

Agriculture By the Numbers

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NDSU Extension Agribusiness and Applied Economics

Beef Replacement Heifer Dynamics

Agricultural Commodity Prices Not the Only Factor When it Comes to Tariffs

Short-term and Long-term Impacts of U.S. Trade Strategy Very Unclear

Beef Replacement Heifer Dynamics

Tim Petry, Extension Livestock Marketing Specialist

It's been one of the most asked questions in the U.S. beef cattle industry recently: "When will beef cow herd rebuilding begin?" That question is a result of six straight years (2019-2024) of beef cow liquidation, current record-high cattle prices and improvement in moisture conditions in some U.S. cattle-producing regions.

A number of obstacles, including drought conditions on a regional basis, production cost inflation, elevated interest rates and increased beef production due to higher fed cattle carcass weights, may be hurdles to herd rebuilding.

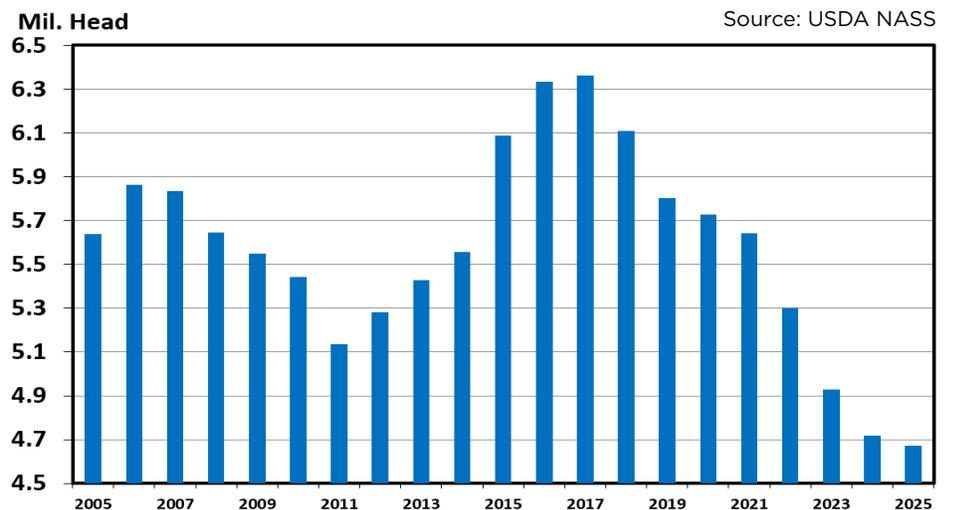
One of the pieces to the beef cow herd restocking puzzle is the availability of beef replacement heifers to rebuild the herd.

The USDA-National Agricultural Statistics Service (NASS) released the annual CATTLE inventory report on January 31, 2025: <https://usda.library.cornell.edu/concern/publications/h702q636h>

NASS reported the Jan. 1 U.S. beef replacement heifer inventory at 4.67 million head has declined 45,900 head (1.7%) from the 4.72 million head in 2024 and was the lowest number since 1950. So, the availability of heifers for herd rebuilding is a concern.

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



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After the last cyclical low in beef cow numbers on Jan. 1, 2014, much-improved moisture conditions allowed herd rebuilding to start in earnest. However, there were more replacement heifers available then than there are now. Compared to the 4.67 million heifers available to begin 2025, there were 5.56 million heifers available to begin 2014 and 6.09 million available in 2015.

The number of replacement heifers can change throughout the year, though.

Since 2001, the NASS report has divided beef replacement heifers into two categories. The first category is beef replacement heifers over 500 pounds expected to calve as two-year-old heifers in 2025. Those heifers were bred in 2024. The second category is heifers over 500 pounds which may be bred as yearlings in 2025 to calve in 2026.

Categorized as “Other Heifers” are beef heifers over 500 pounds not reported by producers as replacements.

The number of beef heifers expected to calve in 2025 at 2.92 million head was down 1.7% from 2.97 million in 2024 — the lowest number since records began in 2001.

All the heifers expected to calve do not enter the cow herd and get reported as cows the next Jan. 1. Some heifers may not be pregnant, some may lose a calf and be sold and some may raise a calf but not rebreed or have other issues and be marketed before Jan. 1.

The number of beef heifers planned for breeding in 2025 was 1.75 million head, up just 3,800 head from 2024, but still historically low.

The number of heifers reported for breeding is usually only 60 to 65% of the following year’s heifers expected to calve. For example, on Jan 1, 2024, 1.75 million heifers were kept for breeding. But on Jan. 1, 2025, there were 2.92 million bred heifers.

The difference comes from the other heifer category. Some cattle producers purchase heifers to breed instead of retaining their own. Others purchase heifers to develop, breed and market as a value-added enterprise.

The number of other heifers in 2025 was 9.59 million head compared to 9.65 million in 2024.

Due to the dynamics of the “Other Heifer” category, sometimes NASS revises the previous year’s replacement heifer category. For example, on Jan. 1, 2025, NASS revised 2024 beef replacement heifer numbers downward from the original 4.86 million head to 4.72 million. That was due to the drought which caused fewer heifers to be bred than originally planned.

NASS revised 2024 North Dakota replacement heifer numbers down from 163,000 to 158,000.

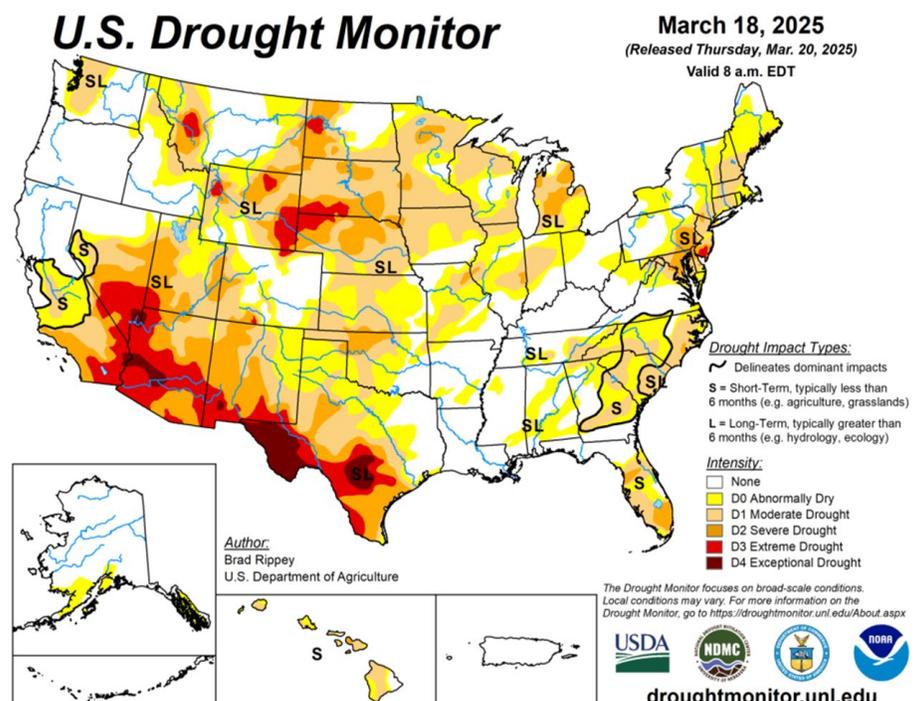
In years when adequate moisture conditions allow restocking plans to begin, the replacement heifer category may need to be adjusted upward if more heifers are bred than planned.

Keep in mind that NASS numbers are not wrong when they are issued. However, they may be revised due to producers changing plans throughout the year.

Although the number of bred heifers expected to calve in 2025 is limited, there is potential for additional heifers to be bred than originally planned if moisture conditions improve.

The top eight beef cow states in order of importance are Texas, Oklahoma, Missouri, Nebraska, South Dakota, Montana, Kansas and North Dakota, all of which account for over 50% of the U.S. beef cow herd. All are currently experiencing varying degrees of drought conditions, according to the U.S. Drought Monitor.

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Beef Replacement Heifer Dynamics — continued from page 2

On Jan.1, 2025, NASS reported 158,000 North Dakota beef replacement heifers, which is the same number as 2024.

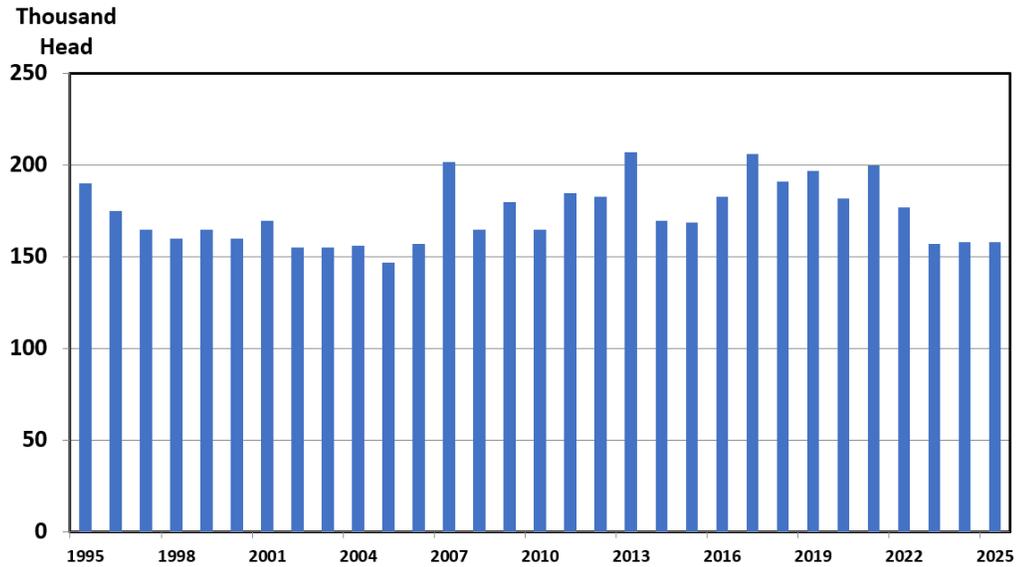
North Dakota cattle producers typically background and develop many replacement heifers as a value-added enterprise. Before drought conditions in the last few years, the top 10 highest-ever beef replacement heifer numbers were recorded in North Dakota.

There are a number of reasons why many heifers are usually retained in North Dakota. Lightweight heifers receive at least \$30/cwt. price discounts to steers in the fall but continue to gain in price relative to steers as weights increase.

Retaining heifers provides marketing flexibility. They can be kept and bred in the summer or marketed in the spring as feeder cattle, depending on weather and market conditions. North Dakota-developed replacement heifers are in demand not only in North Dakota, but in other states due to their high quality.

North Dakota cattle auction markets are reporting replacement-quality, Bangs-vaccinated, 800-900 lb. heifers from the other heifer category bringing over \$2,200 per head, which may indicate optimism.

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



Source: USDA NASS

North Dakota Weekly Cattle Auction Summary AMS Livestock, Poultry, & Grain Market News North Dakota Dept of Ag Mrkt News Mar 21, 2025



HEIFERS — Medium and Large 1 (Per Cwt/Actual Wt)

Head	Weight Range	Average Weight	Price Range	Average Price	
15	355-384	374	420.00-435.00	430.26	
67	414-446	434	375.00-406.00	392.21	
177	462-494	477	346.00-385.50	370.91	
179	502-547	535	334.50-368.00	343.04	
349	551-597	575	306.00-350.00	331.81	
324	613-644	632	296.00-319.00	307.57	
15	601	601	317.50	317.50	Replacement
326	654-681	666	272.00-313.00	302.32	
15	678	678	300.00	300.00	Replacement
148	700-734	725	259.00-288.00	280.88	
60	704-743	717	284.00-295.00	289.29	Replacement
67	755-789	762	263.00-291.50	284.05	
8	793	793	266.00	266.00	Replacement
12	803-809	806	253.00-260.00	256.49	
32	820	820	271.50	271.50	Replacement
22	857-886	872	230.00-250.00	240.17	

Agricultural Commodity Prices Not the Only Factor When it Comes to Tariffs

Bryon Parman, NDSU Agricultural Finance Specialist

When it comes to tariffs, as they pertain to agriculture, thoughts immediately turn to commodity prices. This is understandable since many of our major crops, such as soybeans, corn and wheat, and our livestock products, such as beef, poultry and pork, are exported. However, while commodity prices are a major factor in farm profits, production costs are the other key determinant. There are several major cost items that import tariffs will likely impact. This article does not attempt to argue for or against the tariff policies enacted or proposed. Indeed, there are many economic benefits to utilizing tariffs in trade policy, both for exports and imports, but they are beyond the scope of this article. However, in the short run, there will almost certainly be price responses to consumers for products impacted by tariffs.

One area likely to be impacted by tariffs is agrochemicals, specifically pesticides and herbicides. The U.S. herbicide market is estimated at \$13.5 billion in 2025. According to NDSU's enterprise budgets, per-acre herbicide costs in North Dakota may range from as low as \$20 per acre up to \$50 or \$60 per acre, depending upon region and crop type. In states such as Nebraska and Iowa, which are experiencing tougher weed pressures, herbicide costs exceed \$100 per acre for some crops. These recent budget costs are projected before any tariffs are imposed. Current estimates are that 99% of glyphosate, 85% of glufosinate, 49% of 2,4-D and 100% of the atrazine used in the U.S. is imported from China. These are not the only herbicides imported from China but are some of the more widely used in commercial U.S. agriculture. In February, the U.S. imposed a 10% tariff on Chinese imports, an additional 10% tariff in March and more tariffs to be expected in April.

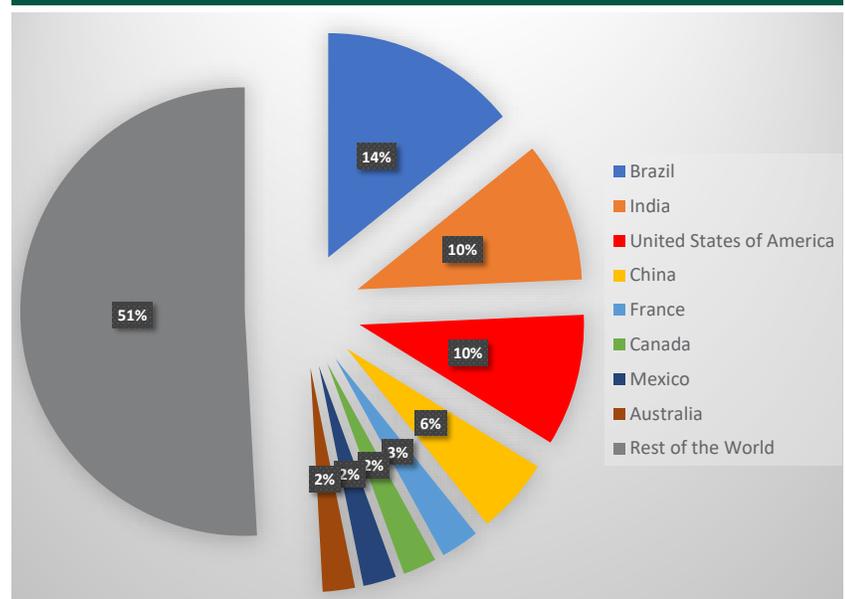
Fertilizers are another production input that tariffs may impact. The U.S. imports around 90% of the potash it uses; of that, 85% comes from Canada. In March, however, President Trump signed an executive order reducing the tariffs on items traded under the United States-Mexico-Canada Agreement to be

reduced to a 10% tariff rather than the stated 25%. Before the Trump administration, there already were tariffs placed on significant exporters of phosphorus, including a 14.2% tariff on Moroccan phosphate and an 18.8% tariff on Russian phosphate. For reference, the U.S. imports anywhere from 6% to 16% of the phosphate rock used since 2005. The U.S. also imports around 10% of the nitrogen fertilizers used in a given year, with around 30% imported from Canada.

Tariffs on steel and aluminum imports to the U.S. are also products that may impact downstream prices, including farm equipment and parts. The White House Fact Sheet regarding Section 232 tariffs states that President Trump intends to "close existing loopholes and exemptions to restore a true 25% tariff on steel and elevate the tariff to 25% on aluminum" with the expectation that these measures will help revitalize and strengthen domestic steel and aluminum production (the previous tariff on aluminum was 10%). While tariffs on steel and aluminum have been in place for many years, there

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Figure 1 - Top Fertilizer Importers by Country 2023 by Amount of Global Spending



Data from trademap.org. Accessed 4/1/2025.
<https://www.trademap.org/Index.aspx>

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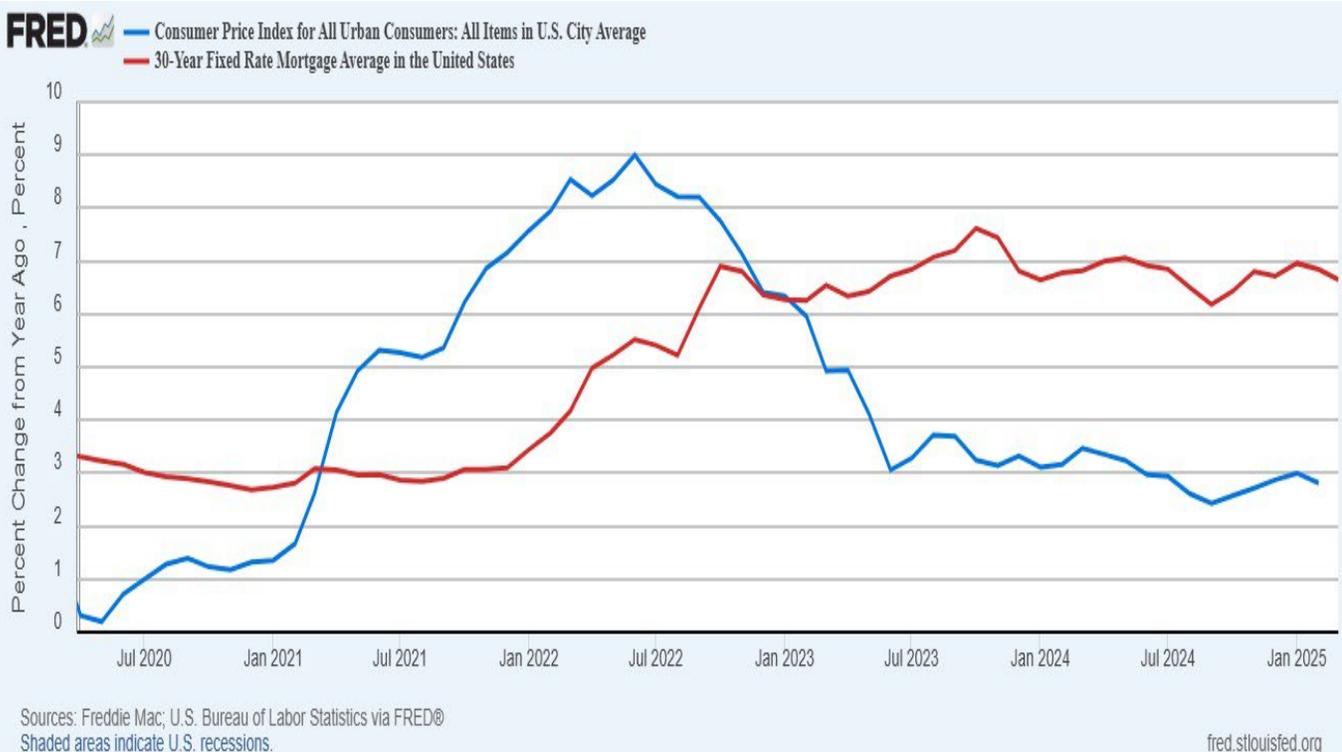
have been many exemptions for some counties or carve-outs for particular steel and aluminum products, such as stamped bumpers and wire. The new tariffs are expected to eliminate those carve-outs. Of the two products, the tariffs on aluminum will likely be more impactful since, as of 2023, the U.S. imported 26% of the steel consumed and 44% of the aluminum consumed domestically; also, the previous tariff policy was 10%, not 25% on aluminum. The transportation industry is by far the largest user of aluminum at 36% of total usage.

Tariffs may have a significant impact on interest rates. The immediate consequence of import tariffs and potential retaliatory tariffs on U.S. exports may be price inflation at the consumer and producer levels. The Federal Reserve has been combating inflation since it began rising rapidly in early 2021 and peaking in the summer of 2022 at nearly 9%. In response, the Federal Reserve began increasing the federal funds rate, influencing interest rates nationwide. In the last year, however, the Federal Reserve has reduced the federal funds rate from a high of 5.5% to 4.5% through three rate cuts in the third and fourth quarters of 2024. One concern is that, with tariffs likely increasing prices domestically, the expected 2025 rate cuts will have to be delayed

until the Federal Reserve can assess any potential price increases. Another concern is that if the price increase occurs at the same time as an economic slowdown, growth in unemployment numbers might accompany the rise in prices.

Overall, it is difficult to build a set of predictions for the short-run impact that both the enacted and proposed trade policies might have. First, it is uncertain if all the proposed tariff policies will go into effect and how long they will remain if they do. Next, the reactions from trade partners will greatly impact import and export prices. Another important consideration is how quickly domestic industries can adjust. Finally, the overall macroeconomic impacts will likely weigh on the Federal Reserve's attempt to fight inflation while keeping U.S. unemployment as low as possible. In the long run, many options and adjustments are available for industries such as agriculture and consumers, who have plenty of time to adapt. For instance, agrochemical products impacted by tariffs could move production from China to the U.S., but that may take many years to accomplish. However, in the short run, there is likely to be some friction and switching costs that will have to be overcome.

Figure 2: U.S. Inflation vs. the 30-Year Fixed Rate Mortgage



Short-term and Long-term Impacts of U.S. Trade Strategy Very Unclear

Frayne Olson, Crop Economist/Marketing Specialist

The U.S. is beginning a significant shift in international trade policy that could have important implications for U.S. agriculture and the overall U.S. economy. The proposed shifts to trade policy have been changing very rapidly, with no historical reference points that can be used as a guide for potential market adjustments and changes in economic behavior. This makes developing crop marketing plans and managing farm and ranch operations very difficult.

Proposed U.S. reciprocal tariffs on imported products and potential retaliatory tariffs by trading partners can have different implications for alternative crop exports and crop price movements. Previous Agriculture By the Numbers articles have tried to outline some of these different impacts by crop, but this issue aims to provide more historical context. The goal is to provide a quick reference that can be used to evaluate the possible impacts of future changes in trade policies by countries that purchase U.S. grains and oilseeds.

Corn - Corn is the largest U.S. crop when ranked by planted area, total bushels produced and value of production. Exports account for approximately 15% of total corn use each year. While this is a relatively small percentage compared to soybeans and wheat, exports significantly impact short-term price movements. Figure 1 shows the historical exports for the seven largest buyers of U.S. corn.

Mexico, Japan, Columbia and South Korea are typically the top four buyers of U.S. corn, with exports to Mexico growing steadily over the past decade. Trade relationships with these countries will be important for supporting U.S. prices. U.S. corn exports to China have been very sporadic and peaked during the 2020/21

marketing year because of the Phase One trade agreement. China has the capacity to purchase large volumes of U.S. corn, but Mexico, Japan, Columbia and South Korea are more stable buyers.

Soybeans - Soybeans are the second-largest U.S. crop ranked by planted acres, bushels produced and value of production. Exports account for 40-45% of total use and play a significant role in determining market price levels. Figure 2 shows the historical exports for the seven largest buyers of U.S. soybeans.

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Figure 1 - Historic U.S. Corn Exports by Country

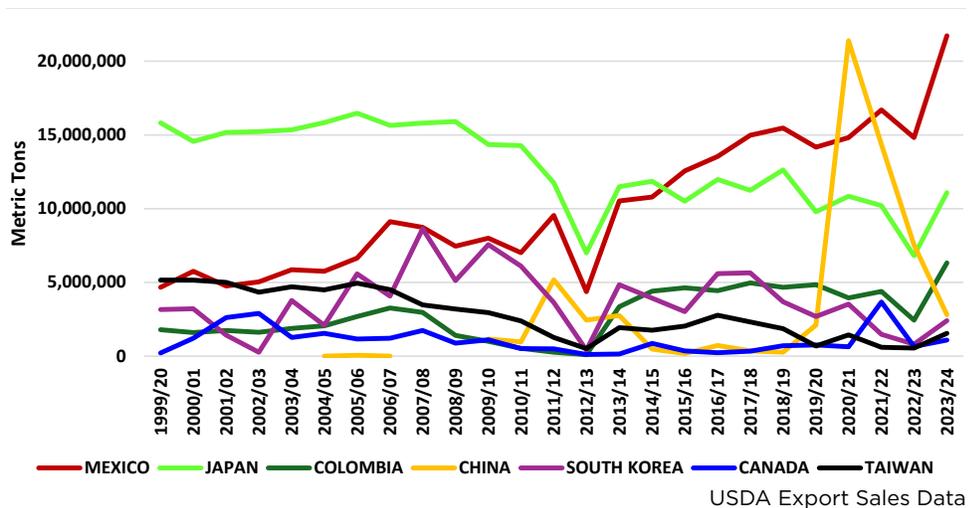
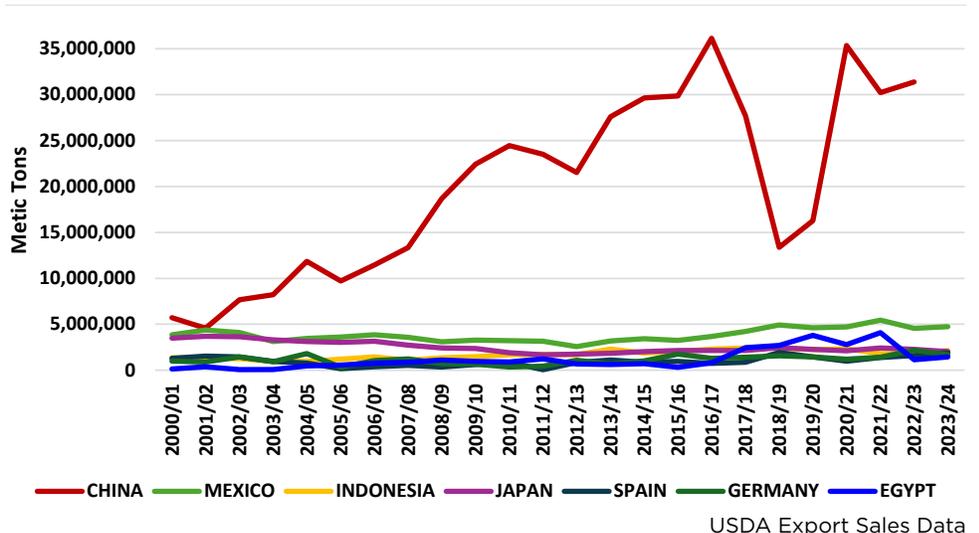


Figure 2 - Historic U.S. Soybean Exports by Country



Short-term and Long-term Impacts of U.S. Trade Strategy Very Unclear — continued from page 6

China is the single largest buyer of U.S. soybeans, followed by Mexico, Indonesia and Japan. The significant drop in Chinese imports during the 2018/19 and 2019/20 marketing years was due to a previous trade war with China. Soybean export sales to China recovered in the 2020/21 marketing year because of the Phase One agreement. In contrast, soybean exports to Mexico, Indonesia and Japan have been relatively stable over the past 24 years. The greatest challenge with diversifying U.S. soybean exports is the need to sell soybeans to countries with sufficient oilseed processing capacities. The status of U.S. trade relations with China will be critical for determining U.S. soybean prices.

Wheat - Wheat is the third-largest U.S. crop ranked by planted area, total bushels produced and value of production. Exports account for approximately 40% of total wheat use in recent years. Exports play a significant role on short-term prices and changes in global wheat supply and demand conditions can shift U.S. prices quickly. Figure 3 shows the historical exports for the seven largest buyers of all U.S. wheat.

Mexico has been the largest buyer of U.S. wheat for the past six years. The Philippines has been a very consistent long-term buyer of U.S. wheat, but Japanese purchases have slowly been declining over the past decade. In contrast, export sales to Egypt and China have fluctuated significantly. Egypt was once the largest buyer of U.S. wheat but has shifted a significant amount of its purchases to Ukraine and Russia over the past 10 years. Trade relationships with Mexico, the Philippines, Japan, South Korea and Taiwan will be important for supporting U.S. wheat prices. Canada, Australia, Argentina, the European Union, Ukraine and Russia are all major competitors in supplying wheat to the global market.

Figure 3 - Historic U.S. All Wheat Exports by Country

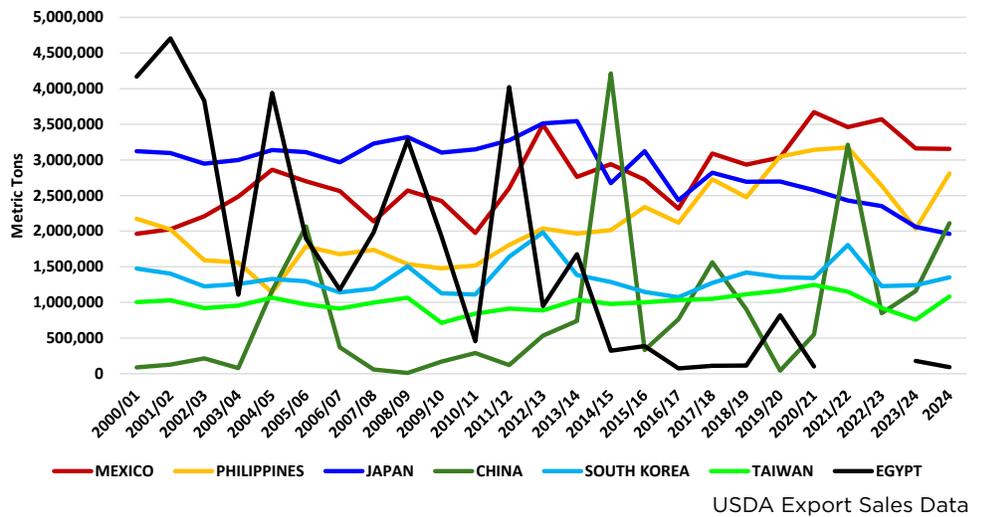
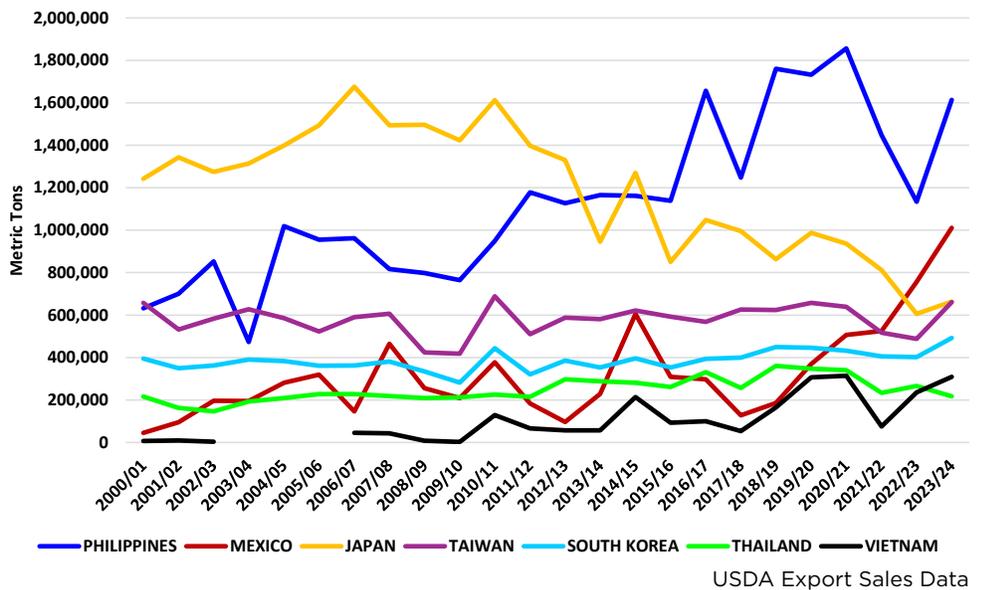


Figure 4 - Historic U.S. Spring Wheat Exports by Country



Spring Wheat - Spring wheat prices are closely tied to U.S. winter wheat and global wheat prices. Exports account for 45-50% of total spring wheat use. Spring wheat is considered a specialty wheat in the global markets and usually maintains a price premium over other wheat classes. However, this price premium can only reach about \$1.00-\$1.25 per bushel before domestic and international buyers begin looking for alternative sources of wheat flour protein. Figure 4 shows the historical exports for the seven largest buyers of U.S. spring wheat.

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Short-term and Long-term Impacts of U.S. Trade Strategy Very Unclear — continued from page 7

The Philippines is the largest buyer of U.S. spring wheat. Spring wheat exports to Mexico have risen rapidly in the past several years, and it is now the second-largest buyer. Exports to Japan have slowly declined in the past 10 years, while exports to Taiwan, South Korea, Thailand and Vietnam have been relatively stable. Trade relationships with Mexico will be watched very closely by the spring wheat markets. In addition, changes in port fees and ocean freight costs can have a significant impact on the relative prices of U.S. and Canadian spring wheat in global markets.

Each country impacted by changes in U.S. trade policy will likely respond differently. Some countries may apply targeted retaliatory tariffs on U.S. products. In this case, U.S. grains and oilseeds may or may not be included. Other countries may agree to negotiate new trade agreements with the U.S. This usually takes time, and it is unclear if existing tariffs will remain, be reduced or be eliminated. It is unlikely that crop prices will recover until a new trade agreement is implemented. Country-by-country trade responses will need to be monitored to understand crop price movements.



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