Agriculture By the Numbers

End of the Year 2020

NDSU Extension Agribusiness and Applied Economics

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Closing Out 2020: U.S. Producers Set to Have Their Best Year in the Last 6

By Bryon Parman, NDSU Extension Agricultural Finance Specialist

2020 is going to be remembered by many of us as one of the strangest years of our lives.

Older generations have dealt with pandemics, such as the Spanish flu, as well as world wars, but for many of us, COVID-19 is the first national crisis that has lasted this long and affected our lives this much.

At the beginning of 2020, the outlook for agriculture wasn't all that great. While we had a trade deal in place, no one was sure exactly which commodities would be purchased by China under the new agreement, when they would be purchased and the quantities. Furthermore, markets were tired of reacting to rumors or official statements made in 2018 and 2019 such that until they actually saw purchases occur, they were going to remain cautious.

The outlook for farm income from the U.S. Department of Agriculture (USDA) was essentially more of the same, projecting net farm income and net cash income to look a lot like 2018 and 2019. The following chart is the February 2020 USDA projection for farm incomes showing 2020 to be a bit lower than 2019 due to the expectation that we likely would not have another Market Facilitation Program (MFP) payment.

As the COVID-19 pandemic spread and lockdowns caused the suspension of economic activity in many sectors, commodity prices in agriculture began to suffer. COVID-19 outbreaks in packing plants made matters much worse and were impacting meat prices dramatically. The outlook was poor, causing the federal government to react in similar fashion to how it did with Market Facilitation.

In fact, the University of Missouri Food and Agricultural Research Institute (FAPRI) estimates that with MFP, the Paycheck Protection

Continued on page 2.

Closing Out 2020: U.S. Producers Set to Have Their Best Year in the Last 6 — continued from page 1

Program and Coronavirus Food Assistance, ad-hoc payments in 2020 totaled more than $20 billion. If you add in programs included in the farm bill and disaster assistance, government payments will approach $33 billion, more than any year ever[1].

However, as 2020 progressed, purchases by China and other important trade partners, along with dry weather in parts of the U.S., resulted in a dramatic improvement in commodity prices over what we saw in the early and late spring. This was so much so that the same FAPRI report from September estimates that net farm income in 2020 would be nearly $15 billion higher than in 2020, at $98.6 billion total. The USDA's revised forecast for 2020 released in September showed net farm incomes up from $96.7 billion in February to $102.7 billion, with net cash income moving up as well (illustrated in the figure below).

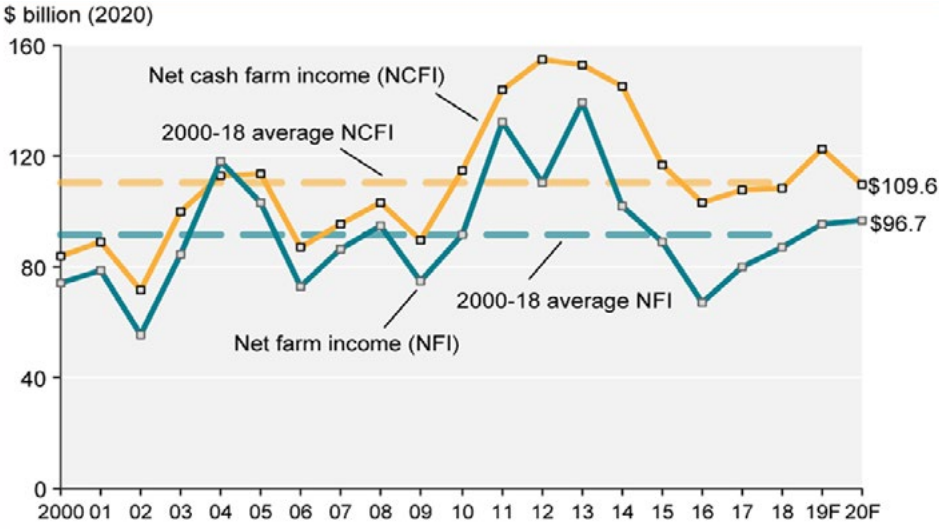
By early December, the USDA had revised again the expectations for net farm incomes up to nearly $120 billion, nearly $25 billion higher than the February forecast and $17 billion higher than September.

In fact, if the USDA is correct, 2020 will have the highest income since 2014, where we experienced record livestock prices and decent overall commodity prices. With the combination of government program payments and stronger harvest prices, what looked to be a financial disaster in the spring for U.S. agriculture has turned into the best year in the last six.

However, as is usually the case in agriculture, the good news in 2020 comes with a caveat

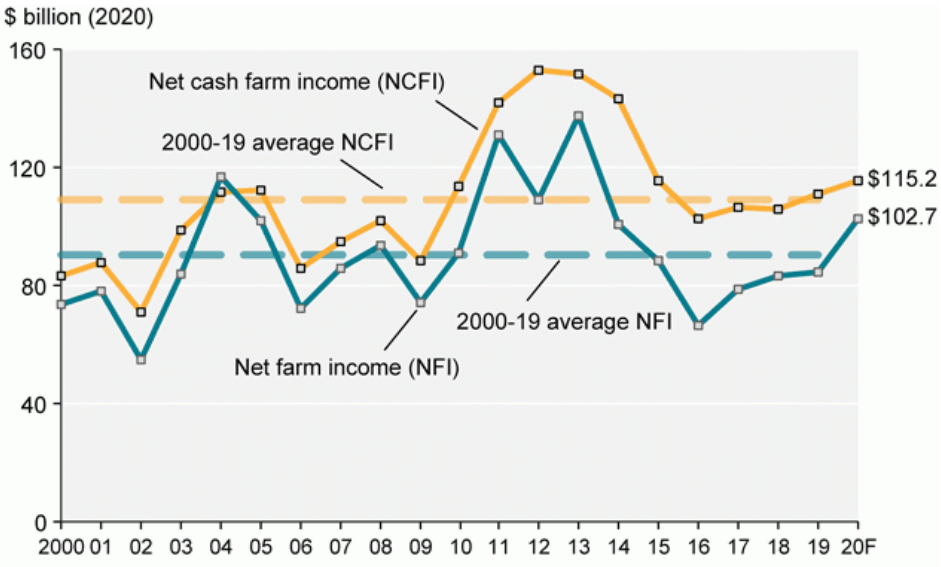
Continued on page 3.

Net Farm Income and Net Cash Farm Income, 2000-20F



Note: F = forecast. Values are adjusted for inflation using the chain-type GDP deflator, 2020=100.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics. Data as of February 5, 2020.

Net Farm Income and Net Cash Farm Income, 2000-20F



Note: F = forecast. Values are adjusted for inflation using the chain-type GDP deflator, 2020=100.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics. Data as of September 2, 2020.

[1] From the September "Baseline Update for U.S. Farm Income and the Farm Balance Sheet." September 2020. FAPRI-MU Report #05-20

Closing Out 2020: U.S. Producers Set to Have Their Best Year in the Last 6 — continued from page 2

into 2021. Net farm incomes are projected much lower into next year, primarily because they are calculated in the absence of any MFP or CFAP assistance.

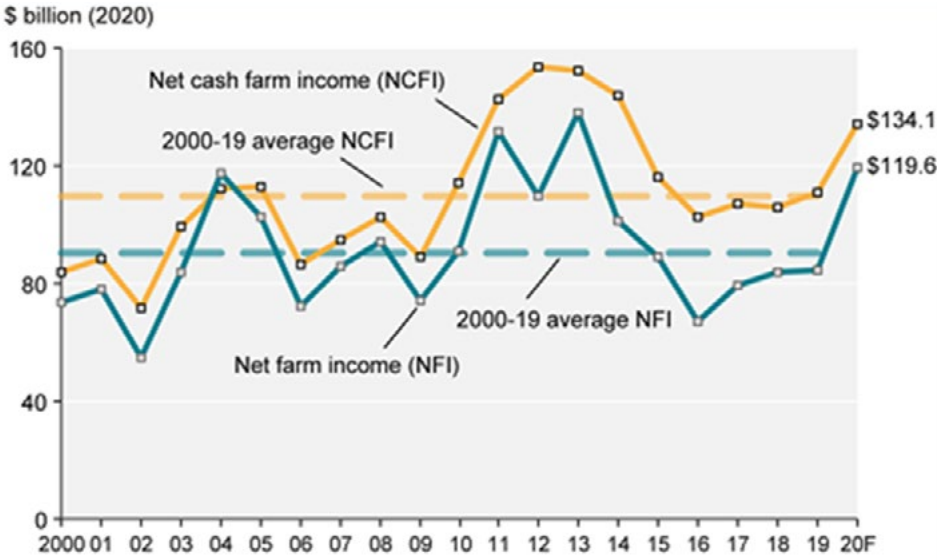
With 2020 having the double impact of CFAP, some residual MFP payments and higher fall prices, 2021 projects to look more like 2018. While having some form of MFP or CFAP certainly is possible in 2021, stronger commodity prices will make it less likely, and we believe most producers would rather not find themselves in a position where another round of assistance is necessary.

A lot remains to be seen next year. First, what will food consumption patterns look like in 2021? Will we continue to have restrictions across the country and around the world or will things relax with the delivery of a vaccine?

The other thing is, if/when things become closer to the way they were before the pandemic, will consumer patterns return, or have they permanently changed at least somewhat? Will telecommuting become much more popular, dropping ethanol demand and business lunches at local restaurants?

One thing appears certain, however; a year that in the first quarter looked pretty dismal for U.S. agriculture has finished on a much more positive note.

Net Farm Income and Net Cash Farm Income, 2000-20F



Note: F = forecast. Values are adjusted for inflation using the Gross Domestic Product chain-type price index, 2020=100.
Source: USDA, Economic Research Service, Farm Income and Wealth Statistics.
Data as of December 2, 2020.

Lamb Prices Recover After COVID-19 Disruptions

By Tim Petry, NDSU Extension Livestock Economist

Like most livestock commodities, the sheep industry experienced significant disruptions due to the COVID-19 pandemic.

Slaughter and feeder lamb prices started 2020 above previous years' levels through early March. Prices were expected to continue to be supported by a number of bullish factors. Cattle and hog prices also were expected to perform better than in previous years.

Approximately one-half of lamb consumed in the U.S. is imported, with Australia and New Zealand providing about 80%. A multi-year drought since 2017 in Australia's sheep-producing region caused a 12% forced reduction in the sheep flock.

Demand for Australian lamb and mutton by China was supported by the pork shortage caused by African swine fever. In 2019, China increased lamb imports by 43%, and that demand was expected to continue.

So expectations were for less Australian lamb imports to the U.S. in 2020.

Other factors supporting lamb prices included an expected lower lamb crop in 2020. The U.S. Department of Agriculture (USDA) National Agricultural Statistics Service publishes an annual "Sheep and Goats" inventory report in January. The breeding sheep and market lamb inventories were down about 1% on Jan. 1, 2020, which likely meant a smaller lamb crop.

North Dakota bucked that U.S. trend, with the number of breeding ewes up almost 14% - the largest percentage increase of any state.

The strong U.S. economy with historically low unemployment and a record high stock market supported domestic lamb demand. Ethnic demand for lamb was especially strong.

Furthermore, plans for the March opening of a new state-of-the-art lamb slaughter plant (Colorado Lamb Processors) near Brush, Colo., buoyed expectations.

Unfortunately, as the COVID-19 pandemic hit the U.S. in March and spread rapidly, severe disruptions occurred throughout the meat industry. The ability of lamb packing plants to harvest animals was impacted by the spread of the virus in the workforce.

Some plants were forced to shut down. Closed plants and those operating at reduced volumes due to Centers for Disease Control and Prevention and Occupational Safety and Health Administration guidelines reduced the demand for lambs, especially in that region.

A severe blow to the industry occurred when the Mountain States-Rosen lamb packing plant in Greeley, Colo., declared bankruptcy and was sold for refurbishing to a beef plant. Furthermore, plans to open the Brush plant were put on hold.

Some lamb producers had profitable lamb delivery contracts canceled.

The demand for lamb meat also suffered because many high-value cuts such as racks, chops and legs were destined for food service institutions such as high-end restaurants, hotels and cruise lines. Stay-at-home and social distancing orders caused many food service establishments to close or severely reduce business.

In many cases, lamb products cannot be rerouted easily from food service to retail food stores.

Slaughter lamb prices in the northern Plains plummeted (see accompanying chart) from $177 per hundredweight (cwt) in March to $100 in late April, and feeder lamb prices crashed as well.

The steep decline in prices caused sheep and lamb eligibility for the 2020 USDA Coronavirus Food Assistance Program (CFAP1) for livestock announced in May. CFAP1 payments covered actual sales between Jan. 15 and April 15. Producers with sheep greater than 2 years of age received $24 per head and producers received $33 for younger sheep and lambs. Initially, sheep more than 2 years old were not included but were added later.

Producers owning sheep and lambs not sold received payments based on the highest inventory on a producer-selected date between April 16 and May 14. All classes of sheep and lambs were paid $7/head.

CFAP1 payments to sheep producers in the U.S. totaled $65.14 million, with North Dakota producers receiving $1.29 million.

In September, the USDA announced the CFAP2 program for livestock producers. Eligible sheep producers could apply for $27/head based on the highest inventory of sheep and lambs, **excluding** breeding stock, on a selected date between April 16 and Aug. 31.

Continued on page 5.

Lamb Prices Recover After COVID-19 Disruptions

— continued from page 4

The CFAP2 application deadline was Dec. 11, so applications still are being processed. The latest available amounts paid are $71.73 million to U.S. producers, with North Dakota producers receiving $1.62 million.

The closing of the Greeley plant and other COVID-related slaughter plant capacity issues have had significant implications for USDA lamb price reporting and price risk management. The plant was the second largest U.S. facility, with processing capacity of about 6,000 head per week.

Weekly slaughter lamb carcass prices have not been reported since late July due to confidentiality guidelines imposed by the USDA Agricultural Marketing Service (AMS). USDA Livestock Risk Protection (LRP) insurance has not been offered since July because it is based on AMS carcass price reports.

Because no futures market for lamb exists, LRP was a valuable price risk management tool, especially with the extreme volatility in lamb prices that was exasperated by the pandemic.

2020 sheep and lamb slaughter likely will decline about 3.5% to 2.24 million head, the lowest level since 2016. Lamb slaughter weights are down due to drought in much of the western U.S. sheep-producing region, so 2020 lamb production may be down about 5%.

Lower production, along with a number of other supportive factors, have caused a recovery in lamb prices since September (see chart) to near pre-COVID levels. Price support came from fewer lamb imports, government lamb purchases, a strong ethnic demand especially at retail and new plant capacity.

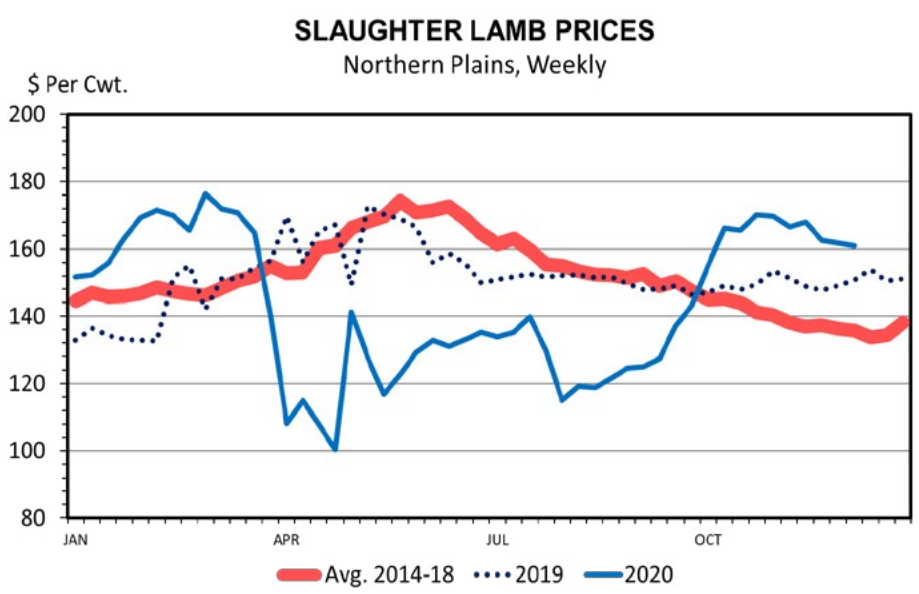
The new Brush plant has opened and is expected to ramp up production for the spring holiday lamb season demand. A refurbished slaughter plant in San Angelo, Texas, also is expected to open in early 2021.

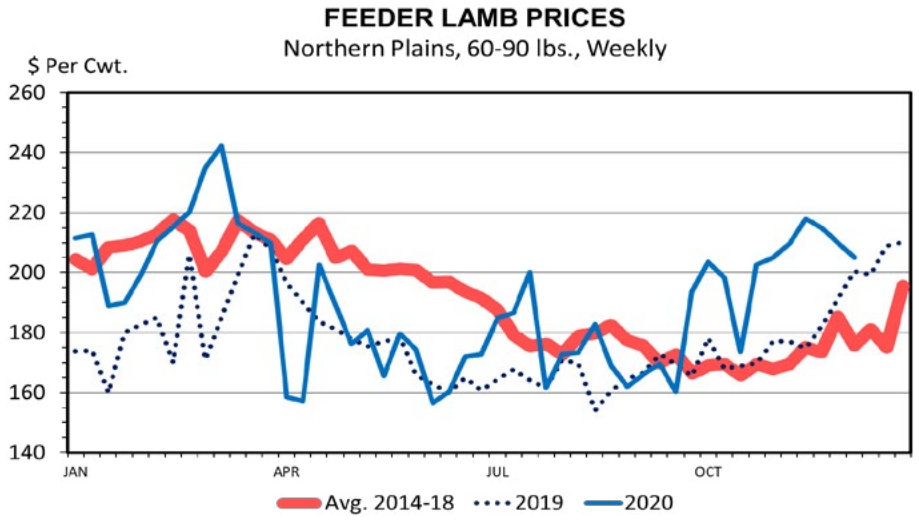
The recovery in lamb prices is expected to carry over into 2021. But a number of headwinds exist. At the forefront is the continuing pandemic and its impact on the U.S. economy. Widespread use of vaccines would be positive.

Drought in the western U.S. sheep-producing region is a concern as pasture and range conditions have deteriorated. Questions surround the lack of USDA price reporting and the availability of LRP-Lamb insurance. Increasing corn prices negatively impact feeder lamb prices, so prospects for the 2021 corn crop are important.

And concerns with the availability of sheep and lamb markets continue. Eastern North Dakota and northern Minnesota producers now have one fewer market with the recent closing of the West Fargo Stockyards.

Happy holidays and let's hope for a better 2021!





Data Source: USDA-AMS

North Dakota Custom Farm Work Rates

By Ron Haugen, NDSU Extension Farm Management Specialist

The results of the 2020 North Dakota custom farm work rates survey have been released

This survey is conducted by the North Dakota Agricultural Statistics Service (U.S. Department of Agriculture) and contains state-level custom work rates for land tillage, planting, fertilizer and pesticide application, haying operations, hauling, custom harvesting and other custom work.

The survey is done in two parts: the early season operations and the 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 is for fall work such as custom harvesting, grain drying and hauling.

These surveys are done every four years and are funded by the North Dakota Agricultural Experiment Station and NDSU Extension.

The survey shows the number of reports for each operation, the range in rates (minimum and maximum rates reported), the most frequently reported rates and the average rate for each operation. The survey also compares the current rates to the 2016 rates (the last time the survey was completed). Custom rates include charges for machines and equipment, tractor and power units, fuel, repairs and operator labor.

The survey usually has a wide range of rates. Sometimes the rate charged may not be the full economic cost of the operation. In some situations, knowing how to allocate costs properly to a specific operation may be difficult.

The 2020 early season operations survey summarized about 1,540 reports from farmers, ranchers, aerial sprayers, elevators and custom operators. This response rate is about the same as the 1,563 reports in 2016.

The late-season operations survey summarized about 1,600 reports. This is up from 1,100 reports in 2016. We express appreciation to these survey participants. This is data that is very useful in research and is available to the public so producers have a guide when rates are negotiated.

Continued on page 7.

North Dakota Custom Farm Work Rates

— continued from page 6

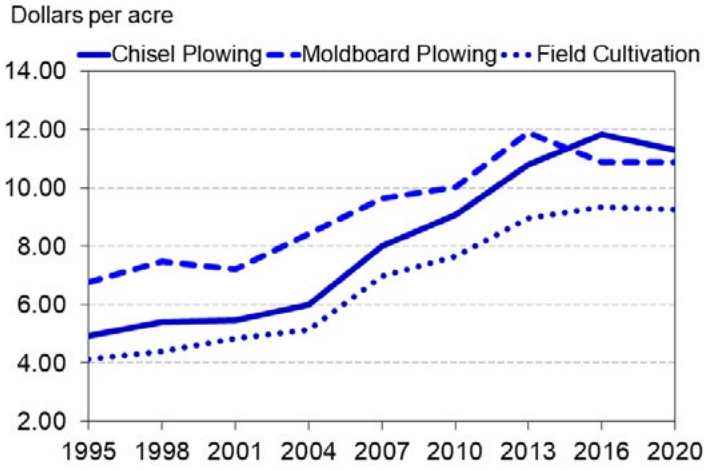
Items to note in comparing the 2020 rates with 2016 rates:

- A factor that affects custom charges is the fuel cost. Diesel fuel prices surveyed in 2020 were 92% of the 2016 price: $1.80 per gallon in 2020 versus $1.96 per gallon in 2016. The lower fuel price would be a factor affecting the overall custom rate charges. It would affect some operations more than others.
- Fertilizer applications, pesticide applications and baling were generally higher.
- General tillage operation charges were flat to lower.
- Mowing and clipping of Conservation Reserve Program land took a notable increase.
- Silage chopping and hauling costs increased.
- Seed and planting charges were flat or increased slightly.
- Labor items such a sheep shearing, calf branding and post hole digging had significant cost increases.

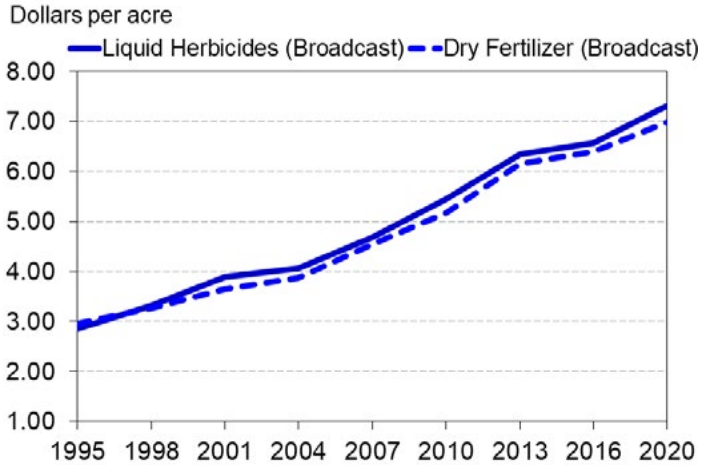
A popular rate that producers want to know about is custom combining charges. The harvesting charges were generally flat to slightly higher in the 2016 to 2020 comparison. One interesting note is that the combine hourly rental rate was up significantly, most likely because of higher combine dealer listed prices.

The early and late-season custom rate publications can be found on the NDSU Extension farm management page under publications at www.ag.ndsu.edu/farm-management/publications.

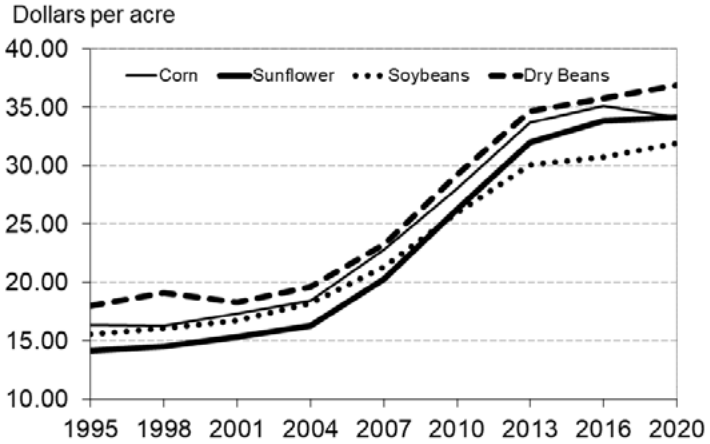
Land Tillage — Average rate: 1995-2020



Chemical Application — Average rate: 1995-2020



Straight Combining — 1995-2020 North Dakota



Source: North Dakota Agricultual Statisics Service (USDA)

Another Look at U.S.–China Trade

By Frayne Olson, NDSU Extension Crop Economist/Marketing Specialist

Last month, my Agriculture By the Numbers article focused on the structure of the Phase One trade agreement between the U.S. and China. The article highlighted how U.S. officials are tracking the expanded trade opportunities created by the agreement.

Two of the six chapters in the agreement impact agricultural trade. Chapter Three addresses nontariff trade barriers that restrict or prevent the flow of U.S. agricultural products into China. Chapter Six outlines dollar targets for expanding Chinese imports of U.S. agricultural, manufacturing and energy products, as well as expanding services such as finance, insurance and cloud services.

No doubt that the Phase One agreement has created benefits for U.S. agriculture and helped increase commodity prices. Table 1 shows the value of U.S. exports to China for the agricultural products listed in the Phase One trade agreement from January through October of 2017 and 2020. 2017 is the baseline year used to monitor the promised increases in Chinese purchases.

The value of all listed agricultural imports, from January through October, has increased from $15.3 billion in 2017 to $17.4 billion in 2020. However, the types of products bought also have changed. Five of the top six products in 2020 are either animal feed or animal meat products. This suggests that Chinese state-owned firms and private companies are responding to strong domestic demand for animal protein.

China is the world's largest pork producer, typically accounting for half of the world's total pork production and about five times larger than U.S. pork production. It is also the world's second largest chicken meat producer, just behind the U.S., which is the largest producer.

In August 2018, hogs in China's Liaoning Province tested positive for African swine fever (ASF), leading to an estimated 38.7% reduction in China's hog herd by August 2019. Rapidly rising pork prices stimulated an expansion of the Chinese poultry, egg, dairy and aquaculture sectors.

Continued on page 9.

Table 1. Value of U.S. Exports to China by Commodity for Agricultural Products Listed in Phase One Agreement.

2017			2020	
Product	**Jan. – Oct. Total** ($1,000)	**Annual Total** ($1,000)	**Product**	**Jan. – Oct. Total** ($1,000)
Soybeans	8,284,323	12,224,802	Soybeans	7,829,034
Cotton	761,560	972,554	Meat of swine	1,396,801
Raw hides – bovine	720,040	876,715	Cotton	1,344,685
Grain sorghum	644,498	839,459	Grain sorghum	761,363
Whole frozen fish	750,486	821,879	Corn	680,677
Animal fodder	327,527	388,862	Poultry meat	597,707
Total all 217 products	**15,331,581**	**20,836,706**	**Total all 217 products**	**17,452,587**

Data from U.S. Department of Agriculture Foreign Agricultural Service's Global Agricultural Trade System.

Another Look at U.S.-China Trade — continued from page 8

A recent report by Xinhua, China's official state news agency, says the pig and sow herds have recovered to more than 90% of their pre-ASF levels in November 2020, and that production is expected to fully recover by the first half of 2021. While several private analysts are questioning the rate of expansion, we have agreement that pig herd expansion is occurring at a rapid rate, leading to very strong feed demand. In addition, we see no indication that China's poultry, egg, dairy or aquaculture sectors are contracting.

The U.S. is the world's largest corn producer and exporter, while China is the second largest corn producer. For reference, the U.S. Department of Agriculture (USDA) estimates 2020 U.S. corn production at 368.5 million metric tons (mmt) and 2020 Chinese corn production at 260.0 mmt.

Figure 1 shows the historical Chinese corn production, domestic consumption and stocks-to-use ratio, using USDA data. The USDA estimates suggest total corn production has been relatively stable since 2015, but total domestic consumption continues to increase.

Domestic corn use has exceeded total production since the 2017-18 marketing year. The shortfall between corn production and consumption can be made up by drawing down inventories, which has been happening, and/or increasing imports, which is occurring.

While obtaining accurate estimates of Chinese agricultural production and consumption is very difficult, we see other market signals and buyer actions that can supplement the USDA information.

For example, average hog prices in China went from 18.50 yuan per kilogram ($1.22/pound) on Aug. 1, 2018, to a peak of 40.50 yuan per kilogram ($2.60/pound) on Oct. 24, 2019, and are now 32.50 yuan per kilogram ($2.26/pound) on Dec. 15, 2020. This indicates that hog numbers have improved since late 2019 but are still tight. This also helps explain why China is purchasing more pork from the U.S.

Another example is broiler prices in China. Average broiler prices on July 31, 2018, were 8.40 yuan per

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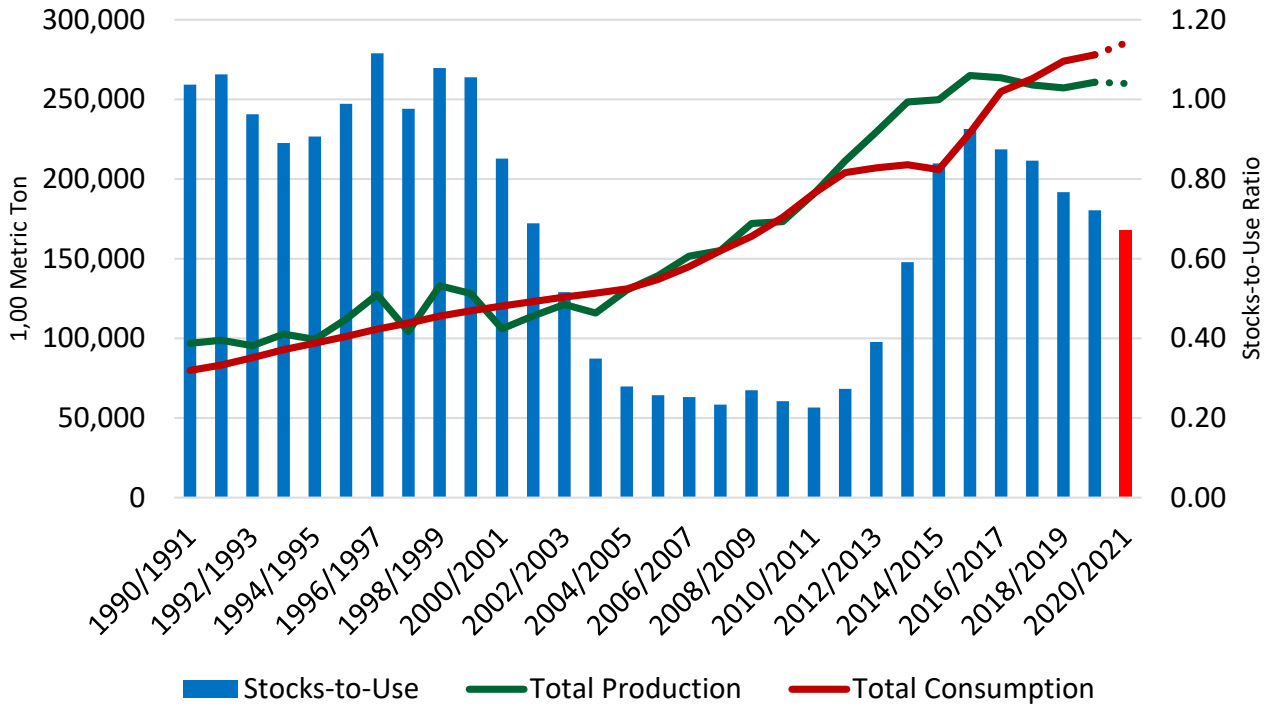
Figure 1. Chinese Historical Corn Production, Domestic Consumption and Stocks-to-Use Ratio



U.S. Department of Agriculture - Foreign Agriculture Service, Grain: World Markets and Trade

Another Look at U.S.-China Trade — continued from page 9

kilogram ($0.56/pound), 12.60 yuan per kilogram ($0.81/pound) on Oct. 31, 2019, and 7.90 yuan per kilogram ($0.54/pound) on Nov. 30, 2020. Once again, the higher domestic prices for chicken can help explain the increased exports of U.S poultry meat to China.

In contrast, average corn prices in Julin Province, a major corn producing region in northeastern China, were 1,630 yuan per metric ton ($6.06/bushel) on July 31, 2018, 1,710 yuan per metric ton ($6.17/bushel) on Oct. 21, 2019, and 2,490 yuan per ton ($9.61/bushel) on Nov. 30, 2020. Chinese domestic corn prices are signaling much tighter corn supplies and making imports from the U.S. more economically attractive.

However, corn is not the only feed available for livestock. China also has been importing large amounts of sorghum from the U.S. and barley from France and Ukraine. One reason for the increased barley purchases is the recent 80.5% import tariff China placed on Australian barley.

The Chinese government auctions of state-owned corn have seen aggressive bidding from local buyers. We also have reports that Chinese feed mills are buying more domestic feed wheat and rice, not suitable for human consumption, to blend with corn.

Based upon the information we have today, the outlook for increased U.S. feed grain, oilseed and meat exports to China looks strong. The Chinese economy has recovered quickly from the COVID-19 economic slowdown, the “middle class” continues to grow, consumers’ concerns about food safety make U.S. products attractive and domestic food price inflation is a concern for the Chinese government.

However, high prices and a growing demand base can stimulate a wide range of responses. For example, the Chinese government could increase the support price for corn, relative to other crops, to encourage more corn planting in 2021 and beyond. China also could purchase feed grains and oilseeds from Brazil, Argentina, Ukraine, Russia, Europe, Australia and Canada. Using a wide range of suppliers increases competition and diversifies supply chains.

Increasing U.S. agricultural export volumes into China can lead to higher commodity prices, but also could be viewed as a potential source of risk. Many of the political and economic tensions between the U.S. and China have not gone away because the Phase One agreement was signed. Continuing concerns about trade deficits, intellectual property rights, business investment by Chinese firms in the U.S. and U.S. business investments in China, the political and economic oversight of Hong Kong, Taiwan’s political independence, differences in labor laws, shifting environmental regulations and human rights concerns are just a few of the potential issues that could restrict or halt trade between the U.S. and China.

The challenges of coordinating economic activity between a market-based economy, such as the U.S., and a centrally planned economy, such as China, are enormous. While great optimism is building in agricultural markets for increased exports to China, we also have hurdles that must be overcome. The key to maintaining stable trade growth is continuous monitoring and open discussions.