



QUARTERLY U.S. RURAL ECONOMIC REVIEW

Stalled Trade Talks, Record Rains Upend Agriculture

June 2019

This quarterly update is prepared by the Knowledge Exchange Division and covers the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries.

Inside this Issue...

Executive Summary 1
Global Economic Environment 1
U.S. Economic Environment 2
 U.S. Agricultural Markets 3
Grains, Oilseeds, and Biofuels 4
Farm Supply 8
Animal Protein 8
Dairy 11
Other Crops 13
Specialty Crops 15
 Infrastructure Industries 17
Power and Energy 17
Rural Water Systems 19
Telecommunications 19

Key Points

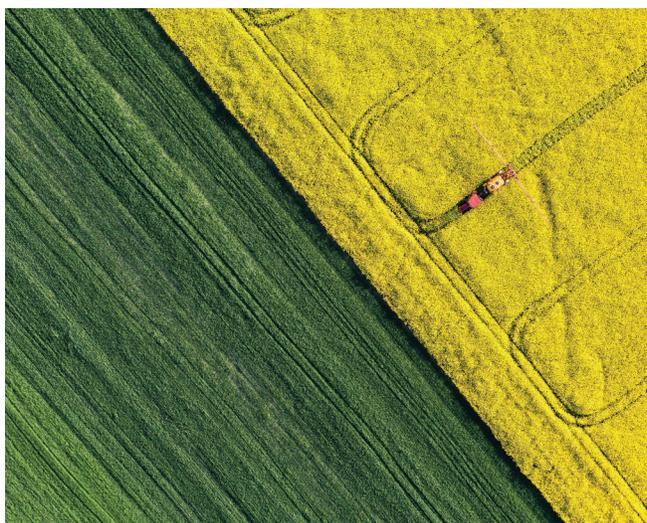
- The world economy continues to slow amid the ongoing U.S.-China trade war. Hopes are for talks to resume soon between the U.S. and China, but confidence in the trade war ending in 2019 is dimming.
- The Federal Reserve in June voted to keep rates steady, but signaled it is open to lower rates in the last half of 2019 on signs that the U.S. economy is slowing.
- Persistent rainfall across the U.S. has significantly disrupted spring planting. Federal aid of \$16 billion for additional trade relief and \$3 billion for disaster relief will help soften the blow for farmers, but not ag retailers.
- Cold and wet weather in California is causing quality issues with some crops, with significant crop losses expected for strawberries and cherries.
- Livestock profitability has improved, with African Swine Fever supporting hog and beef production margins. Dairy prices have begun to recover as production growth slows.
- Several of the nation’s wholesale power markets saw significant changes in Q2, but FERC’s amendments to adjust the demand curve for the PJM market in the east is particularly noteworthy.
- A prohibition against Huawei network technology may force rural telecommunications operators to seek replacement equipment from alternative vendors.

Executive Summary

Global Economic Environment

Global economic growth continues to slide as tariffs drag on global trade and manufacturing. In April, the International Monetary Fund (IMF) projected that global growth in 2019 would slow to 3.3%, down from 3.6% in 2018, as trade tensions take a bigger toll on business confidence.

Trade disputes still loom between the U.S. and China, the EU, Japan, and Mexico. Progress has been slow with no major trade victories yet. And, with the U.S. presidential election looming in 2020, countries may soon shift tactics to be more patient and wait on election results.



Current U.S. trade disputes include:

- **China.** Trade talks with the U.S. and China – formerly the second largest export destination for U.S. agricultural commodities – have stalled. President Trump and President Xi Jinping are expected to meet at the G20 summit in Japan on June 28-29 and resume negotiations.
- **USMCA.** The U.S.-Mexico-Canada Agreement passed the Mexican Senate, but has yet to come to a vote in the Democrat-controlled U.S. House or in Canadian Parliament. Democrats in the U.S. Congress want changes to Mexican labor provisions and stronger enforcement.
- **EU.** Retaliatory tariffs on U.S. agricultural products remain in place. More tariffs from the U.S. on European automobiles and auto parts remain a constant threat.
- **Japan.** Lack of progress in bilateral trade negotiations continues to put the U.S. at a disadvantage to signatories of the CPTPP (Comprehensive and Progressive Agreement for Trans-Pacific Partnership) that enjoy lower tariffs.
- **India.** Trade woes with India have escalated with India placing retaliatory tariffs on U.S. agricultural exports like fruits and tree nuts.

- **Turkey.** Retaliatory tariffs remain in place and have had noticeable impacts on cotton exports to the third-largest buyer of U.S. cotton.

Other geopolitical tensions weigh on global growth. Brexit in particular still looms as a threat over the European economy. The deadline for Britain to leave the EU has been postponed twice, with the deadline now set for Oct. 31, 2019. A “hard Brexit,” or Britain leaving the EU with no formal trade agreement, could potentially damage both the British and European economies.

Heightened tensions between the U.S. and Iran in recent weeks have caused crude oil prices to bounce off of a five-month low. The surge in U.S. fracking output has helped to insulate U.S. crude prices somewhat from overseas tensions. But if Iran tensions escalate, so will crude prices.

The European Central Bank (ECB) has already indicated it is prepared to inject more stimulus into the EU economy to thwart a slowdown. ECB President Mario Draghi will be resigning his post in October, but has set the bloc on a path to even lower interest rates, and has also encouraged member-nations to consider fiscal stimulus.

China’s economy has softened considerably in Q2 despite fiscal and monetary efforts to provide stability. GDP growth is expected to remain slightly above 6% in 2019, but trade tensions with the U.S. will remain a significant downside risk for months ahead.

U.S. Economic Environment

In July, the current U.S. economic expansion will officially become the longest on record, dating back to 1854. The stock market has been flirting with all-time highs and the unemployment rate is at a 50-year low. Despite the strong indicators, some weakness has emerged in the U.S. economy and the Federal Reserve is now signaling that it is poised to cut rates as soon as July. In his FOMC remarks, Fed Chair Powell stated that “an ounce of prevention is worth a pound of cure,” indicating that it will not wait until the economy is showing significant distress before reversing direction on rates. Instead, it will attempt to pre-empt the slowdown.

EXHIBIT 1: Yield on U.S. Treasuries, 2019



Source: The Wall Street Journal

The current range of the Fed funds rate is 2.25% – 2.5%, which could be lowered to 1.75% – 2% by September if the bond market is factoring in the correct moves. And the market and the Fed are aligned. Of the 17-member FOMC board, seven indicated that they expect two rate cuts this year. If this plays out, the Fed would have much less room to operate in the next recession. The Fed funds rate was 5.25% going into the most recent recession in 2007, and was 6.5% ahead of the 2001 recession. Depending on the severity of the next recession, the Fed would likely be quick to reduce rates to zero, and would then need to be creative with other tactics, similar to 2008-09, to stem the economic decline.

For now, the U.S. economy has been performing quite well, but warning signs are flashing yellow. GDP growth in Q1 was impressive at 3.1%. However, much of the growth was supported by an increase in inventories as companies braced for an escalation in the trade war with China. The pace of investment spending, manufacturing, and demand for capital goods have all eased in recent months. And the slowdown trend is widely expected to persist through the remainder of the year.

Meanwhile, inflation remains persistently weak and is expected to weaken further. U.S. job and wage growth has slowed, as has the U.S. housing market, signaling that the expansion could be losing steam. Consumers continue to spend, though, which will power the overall economy forward.

Another warning sign is flashing in the bond markets. The yield curve has been inverted for more than a month with the 3-month treasury yield maintaining a premium to the 10-year treasury yield (*Exhibit 1*). An inversion of the yield curve for a quarter or more has historically signaled the arrival of a recession in the next 12-18 months.

Finally, corporate leverage is also looking increasingly risky. Long periods of economic expansion typically correspond with significant increases in leverage, and this expansion is no exception. According to The Wall Street Journal, non-financial corporate

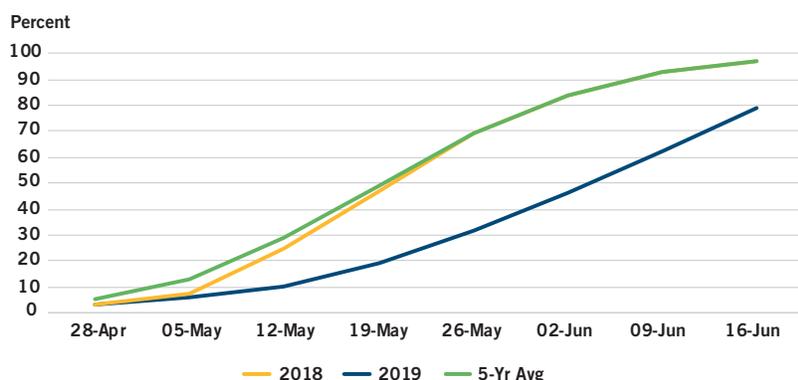
debt has now exceeded prior peaks and has gone from 35% of U.S. GDP in 1985 to 46% today. Default rates remain low, largely because of the interest rate environment, but the risk will continue to grow until it begins to unravel in the next recession.

The Fed will attempt to keep the economic party going through 2019 and into 2020, but the challenge of the task will become only greater in the months ahead.

U.S. Agricultural Markets

Financial stress for many in agriculture continues to build amid unprecedented uncertainty from trade disputes and weather disasters. Nearly all sectors of agriculture were affected last quarter by the inundation of spring rains that kept farmers out of fields throughout the U.S. The amount of acreage lost to prevented planting will remain the major unknown in the months ahead for ag commodities markets. USDA's survey-based acreage estimate scheduled for June 28 will provide new insight on total planted crop acreage in the U.S. However, the market will somewhat discount the report since the survey data was collected in the early part of June when farmers were still struggling with planting delays and flooded fields. Delayed plant maturity of late-seeded crops will further muddy estimates on yield and crop sizes throughout the remainder of the 2019 growing season.

EXHIBIT 2: Corn Emergence



Source: USDA-NASS

Wet weather also continues to complicate harvest operations for fall-seeded crops like winter wheat, raising concerns on crop quality. For specialty crops, cold and wet weather has created problems with crop development in California, particularly for strawberries and cherries where significant losses are expected.

Further complicating planting decisions for farmers this spring is the stalled trade negotiations with China and Market Facilitation Program (MFP) aid that will be tied to planted acreage. President Trump pledged up to \$16 billion in aid to farmers affected by trade disruptions and weather disasters with implementation details of the aid still unknown.

Livestock operators, though, are enjoying greener pastures resulting from this spring's abundant rainfall. Profit margins for hog and cattle producers have also improved with pork and beef prices pushed higher by growing concerns of African Swine Fever (ASF) in China. Dairy producers, meanwhile, are seeing some relief in rising milk prices as production growth slows.

Grains, Oilseeds, and Biofuels

Trade continues to create headwinds for U.S. grains and oilseeds. Recent developments include setbacks in China negotiations, threatened tariffs on Mexico, and sluggish trade deal negotiations elsewhere. While Mexico may make substantial new agricultural product purchases, it is already consistently one of the top trade partners for the U.S. grain and oilseed sector. Here's how

Mexico ranks for some key export areas:

- 1st: corn, distillers' grains
- 2nd: wheat, soybean meal, soybean oil
- 3rd: soybeans

Domestic demand has not kept up with last year's large corn supplies, but soybean crush has remained robust, taking advantage of low soybean prices. Domestic and export wheat use has been disappointing this year. With wheat supplies carrying forward and a larger harvest

expected this year, the outlook hinges on the potential for higher demand.

Much of the Midwest has experienced one of the wettest springs in recent memory, which has significantly reduced corn production expectations.

This wet weather is worrying some ethanol producers and has created headaches for the farm supply sector. Ethanol producers, already enduring one of the longest low-margin periods in years, are now facing the prospect of limited corn availability and higher corn prices. Ag retailers were trying to bounce back from a weak fall agronomy season, and they continue to contend with concerns about the weak farm economy.

Corn

2019 Production: U.S. corn planting progress has been the slowest on record due to the soaking-wet spring. While the Eastern Corn Belt has been hit hardest, Western Corn Belt states like Nebraska are also behind last year and the 5-year average. At this stage, the cold, wet weather has slowed emergence, too (*Exhibit 2*).

The slow pace of planting reduces production for two reasons. First, late-planted corn has lower yields, meaning the national average yield will certainly be lower than trend. Current talk in the industry has yields dropping to the 160-170 bushels per acre range or lower; the USDA projects the U.S. corn yield to be around 166 bushels per acre. However, a lot of the growing season remains. This summer will determine much of the final yield estimate.



Second, fewer acres will be planted. The industry is estimating that prevented corn planting acreage is between 5 million to 10 million acres. The USDA currently pegs a 3 million acre decline from spring intentions. A combination of 165 bushels per acre yield and a reduction in corn area of 5 million acres (to 80.4 million harvested acres) would put 2019 U.S. corn production at just over 13.25 billion bushels. This represents a drop of a little over 1.75 billion bushels from initial estimates earlier this year.

Grain elevators could be handling less corn. One option for elevators is to hold over inventory from 2018-19 into the 2019-20 marketing year. One caveat is that higher futures and basis prices and tighter carries will likely encourage higher farmer sales. The December 2019 to July 2020 carry has shrunk from around 20 cents prior to the poor spring weather to just 5 cents in mid-June. As a result, while corn volume will likely be down year-over-year (YoY), it could be higher than production numbers alone may indicate.

The risk for elevators is the combination of higher prices and tighter futures market carries. Stronger basis for many areas of the Midwest would increase purchasing costs per bushel. At the same time, basis may not appreciate over the marketing year and futures markets will likely have limited carries. As a result, margins on moving grain from harvest to later in the year could be squeezed.

Demand picture: Corn use estimates for 2018-19 have dropped since the start of the year, and every demand category is lower YoY. The on-going weakness in

ethanol margins and higher corn prices will likely lower consumption in the quarter ahead with further reductions not out of the question.

The lower demand trend will certainly continue in 2019-20 as markets ration supplies because of the smaller corn crop. However, the main question remains: By how much? The next quarter will likely provide a better picture as the USDA starts to incorporate more production information into their monthly World Agricultural Supply and Demand Estimates (WASDE) Report.

Larger South American corn supplies will be competing with U.S. production on the global stage. Brazil and Argentina are rebounding strongly from crops hit by dry weather last year. South American production is projected to hit a new record – more than 6 billion bushels. These supplies will help fill trade gaps left by the smaller U.S. crop.

Soybeans

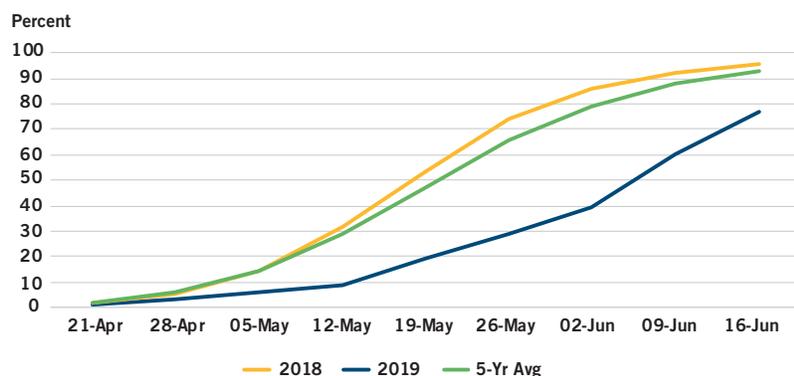
Demand outlook: The next three months will close out the 2018-19 marketing year, finalizing overall soybean demand. Crush pace to date is on track to meet USDA's current projections. However, exports are in trouble.

Trade relations have taken a blow in recent weeks. Of particular concern is the apparent deterioration in U.S.-China trade talks. The Trump administration has imposed additional tariffs on Chinese goods. Additionally, China has retaliated with their own tariffs, and reports suggest propaganda targeting the U.S. has increased. As a result, soybean exports may slide further as China may renege on purchases – pushing them to 2019-20 or cancelling them.

ASF in China and Southeast Asia will also hurt export demand. The reduction in hog herds in these regions will significantly reduce soybean (and corn) demand. This will weigh down U.S. soybean (and corn) export potential for several months.

Domestic soybean crush volume remains strong, but has recently slowed compared to last year's break-neck pace. Crush volumes will likely continue at a robust pace for the remainder of the marketing year as crush

EXHIBIT 3: Soybean Planting



Source: USDA-NASS

margin remains elevated. Next year, crush volumes will likely remain at the higher-level of use as two new crush facilities come online.

2019 production: The outlook for 2019 U.S. soybean production is down, but not out. Soybean planting has progressed at a near-record slow pace, but this is not yet as detrimental as late corn planting (*Exhibit 3*).

Soybean yields will likely decline from initial projections due to late planting. However, acres will not decline as much as corn for two reasons. One, it is a shorter-maturity, lower-input crop. As a result, acres that were intended to be planted with soybeans still have time to be planted. Two, some acres that could not be planted with corn will shift to soybeans. This switch is still up in the air. The June acreage report should provide additional insights on any changes in this regard.

As of the June 2019 WASDE report, the USDA has maintained its estimates for U.S. soybean acreage and yield for the 2019-20 marketing year.

Wheat

2019 production: The potential for U.S. and global wheat production is high this year. Despite nearly 2 million fewer acres, U.S. wheat production is expected to rise slightly YoY thanks to lower abandonment and higher yields. The winter wheat crop is looking solid with more than 60% of the crop in good to excellent condition compared with less than 40% this time last year.

With higher yields comes lower protein levels. Protein levels in the hard winter wheat areas of the Southern Plains are expected to be much lower YoY. Additionally, recent wet weather in the Southern Plains at harvest time is creating quality concerns. If this weather pattern continues, quality deterioration will be a significant issue this year.

Globally, wheat production outside China is expected to increase by well over 5%.

Every major wheat exporter is expected to increase production after dry weather hampered the crop last year in nearly every major producing region.

Recent global weather concerns and higher corn prices have pushed wheat prices higher. Dryness in parts of Southeastern Europe and Russia and in Australia is pushing down wheat production estimates. Weather will continue to drive markets at this stage leading to volatile short-term prices.

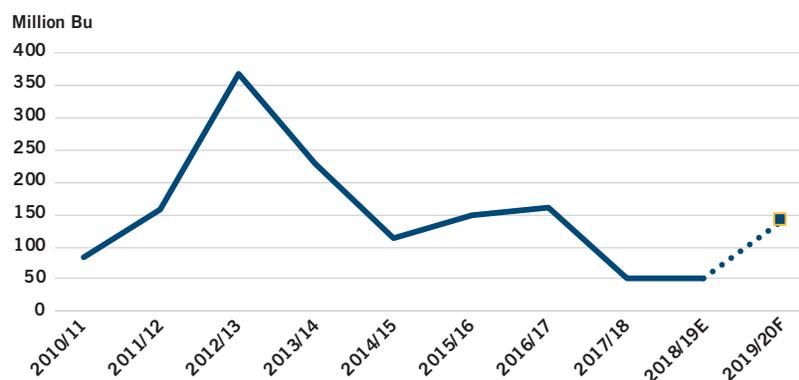
2018 demand review and 2019 demand potential: The books officially closed on the 2018-19 marketing year on May 31, and the wheat demand year-in-review for 2018 is disappointing. The total wheat use estimate for 2018-19 is down 50 million bushels compared to the first estimate from May 2018, driven entirely by falling domestic consumption.

While wheat exports slightly exceed their initial estimate, export projections reached as high as 1.025 billion bushels, 75 million bushels above current estimates.

Combined, this represents a total demand decline of around 5% from its peak. Weaker than projected feed demand and higher exports on the expectations of lower global wheat supplies did not materialize.

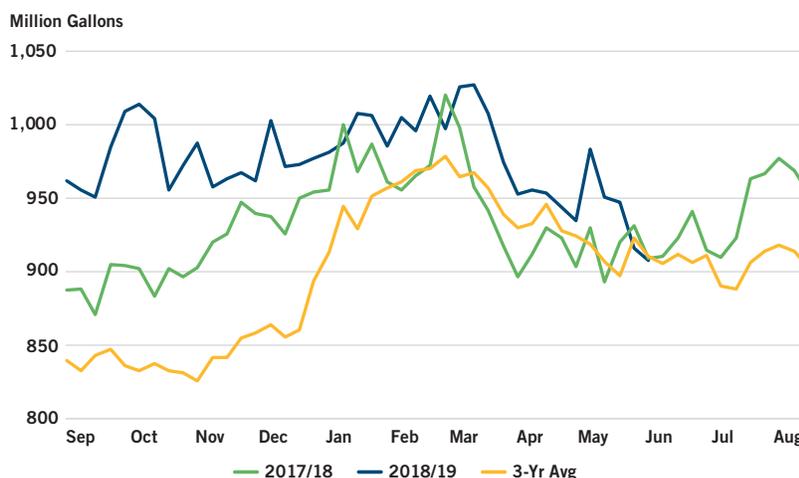
Demand potential for 2019 is relatively flat, with current USDA projections up around 2%. The supply and demand balance is similar to last year with stocks-use remaining above 50%.

EXHIBIT 4: U.S. Wheat Feed Use



Source: USDA-FAS

EXHIBIT 5: U.S. Ethanol Stocks



Source: U.S. EIA

One likely area for wheat growth in 2019 is feed demand (*Exhibit 4*). As the market speculates about the small corn crop increasing corn prices, wheat may become a more viable feed option this year. Take 2015-16 as a comparable year when corn production was 13.6 billion bushels after the 2014-15 14.2 billion bushel crop. Wheat feeding increased in the U.S. from 113 million bushels to 149 million bushels.

Wheat feeding will likely be close to USDA's current 140 million bushel estimate and may approach higher levels if corn production slides further. This could be a low estimate as meat production and livestock herds have grown steeply compared to 2015-16.

Ethanol

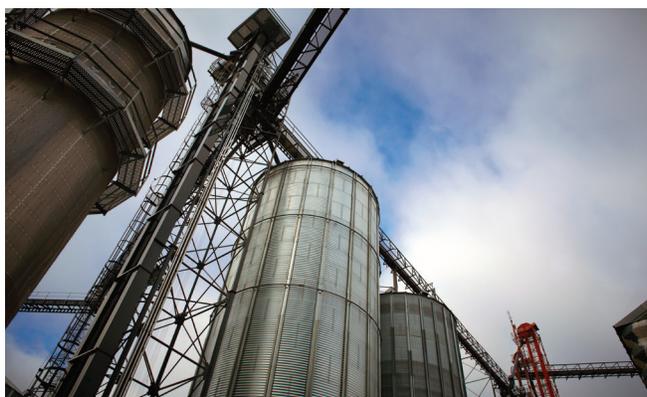
Weak margins persist: After peaking close to 25 cents per gallon according to Iowa State University data, ethanol margins have fallen back to break-even levels. Ethanol production declined during the margin run-up and then increased, causing this swing back to lower margin levels. As corn prices rally and demand remains stagnant, margins will remain under pressure.

Declining stocks that have moved in line with the three-year average for the first time this year provide some good news (*Exhibit 5*). Weekly EIA data show ethanol stocks bouncing around 950 million gallons with some recent significant variability, particularly to the downside with recent stocks figures close to 900 million gallons. Year ago-levels were vacillating around the 920 million gallon level.

While good news, stocks above 900 million gallons do not indicate that ethanol prices will move higher on any demand strength. Rather, ethanol prices will track corn price movements. Iowa State University data indicate margins have not moved to a significantly higher level on these tightening supplies.

Corn prices and availability are causing concern at many ethanol plants due to the slow planting pace and lower production. The risk is two-fold. First, higher corn prices may reduce margins if ethanol prices do not increase as much as corn prices do. This can happen at the national level, but localized price changes will also be important. Plants in the Western Corn Belt that were spared the worst of the wet weather may not see the same price pressure as those in the Eastern Corn Belt.

Second, if corn is unavailable, ethanol plants will need to curtail production. This increases the per-gallon cost because fewer gallons are moving through. This double-whammy could be a major issue for ethanol plants that are already facing low margins.



E15 policy change: EPA has finalized its summer E15 rule allowing for year-round sales of E15 gasoline blends. The short-run impact will be limited. Gasoline retailers will need time to add pumps and consumer awareness will need to grow. These do not happen overnight. While the Renewable Fuels Association indicates E15 sales could increase by several hundred million gallons this year, this remains a small part of total gasoline sales.

This policy creates long-term certainty for gas retailers and retailers will be more willing to invest in the infrastructure required to sell E15.

One of the last hurdles facing E15 will be petroleum industry legal challenges. At worst, a court could place an injunction, stopping the rule from being enforced until any cases are resolved. However, this is a high bar, and it could be difficult to obtain. This lingering legal uncertainty could slow the initial adoption of E15.

Farm Supply

Wet spring weighs on outlook: Weather has dominated the farm supply sector for nearly nine-months now. Last fall, wet weather prevented many farmers from getting fieldwork done and many ag retailers from getting fertilizer in the ground. The story has been the same for the past three months.

Ag retailers are at risk of high inventories of unsold fertilizer, seed, and crop protection products. Fewer acres planted means custom application revenue will be down, too. Weather has increased the farm supply sector's risk of lower revenue this year. The coming months will determine the extent of the damage.

Glyphosate case roundup: So far, two juries in California have awarded millions of dollars in damages to individuals who have developed cancer after using Roundup, Bayer's name-brand version of the herbicide, glyphosate. There are currently 10,000 cases from plaintiffs claiming Roundup caused them physical harm.

The scale and verdicts of these lawsuits warrant the attention of the agriculture industry at-large. Could a farm worker or ag retailer employee who applied glyphosate successfully sue their employer? Could consumers claim they were harmed by food they ate that contained trace amounts of glyphosate? Could this be traced back to food manufacturers, grain elevators, or farmers? Who would be held liable?

At this stage there are more questions than answers. Those that manufacture, sell, and apply glyphosate products should closely watch for developments in this area.¹

Animal Protein

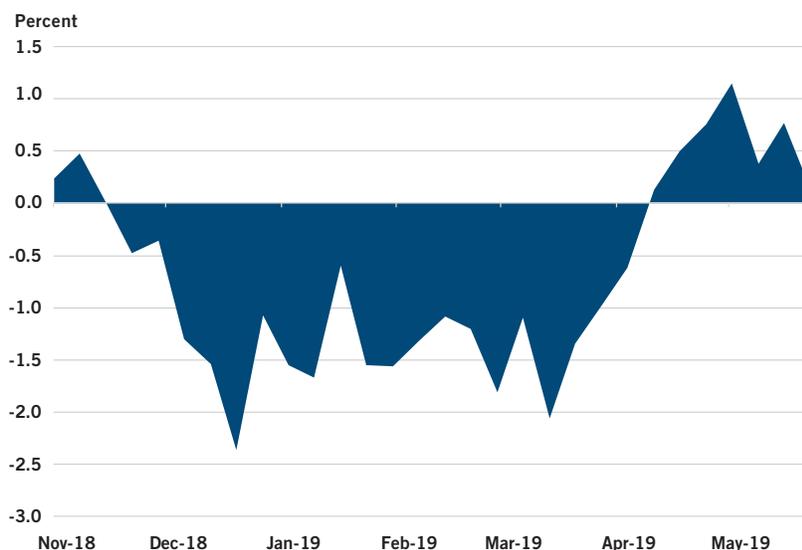
The U.S. animal protein sector continues to be whipsawed by factors largely outside of the control of producers and processors, like much of last year. Weather, African Swine Fever (ASF), and trade threats have disrupted the U.S. animal protein sector. The U.S. animal protein sector is watching for clearer signs of the market's direction after enduring weather disruptions to cattle feeding and crop planting, trade euphoria over the outbreak of ASF, and trade threats with export customers.

U.S. animal protein production growth will likely be less than 1.5% in the second quarter which is a modest improvement from the first quarter's 0.5%. Beef weights have returned to more normal levels – though are still below the level of growth seen in recent years. With more normal weather expected for the rest of the summer and this fall, and with new poultry plants ramping up production, all signs point to protein supply growth to pick up in the back-half of 2019.

The spike in corn prices in the last month has clearly dampened the outlook for the animal protein sector. Corn prices climbed 70 cents per bushel in May as farmers struggled to plant, increasing the odds of a significant

EXHIBIT 6: Heifer Dressed Weights

Year-over-year Change



Source: Livestock Marketing Information Center

shift in acres to soybeans and a material hit to crop yields. Meat and poultry producers haven't seen corn prices over \$4 per bushel much in the last five years. With the threat of additional weather disruptions this summer and the implications to yield, feed costs look increasingly volatile.

Beef

The U.S. cattle and beef sector have experienced very unusual weather thus far in 2019. Difficult winter weather pressured feed performance and steer and heifer weights and delayed corn and soybean planting, driving corn prices to multi-year highs. As a result, U.S. beef production declined by 0.8% in the last quarter. Now that weather is more typical in much of the cattle feeding region, weights have normalized (*Exhibit 6*).

Exports have also been sluggish, declining almost 5% in the first quarter despite the slow supply growth at the start of the year. Shipments to Mexico remain strong but this has been more than offset by weaker volumes to Japan, Canada, and Hong Kong. In Japan, the tariff levels of the CPTPP have gone into effect, putting U.S. beef shipments to Japan at a disadvantage to Australian and Canadian beef. Exports to Hong Kong are also down more than 40% so far this year on a volume basis.

While this isn't directly a tariff, it reflects the challenges Hong Kong importers have with purchasing beef from the U.S. as long as mainland China and the U.S. are at odds.

Weather will be the major question for U.S. beef for the remainder of 2019 and into 2020. Will the rain on the plains lead to improved forage conditions for cow-calf producers through the fall? What will be the impact of the delayed corn planting, which is the latest on record? Many producers through the Corn Belt are asking whether corn is even an option to plant this late in the season. This uncertainty has pushed December 2019 corn futures over \$4 per bushel – greatly impacting current margins for cattle feeders and cow-calf producers.

These elevated corn prices may very well bring any modest growth in 2020 into question.

Pork

The U.S. pork industry continues to march ahead on the belief that trade opportunities driven by the outbreak of ASF in China and other parts of Asia will lead to significant U.S. pork exports. Exports to China have indeed expanded, but have been more than offset by lower shipments to Mexico and Korea. Overall U.S. pork exports declined by close to 5% in the first quarter driven by double-digit declines in exports to Mexico and Korea, based on the latest available trade data. The weakness in exports has been partly driven by higher hog prices supported by the anticipation of increased exports to China (*Exhibit 7*). The 20% retaliatory tariff on U.S. pork in response to U.S. tariffs on Mexico's steel and aluminum has also affected trade.

Pork production has grown steadily this year. The 2.9% growth in the first quarter is largely in line with our continued forecast of 3% growth for 2019. But with exports falling below prior-year levels and supply expanding, U.S. consumers and commercial freezers are being asked to find a home for significant volumes. Domestic pork consumption increased by 4% on a

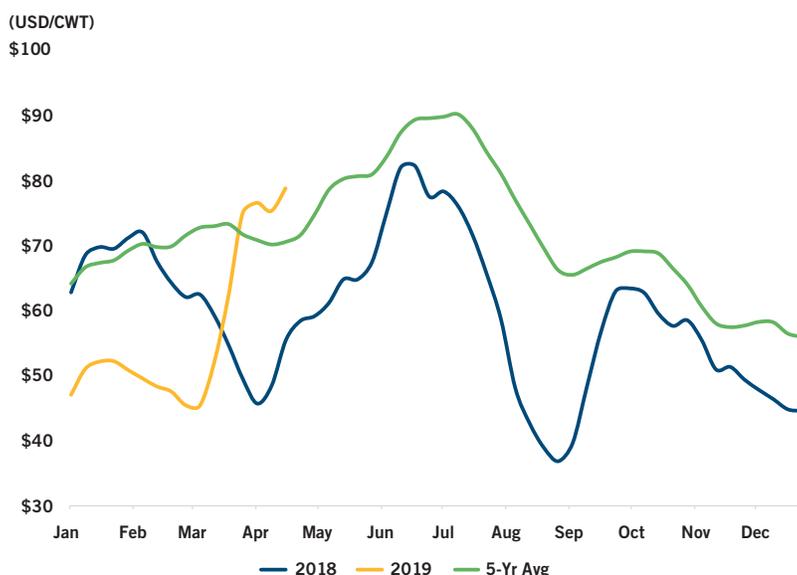
per-capita basis to a level not seen in the first quarter in 20 years. Exports will need to grow for the U.S. pork sector to be profitable amid continued production growth.

It is difficult to overstate the possible impact of the outbreak of ASF – not just to pork, but to the overall animal protein trade for years to come. Based on our current understanding of Chinese pork supply since the spread of the virus in August 2018, we expect Chinese pork production to decline by one-third over 2019 and 2020. This will spur a surge of beef, pork, and chicken imports into China as it tries to fill a shortfall in animal protein supply that no single pork-producing country will be able to fill. While China's demand outlook seems clear, the timing of shipment is highly uncertain. The timing of those trade flows are key to hog prices and producer profitability going forward. Hog prices and feed costs indicate healthy margins for producers through 2020, but that story can change quickly if pork exports do not pick up.

Chicken

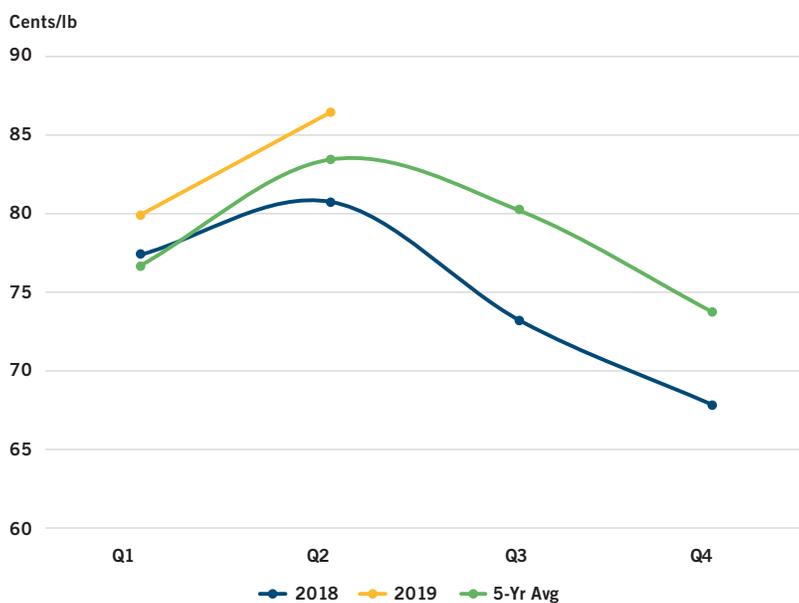
The outlook for the U.S. chicken sector has improved in the last quarter driven by higher prices on both white and dark meat. Today, composite chicken prices are up 7% compared to unchanged levels from 2018 into the first quarter. This improved pricing is in spite of the fact that two new chicken plants have come online so far this year. In the first quarter, chicken production was flat and looks to be barely up 1% in the second quarter (*Exhibit 8*).

EXHIBIT 7: Hog Carcass Base Price



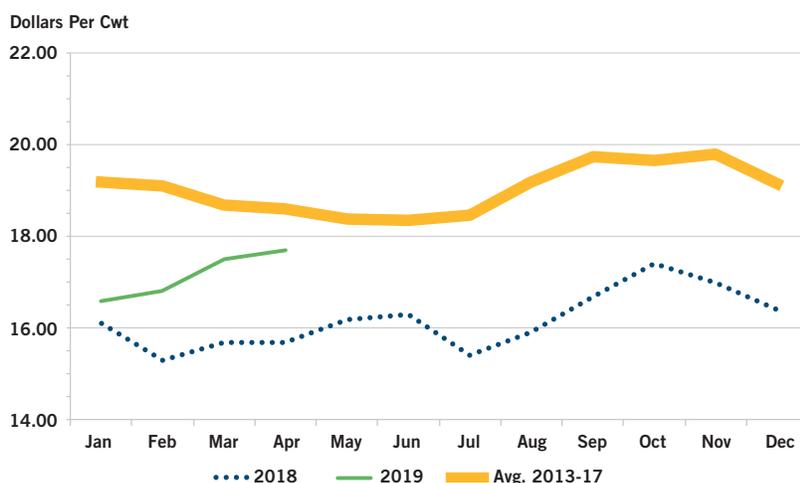
Source: Livestock Marketing Information Center

EXHIBIT 8: Composite U.S. Chicken Prices (cents/lb)



Source: Livestock Marketing Information Center, CoBank estimates

EXHIBIT 9: All Milk Price U.S., Monthly



Source: USDA-NASS, Livestock Marketing Information Center

While pricing has improved seasonally going into summer, chicken weights continue to trend below the prior year. Through April, live chicken weights have averaged 6.24 pounds, which is a slight decline from 2018. One of the major drivers of this decline in weights has been the recent weakness in breast meat prices.

Like the rest of the U.S. animal protein complex, trade continues to be a focus for the chicken sector. Through the first four months of the year, chicken exports were down about 1% but that hasn't kept leg quarter prices from climbing. As the global protein trade anticipates large purchases from China, it has helped to lift leg quarter prices from 28 cents per pound at the beginning of the year to near 50 cents per pound currently. But just like pork and beef, the trade volumes don't reflect the expectation of the major importers around the world.

The most significant development for U.S. chicken exports will be the reopening of China, which banned U.S. poultry four years ago over avian flu. With the outbreak of ASF over the last 10 months in China, this market is expected to reopen if a trade deal between the U.S. and China is announced.

Dairy

Dairy margins are improving for the first time since the summer of 2018, largely driven by higher milk prices which have been rising nationally since December of 2018. The March and April USDA National Agricultural Statistical Service (NASS) All Milk prices were the highest since the fourth quarter of 2017. Increased dairy cow slaughter and better demand for milk have improved the picture for the remainder of 2019.

Stable milk supplies

While the U.S. milk cow herd in April was down 1% (90,000 head) YoY, it was offset by better milk cow productivity (up 0.1%).

Eastern Corn Belt and Middle Atlantic states registered the biggest dairy herd declines: Illinois -10%, Virginia -10%, Pennsylvania -6%, Ohio -5% and Indiana -4%.

Stable milk supplies have balanced with dairy product consumption so far this year, close to unchanged from 2018. The USDA Economic Research Service (ERS) reports that first quarter butter usage increased 3% YoY and cheese usage was down 0.6%. American-type cheese usage was up 1% – increasing YoY in every quarter since the first quarter of 2017. Usage of other types of cheese (mostly Italian-types) stumbled in the first quarter, declining 2% YoY.

The USDA-NASS All Milk price averaged \$16.97 per cwt during the first quarter of 2019, up more than \$1 YoY (*Exhibit 9*). The April 2019 YoY All Milk price increased \$2 to \$17.70 and the milk price for the cheese market (class III) increased \$1.50 per cwt. Cheddar cheese wholesale prices and the class III milk price continued to rise during April and early May, suggesting that usage of all cheeses could rebound. Weekly cheese price quotes have weakened through May, which means the All Milk price could plateau near \$18 for the next few months.

Exports

The 2019 export signals are mixed so far and less critical to short term forecasting than domestic supply and demand (*Exhibit 10*). However, the international market for milk powder is contributing to a flat outlook for milk prices.

Skim milk powder prices in Western Europe and Oceania peaked in February and March and have declined slightly since (*Exhibit 11*). EU milk production during the first quarter of 2019 was unchanged from a year earlier, but is expected to increase, adding further pressure for the remainder of 2019. Skim milk powder exports to China from both the EU and Oceania were robust during the first quarter of 2019 but recent price trends may imply that trade is cooling. U.S. skim milk powder prices averaged 98 cents per pound during the first quarter, compared to 71 cents a year earlier. U.S. milk powder exports were up 18% in 2018, but first quarter 2019 exports came in 10% lower than the high benchmark set a year earlier.

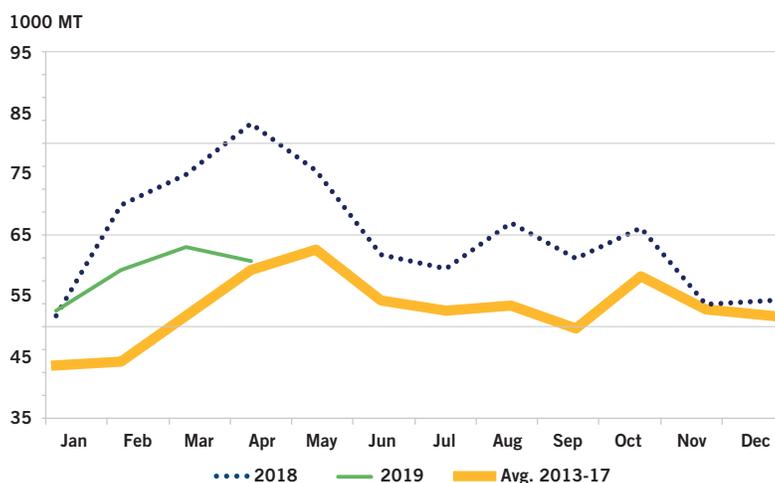
A stronger domestic cheese market could reduce the milk powder market's dependence on exports and still move skim milk powder prices higher. Non-fat dry milk prices in late May were 10 cents higher than the start of the quarter, even in the absence of strong export volumes. Less skim milk powder production, based on no increase in total milk production, along with more milk going to cheese production is keeping domestic supplies in check.

Outlook

The market outlook for the second half of 2019 calls for unchanged milk production, steady growth in cheese usage, and stable usage trends for fluid milk and butter. Fluid milk product sales on a volume basis were down 2.5% YoY during the first quarter, with March

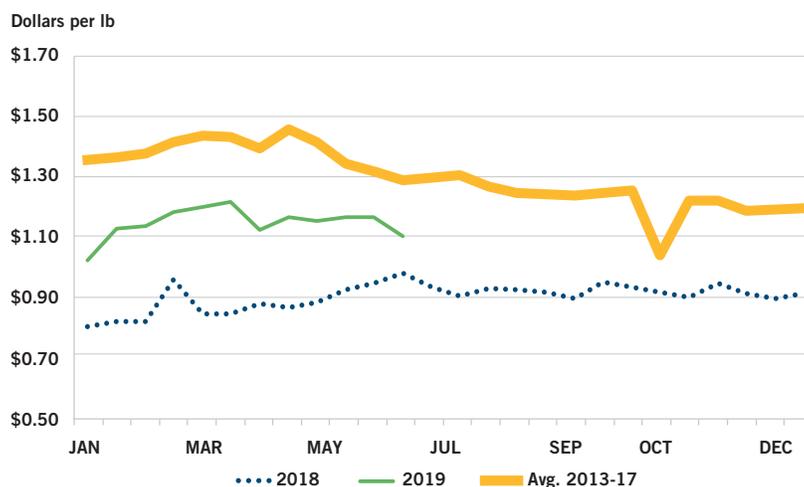
registering a 4.7% decline. The strength in the All Milk price in April suggests that demand for fluid milk this quarter is recovering. Higher cheese prices may dampen expanding fluid milk consumption, but a 2% to 3% increase in cheese usage could lift the All Milk price above \$18 per pound in the second half of the year.

EXHIBIT 10: Milk and Cream Exports Concentrated or Sweetened, Monthly



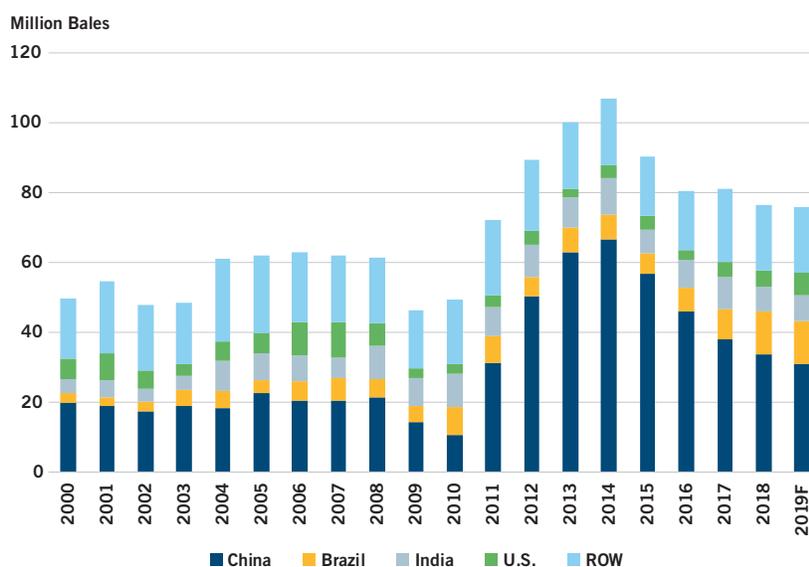
Sources: USDA-FAS, Livestock Marketing Information Center

EXHIBIT 11: Oceania Skim Milk Powder Biweekly



Source: USDA-AMS, Livestock Marketing Information Center

EXHIBIT 12: World Cotton Ending Stocks



Source: USDA-FAS

All Milk prices, which are now \$2 higher than in 2018, should be an incentive to maintain a steady milk cow population. Dairy herd liquidation accelerated through 2018 and continued into the first quarter of 2019. With better prices in 2019, dairy cow numbers may not decline in the second half of the year, which would support more milk production than last year. More dairy product usage should balance forecasted levels of increased milk production in the second half of 2019.

Feed costs

Feed costs are a wild card as U.S. crop planting conditions have been historically slow, raising the probability of higher crop prices and feed costs. Price outlook for primary drivers in the dairy feed ration (corn, soybeans, and alfalfa) are all looking at higher annualized prices. One difference from other high-cost feed years is this year's planting difficulties with corn and soybeans, which nearly eliminates the possibility for corn silage. This situation is unique compared to recent drought years when poor growing conditions drove up corn prices.

Feed costs could also vary regionally. The impact to alfalfa is more subtle, as about half of new alfalfa seedings this year are in the Midwest and Northern plains. Cool and wet weather has slowed crop emergence in those new fields, and the first cutting of all hay is delayed in these areas. Given tight hay supplies in the early season, alfalfa will likely be expensive. In April, prices nationally rose \$15 per ton over March. Delayed hay cutting and corn planting in the Midwest will likely have a national impact but dairies in this region may face even higher local feed costs.

Higher feed costs will reduce the incentive for milk cow productivity gains or expansion of the milk cow herd in the near term.

Flat milk prices and rising feed costs will limit expansion in production for the remainder of 2019.

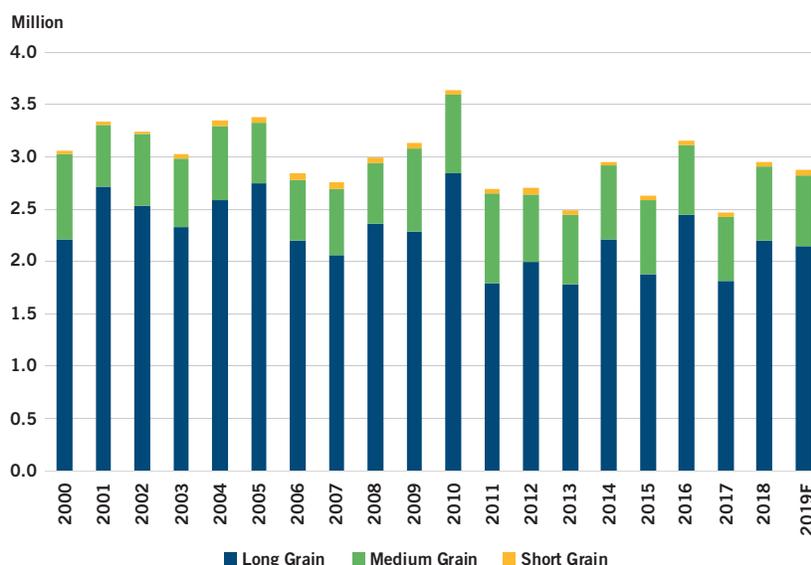
Other Crops

Cotton

Under the growing trade war pressure with China, cotton continued its long-term path of price erosion last quarter. China historically accounts for roughly one-fifth of U.S. upland cotton exports, and the trade deal collapse has escalated uncertainty for the future of cotton exports.

Trade tensions are hurting exports: U.S. upland cotton shipments to China year-to-date (YTD) are down 42% YoY (*Exhibit 12*). Shipments to the third-biggest importer of U.S. cotton – Turkey – are also down 27% YoY. Turkey is retaliating with its own tariffs against the U.S. steel and aluminum tariffs, impeding exports. Shipments of U.S. upland cotton to Vietnam are up YoY, (with some cotton widely rumored to be trans-shipped through Vietnam to China) but have yet to make up for losses to China and Turkey. Total upland cotton exports for the current marketing year are down 14% YoY.

EXHIBIT 13: U.S. Planted Rice Acreage



Source: USDA-NASS

The loss of cotton acreage is a real concern as overly wet spring weather settled throughout the cotton belt, particularly in the Delta region where flooded fields have prevented planting. In regions hampered by planting delays, competing crops like corn and sorghum may pull acreage away from cotton. In early June, only 75% of the projected U.S. cotton crop had been planted, compared to the 5-year average of 87%.

Persistently hot and dry conditions in Georgia, meanwhile, may crimp yields in the second-biggest-producing cotton state. The U.S. Drought Monitor has rated 93% of the state as abnormally dry.

In its June WASDE report, USDA held to its forecast for U.S. cotton production at 22.0 million bales with no change in yield or acreage. USDA lowered its projection for average farm price for the 2019-20 crop year by 1 cent to 64 cents per pound for upland cotton.

The market will continue weighing the loss of exports against the potential loss of acres and yield in the weeks and months ahead. Signs of weakness in the U.S. and global economies amid the ongoing trade war portend losses in global cotton demand in the back half of 2019. With no sign of progress in trade talks between the U.S. and China and weakening economic growth, optimism for a sustained recovery in cotton prices is dimming.

Rice

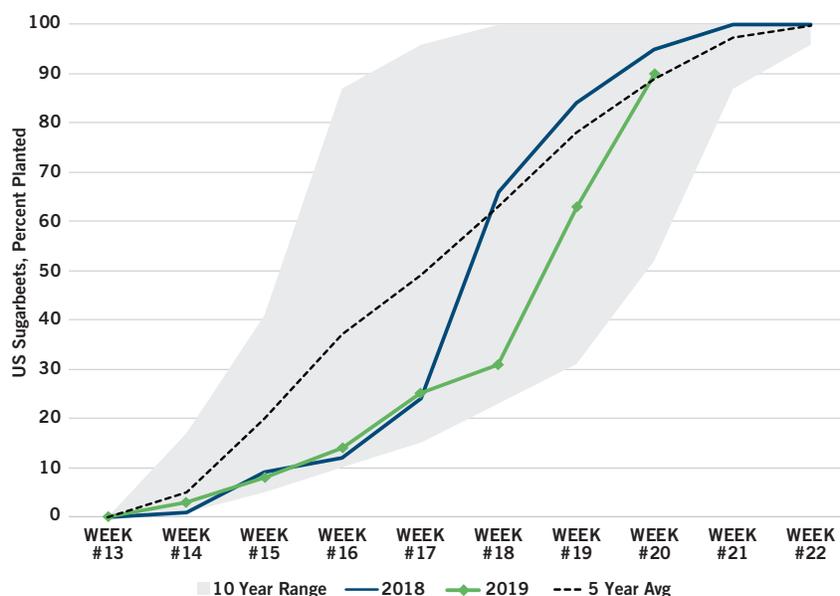
As excessive spring rain delayed U.S. rice planting, fears of lost acreage pushed U.S. long grain rice prices higher in the last quarter alongside corn, soybeans, and wheat. In June, USDA slashed its 2019-20 forecast of total U.S. long grain rice production based on anticipated reduced plantings and increased field abandonment in the Mississippi River Delta region. Growers in the Delta region are expected to switch unplanted fields to shorter-season crops like soybeans. The estimate for total long and medium grain rice planted acreage in the U.S. fell to 2.62 million acres, down 9% from the May estimate and down 11% from 2018 (*Exhibit 13*).

U.S. export sales data for the 2018-19 year ending July 31 show an improvement YoY with total rice shipments up 6.6%. Exports to Mexico – the U.S.'s top export destination – rose 8.4% YoY. (U.S. rice exports were not subject to retaliatory tariffs in Mexico). The U.S. also benefited from Iraq's surprise purchase in May in a U.S.-only tender for 120,000 metric tons of long grain white rice, which will likely ship early in the 2019-20 marketing year. The purchase, four times bigger than originally intended, safeguarded U.S. market share against South American rice in the important Mideast market.

Following last year's large harvest, all rice stocks in the U.S. remain ample and total rice inventories in the U.S. are estimated to be the second highest since 1986. Outside the U.S., major exporters like India, Thailand, and Vietnam have large carry-in supplies that will compete for space in the export market. Meanwhile, China, the world's biggest rice importer, is slowing its exhaustive purchasing pace as its rice stocks are now estimated to be 116 million metric tons—67% of global inventories.

The record levels of global rice supplies will invariably keep rice prices in check for the remainder of 2019. After USDA's upcoming acreage and yield surveys reveal updated U.S. production information, the market will return its focus to clearing large global inventories.

EXHIBIT 14: Total Sugarbeet Planting Progress



Source: USDA-NASS

Sugar

The USDA Economic Research Service (ERS) has reduced its cane sugar production projections for 2018-19 from its February report, but kept beet sugar estimates largely unchanged. The reduction in cane sugar estimates stems from lower harvested acreage expectations reported by Florida processors. As a result, the latest June USDA cane sugar production projections are up just 0.3% YoY and beet sugar is down 7%. Beet sugar production is dropping due to lower yields and lower acreage compared to the previous year. Import projections are up and demand projections are unchanged.

These dynamics lead to a reduction in ending stocks and a strengthening in raw sugar price expectations. Meanwhile refined price projections have remained largely unchanged.

According to USDA's initial 2019-20 crop forecasts released in May, USDA expects production to increase on the back of beet sugar and consumption to grow but at a reduced rate (as has been the trend over recent years). However, demand projections have more downside than upside risk, such that consumption could hold steady or even decline in 2019-20.

Beet sugar expectations for 2019-20 are strong as USDA expects acreage to increase for the first time since 2016-17. The wet conditions that delayed planting in key growing regions may also reduce yields (*Exhibit 14*). This delayed planting was incorporated into USDA yield projections. The good news is that the pace of planting in week #20 closed the gap between 2019 planting progress and the 5-year average.

USDA projects imports for 2019-20 to be up significantly, almost 13% over 2018-19 estimates. This is largely based on the expectation that lower beginning stocks will increase the "need" calculation that establishes the export limit for Mexico.

Specialty Crops

Weather conditions throughout much of California this past spring have been colder and wetter than normal. While a relief after years of drought, the volume and timing of the precipitation has created problems, particularly for strawberries and cherries. Significant losses are expected in the California cherry crop, particularly early season varieties. However, other key production regions have fared better.

Almonds and pistachios are expected to have big production years and prices have remained relatively strong. Meanwhile, pecan prices continue to struggle, despite supply reductions.

While orange production expectations are less than previous estimates, a very solid production year is still expected. However, juice orange prices remain low.

Wine grape production is also looking up. However, the non-bearing acreage growth is expected to come online in coming years, demand growth is slowing, and prices are already relatively weak. The industry is looking to innovation and marketing to millennials to boost demand.



Tree Nuts

Almonds: Almond shipments started off the year behind last year's pace, but April hit record levels, May continued to close the gap, and future commitments are up. Domestic shipments are up 1%, while exports are down 1% – primarily from a smaller in-shell market. As the California Department of Agriculture published in its preliminary 2019 report, almond-bearing acreage is now 1.17 million, up 7% over 2018. Despite weather challenges early in the season, an extended bloom season should increase yield gains over the 2018 season.

Pecans: The March USDA report estimated a 27% reduction in the 2018 pecan crop versus 2017, reaching its lowest level in a decade. This reduction stems primarily from Hurricane Michael and flooding across Texas and Oklahoma. Despite production losses, prices for both shelled and in-shell pecans have remained relatively low due to large carry-over stocks, increased imports, and weak export demand resulting from increased tariffs and growing Chinese production. Imports have been well above normal throughout the latter part of 2018 and January through February 2019 but the pace dropped off significantly in March. While prices could potentially firm up through 2019 as tight supplies meet a growing domestic demand, export struggles will continue to weigh down prices and temper hopes of a significant rebound.

Pistachios: Record production is forecasted for the 2018-19 season on the back of both acreage and yield gains. While these production gains will likely prevent notable price increases, the market is insulated from strong downside price risk due to continued strength in domestic demand and weather problems in Iran (a major global exporter). As a result, export expectations remain relatively strong despite tariff woes.

Grapes

According to the 2018 USDA California grape acreage and crush reports, total grape acreage (all types, bearing and non-bearing) reached 925,000; up 5% from 2017. While wine and table grape acreage continued to climb, raisin grapes continued their fall, declining 3% YoY. Of note is the increase in total non-bearing acreage, which increased 22% primarily on the back of wine and raisin grapes. As a result, supply and demand imbalances in the wine grape market will not likely resolve in the short-term, as demand growth in both of these categories have remained relatively weak over recent years and import competition continues to grow. The industry must look for innovative ways to increase demand, particularly among young millennials where per capita consumption is declining.

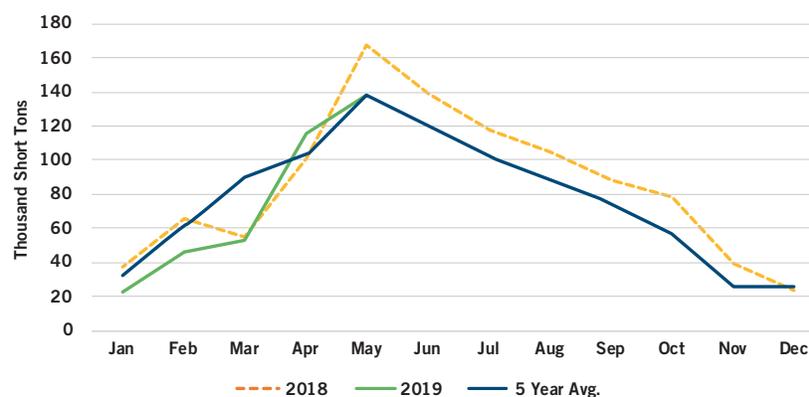
While heavy spring rains caused disease concerns in some areas, overall, reports indicate a relatively healthy 2019 grape crop thus far. According to Ciatti wine and grape brokers, many grape buyers (for the wine market) anticipate adjusting or canceling supply contracts and/or renegotiating prices, which are already at their lowest level in five years.

Citrus

Oranges: USDA 2018-19 projections for U.S. orange production are lower than reports earlier in the season, but remain up (34%) over hurricane-impacted 2017 and 4% over 2016. A significant proportion of this rebound is from Florida.

Some Valencia growers in Florida are reporting difficulties in finding a market. Processors are not accepting uncontracted Valencias because of their large supply purchases from Mexico following Hurricane Irma in 2017.

EXHIBIT 15: Domestic Origin Strawberry Shipments



Source: USDA-AMS

Increases are projected for 2018-19 Mexico orange production. Additionally, recent Brazil orange crop forecasts for 2019-20 are up 36% from 2018-19. With increased supplies expected from the U.S., Mexico, and Brazil, and declining orange juice consumption trends, juice orange prices will likely remain under pressure over the coming year.

Grapefruit: While up over 2017-18, the USDA 2018-19 grapefruit production forecast is down 12% from 2016-17. Most of this decline is in Florida. Meanwhile, Texas production is expected to be up 1.5 million boxes (31%), making Texas the largest projected grapefruit-producing state in 2018-19, a spot previously held by Florida.

Other Fruits & Vegetables

Strawberries: While acreage is down from last year, colder and wetter weather in core strawberry production areas dashed earlier estimates of increased production yields from newer varieties. Average shipments January through March were below average. YTD (through June 3) domestic origin strawberry shipments are 10% below last season (*Exhibit 15*), with shipments lagging the most in California's Salinas-Watsonville area. While April and May shipments rebounded to seasonal averages, many California producers report unmarketable damage to the berry crop from the May rains.

The late start to production supported above-average strawberry prices throughout much of January through March. While bad weather hurt production mostly in California, Florida growers were able to capitalize on these stronger prices. Since March, prices have come back in line with seasonal averages.

Cherries: Like many other crops, cherries have been hurt by increased tariffs into China. Additionally, California cherries have taken a big hit, due to heavy rains during harvest of early season varieties when cherries are most susceptible to rain

damage. An article in *Growing Produce* reported that Don Goforth, sales director of Family Tree Farms in Reedley, estimated that at least half of the state's early cherries grown south of Madera have been lost. Other key production regions have generally fared better.

Tomatoes: On May 7, 2019, the U.S. withdrew from the 2013 Suspension Agreement on Fresh Tomatoes from Mexico. As a result a 18% tariff has been placed on Mexican tomato imports and the U.S. Department of Commerce has resumed its antidumping investigations. Arizona State University estimated that withdrawing from the suspension agreement would result in a 40% to 80% increase in fresh tomato consumer prices.

Infrastructure Industries

Power and Energy

Several of the nation's wholesale power markets saw significant changes this quarter, but those affecting PJM in the east and ERCOT in Texas are particularly noteworthy.

PJM

PJM, which serves 13 states and Washington, D.C., is adjusting its demand curve but is facing new sources of structural downside risk for its capacity resources.



In April, the Federal Energy Regulatory Commission (FERC) accepted PJM's two proposed amendments to adjust the demand curve used in its Base Residual Auction (BRA). The first amendment lowers the demand curve by using a newer, less expensive model of combustion turbine as the reference unit for PJM's net cost of new entry (Net CONE) calculation. (Net CONE represents the capacity revenue a new generator is estimated to need to enter the PJM market economically.) The second amendment removes the artificial outward shift in the BRA demand curve, which the market operator had previously used to limit coal-fired capacity retirements due to state environmental regulations and inexpensive natural gas. These changes are likely to place downward pressure on capacity pricing across much of the PJM footprint in the next BRA. These changes could result in many generators realizing significantly less capacity revenue than they had previously projected.

Additionally, FERC has yet to issue an order concerning PJM's future treatment of state-subsidized capacity resources in the BRA. After finding in June 2018 that the many subsidies for select resources had rendered the BRA uncompetitive, FERC denied the two fixes proposed by PJM in October. As of late May 2019, FERC Chairman Neil Chatterjee maintained that his agency is working diligently on a solution for PJM. The market operator plans to conduct the BRA for the

2022-23 delivery year in August 2019 (instead of May, as originally scheduled), despite pressure from states and market participants to further delay the auction to allow for FERC's pending order.

ERCOT

The ERCOT, which operates most of the power grid in Texas, could see a period of above-average volatility in power prices in the next six months. Low energy commodity pricing in western Texas will likely place downward pressure on power prices, while ERCOT's meager reserve margin of 8.6% could drive emergency price spikes in July and August 2019.

Record-high oil and gas production from the Permian Basin periodically drove down gas pricing at the Waha Hub below \$0/MMBtu in the first six months of 2019, affording ERCOT's gas-fired generation ever-lower dispatch costs. Based on energy sell offers received by these units in the first quarter, ERCOT's Technical Advisory Committee voted in April 2019 to lower the minimum offer price for gas-fired generators in transmission-constrained areas from (positive) \$20/MWh to negative \$20/MWh. While the new price floor for gas-fired generators now matches that for coal-fired generators, it will likely drive power prices to new lows as gas-fired generators set the market's power price in the vast majority of hours.

Conversely, based on ERCOT's Final Seasonal Assessment of Resource Adequacy (SARA) for the coming summer, the market's extraordinarily tight reserve margin of 8.6% is likely to push up power prices when demand peaks in July or August, especially in those regions with significant transmission constraints. While those generation and transmission operators and electricity distributors that own and operate power generating capacity may earn significant revenue through ERCOT's scarcity pricing mechanism, those without such assets could face high summer power prices. Moreover, generation and transmission operators that can shield the state's electricity distributors from sub-annual power price volatility will do much to demonstrate their value.



Rural Water Systems

Midwest Flooding Impact

By mid-March 2019, many streams and rivers in Nebraska, Iowa, South Dakota, and Wisconsin rose to record levels. Several feet of flood water covered commercial and residential areas in Illinois, Indiana, Kansas, Kentucky, and Missouri.

The floods could significantly harm much of the region's water supply. Although floods routinely increase exposure to pathogens such as coliform (including fecal coliform) and industrial toxins, the scale of the ongoing disaster is alarming. More than 300 affected counties have more than one million water wells at risk of contamination, creating potential for widespread pollution as one well's contamination can spread through groundwater to others nearby.

Planning Pays

While we don't yet know the extent of contamination to public water supply systems, utilities' planning for worst case flooding scenarios appears to have paid off. Utilities that placed well heads at higher elevations are faring better than others. For example, the City of Norfolk, Virginia, constructed all of its wells with heads above the 150-year flood plain – a critical decision for maintaining service to its customers, according to the American Water Works Association. This approach has proven prudent as nearly

60% of Federal Emergency Management Agency (FEMA) flood maps were deemed inaccurate or out-of-date as of mid-2017, according to the U.S. Department of Homeland Security, Office of Inspector General.

FEMA is also not yet accounting for National Climate Assessment predictions of increased weather variability. As a result, water utilities counting on FEMA's flood maps in their disaster planning may significantly underestimate the potential medium- and long-term impact.

Data-driven Situational Intelligence

Scientists at the U.S. Geological Survey (USGS) now use next generation, satellite-connected flood gauges that measure water quality and depth every 15 minutes. The USGS and others are using this situational intelligence to inform water utilities, emergency managers, and the general public about current and potential flood conditions.

The National Water Model (NWM) exemplifies how this data-driven situational intelligence is being shared with decision-makers. The NWM has increased the availability of streamflow data by 700-fold, assembling data from 1,500 reservoirs and 5 million miles of rivers and streams across the U.S., including smaller and remote ones.

In an interview with the Associated Press, the director of NOAA's newly-formed National Water Center in Tuscaloosa, Alabama, noted that the model will simulate rain runoff and soil absorption, as well as monitor and measure current moisture conditions. The NWM can also be used to predict the downstream consequences of infrastructure failures, such as breaks in levees and dams.

Telecommunications

Potential Huawei Equipment Ban

President Trump's May 15 executive order, which is likely to effectively ban U.S. telecommunications operators from buying Huawei-made telecom equipment, is expected to impact rural telecom operators more severely than other operators in America. A prohibition against Huawei network technology may force operators to seek replacement equipment from alternative vendors.



In recent years, rural operators had little choice but to purchase core technologies from Huawei – the global market share leader in the telecom equipment industry – for use in their networks. For some rural operators that sought bids, competing vendors would not respond to proposal requests for network equipment, or the prices quoted were 30% to 40% higher than what Huawei was offering.

However, it appears likely that rural operators will not be able to rely on Huawei equipment much longer. The president's executive order laid the groundwork to block certain Chinese telecom companies from selling equipment to U.S. companies. The Department of Commerce has 150 days from when the order was signed to establish rules that identify "particular countries or persons" as foreign adversaries. It is conventional wisdom that Huawei will be listed as a foreign adversary. In conjunction with the executive order, the Department of Commerce added Huawei to its "entity list," which restricts how U.S. companies engage in commerce with certain foreign organizations.

Congress has introduced a bill that would provide up to \$700 million to help telecom carriers remove Huawei equipment from their networks. However, CoBank estimates that the actual costs are likely to top \$1 billion.

5G Delays

Many pundits claim that the administration's executive order could severely disrupt the global 5G ecosystem, leading to a multi-year delay in deploying 5G (i.e., fifth-generation cellular network technology that provides broadband access). This seems excessive as many of the technology companies responsible for developing and deploying 5G are not on the government's entity list. China's 5G deployments could lag those in the U.S., Japan, and South Korea which would result in higher deployment costs (as the global ecosystem wouldn't benefit from China's volume). But beyond that, a significant delay seems unlikely.

Sprint and T-Mobile Merger

Ajit Pai, chairman of the Federal Communications Commission (FCC), announced his support for the Sprint and T-Mobile merger as it meets two of the Commission's top priorities: Close the urban-rural digital divide and advance the U.S.'s leadership in 5G. The Dept. of Justice isn't ready to approve the deal and is apparently looking for the creation of a fourth operator through a divestiture of Sprint and T-Mobile's spectrum and tower assets. This seems like an uphill battle given the scale and distribution challenges this new competitor would face. In addition to divesting network assets, Sprint and T-Mobile are considering spinning off their prepaid business to address antitrust concerns in the prepaid market.

Sprint and T-Mobile say the merged entity ("NewCo") will aggressively build fixed wireless networks in rural America to help bridge the digital divide. This is clearly resonating with the FCC, but rural operators have concerns.

In an open letter to the FCC and U.S. Department of Justice, the 4Competition Coalition argues that the merger will lead to less competition, fewer choices and higher prices.

The group specifically cites T-Mobile's lack of wholesale roaming agreements with rural operators as a major concern. Many rural operators have wholesale roaming

EXHIBIT 16: Forecasted Network Coverage

Network Coverage Footprint		T-Mobile	Sprint	New T-Mobile
		Covered POPs (Millions)	Covered POPs (Millions)	Covered POPs (Millions)
Year 2021	Mid-band (PCS & 2.5GHz)	74.6 (77% uncovered)	174.7 (47% uncovered)	240.9 (26% uncovered)
	Low-band (600 Mhz)	317.9 (2.9% uncovered)	0 (100% uncovered)	319.6 (2.4% uncovered)
Year 2024	Mid-band (PCS & 2.5GHz)	173.2 (47% uncovered)	194.0 (41% uncovered)	282.2 (14% uncovered)
	Low-band (600 Mhz)	323.0 (1.4% uncovered)	0 (100% uncovered)	324.1 (1.0% uncovered)

Source: Sprint / T-Mobile merger filings

agreements with Sprint which enables them to offer large coverage footprints by leveraging Sprint's network. Therefore, with T-Mobile's management team expected to run NewCo, the concern is rural operators will be left with fewer – and more expensive – wholesale roaming options.

Opponents to the merger also question the validity of Sprint and T-Mobile's coverage. Sprint owns a large amount of mid-band spectrum and these signals do not travel as far as low band spectrum signals, which can be problematic for remote coverage areas. Based on the merger filings, many rural residents will not have coverage until 2024 (*Exhibit 16*).

Lastly, in mid-June 10 states sued to stop the merger, citing concerns over higher prices from reduced competition. The attorneys general say the merger would cost Sprint and T-Mobile subscribers \$4.5 billion annually.

Regulation Update

In April, the FCC proposed a 10-year, \$20.4 billion Rural Digital Opportunity Fund to build broadband networks in rural America. The program is for price cap carrier territories and will be funded with re-purposed Universal Service Fund monies that are dedicated to those areas.

In 2015, the Connect America Fund (CAF) awarded price cap carriers more than \$1.5 billion annually to bring broadband speeds of at least 10Mbps downstream and 1Mbps upstream (10Mbps/1Mbps). The Rural Digital Opportunity Fund is a natural evolution of this program, which is scheduled to sunset in 2021. As the Universal Service Fund tapers off subsidy support to legacy telephone networks, it will free up additional funding for CAF.

In April 2019, 186 rural telecom operators accepted \$65.7 million in Universal Service A-CAM (Alternative Connect America Cost Model) funding. These operators must agree to meet specific buildout targets by 2028. Last year, the FCC raised the minimum speed target from 10/1 Mbps to 25/3 Mbps, which increased access to more than 100,000 homes.

Additionally, in May 2019 the FCC announced changes to its A-CAM program by increasing the monthly funding threshold to \$52.50 and a funding cap per location of \$200. These new threshold amounts should increase A-CAM payments to those who accept the offer. ■

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¹This information is a summary of Roger McEowen's blog post:

<https://lawprofessors.typepad.com/agriculturallaw/2019/04/do-the-roundup-jury-verdicts-have-meaning-for-my-farming-operation.html>

This quarterly update is prepared by the Knowledge Exchange Division and covers the key industries served by CoBank, including the agricultural markets and the rural infrastructure industries.

Tom Binet

Senior Economist, Power, Energy and Water

Daniel Kowalski

Vice President, Knowledge Exchange

Crystal Carpenter

Senior Economist, Specialty Crops

Christina Pope

Research Editor, Knowledge Exchange

Tanner Ehmke

Manager, Knowledge Exchange

Will Sawyer

Lead Economist, Animal Protein

Jeff Johnston

Lead Economist, Communications

Will Secor

Economist, Grain and Farm Supply

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Please send them to KEDRESEARCH@cobank.com.**

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