In 1950, approximately 8% of the U.S. population was age 65 or older, which is around the time many either retire or are soon to retire. By 2000, the aged 65 or older adults comprised 12.5% of the population. In 2022, 17.3% were aged 65 or older, and it is expected that in the next 20 years that will increase further to over 22% of the population. As people are living longer on average than they were in the 1950s and therefore working further into their 60s, the BLS data show that about 27% of those 65-74 still work and only 8% of those 75 and older. Thus, since the vast majority of those over 65 tend to retire, a significant increase in their percentage of the population will cause an overall decline in available workers.

Problems finding workers in agriculture is not new. Part of the reason equipment has gotten so large and technology has continued to advance is to replace the need for workers. But in many cases, hyper specialization in crop and/or livestock production has made the seasonality problems worse where planting/calving/harvesting/weaning windows are short. It may be necessary moving forward to diversify production, especially with respect to crop selection so that there is less overlap during planting and harvest seasons, allowing fewer full-time workers to be more productive year round.

Figure 3. Projections of the Older Adult Populations: 2020 to 2060

By 2060, nearly one in four Americans is projected to be an older adult.



Source: U.S. Census Bureau, 2017 National Population Projections