

The Feed

Farmer Mac's Quarterly Perspective on Agriculture

Summer 2021



FARMER  AC
FINANCING RURAL AMERICA

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ABOUT THE FEED

The Feed is a quarterly economic outlook for current events and market conditions within agriculture. The report is broad-based, covers multiple regions and commodities and incorporates data and analysis from numerous sources to present a mosaic of the leading industry information, with a focus on the latest information from the United States Department of Agriculture and their Economic Research Service. There are several regularly included sections like weather and major industry segments, but the authors rotate through other industries and topics as they become relevant in the seasonal agricultural cycle. Where the report adds value to readers is through its unique synthesis of these multiple sources into a single succinct report. Please enjoy.

ABOUT FARMER MAC

Farmer Mac is a vital part of the agricultural credit markets and was created to increase access to and reduce the cost of capital for the benefit of American agricultural and rural communities. As the nation's premier secondary market for agricultural credit, we provide financial solutions to a broad spectrum of the agricultural community, including agricultural lenders, agribusinesses, and other institutions that can benefit from access to flexible, low-cost financing and risk management tools. Farmer Mac's customers benefit from our low cost of funds, low overhead costs, and high operational efficiency. For more than a quarter-century, Farmer Mac has been delivering the capital and commitment rural America deserves.


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FROM THE DESK OF THE CHIEF ECONOMIST

Change Is the Only Constant

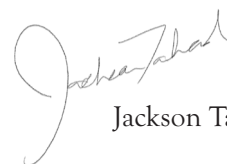
2021 has gotten off to a fast and forceful start. On average, major agricultural commodity prices are up 26% from January to mid-May, and many grain and oilseed prices are near supercycle levels. Consumer mobility is picking up, and so is restaurant and hotel activity. Economic conditions in rural communities are mainly favorable, with lower unemployment levels than in urban areas and strong consumer spending throughout the pandemic. Land values have been fueled by low interest rates and increased farm profitability. The Federal Reserve Bank of Chicago Ag Letter showed a 3% gain in Midwestern farmland values in the first three months of 2021 alone. And unprecedented levels of government support through direct farm payments, food purchases, and stimulus payments provided much-needed liquidity to the sector after a tough stretch in 2020. All in all, this paints a rosy picture for U.S. agriculture, a dramatic turn from the sector outlook just one year ago.

But America's farmers and ranchers know a thing or two about change. A lot can change for producers from one year to the next, one crop to the next, one litter to the next. Weather can derail the best crop outlook; demand that seemed certain can erode with the stroke of a pen; technology that was once cutting edge can become obsolete overnight. A new administration in the White House can also bring new priorities and interests, which producers may need to respond and adjust to. Without a doubt, sound risk management and adaptability are required skills for farmers and ranchers.

In this issue, we look at the many dimensions of change facing farmers and ranchers today. In addition to our regular sector coverage, we cover a broad array

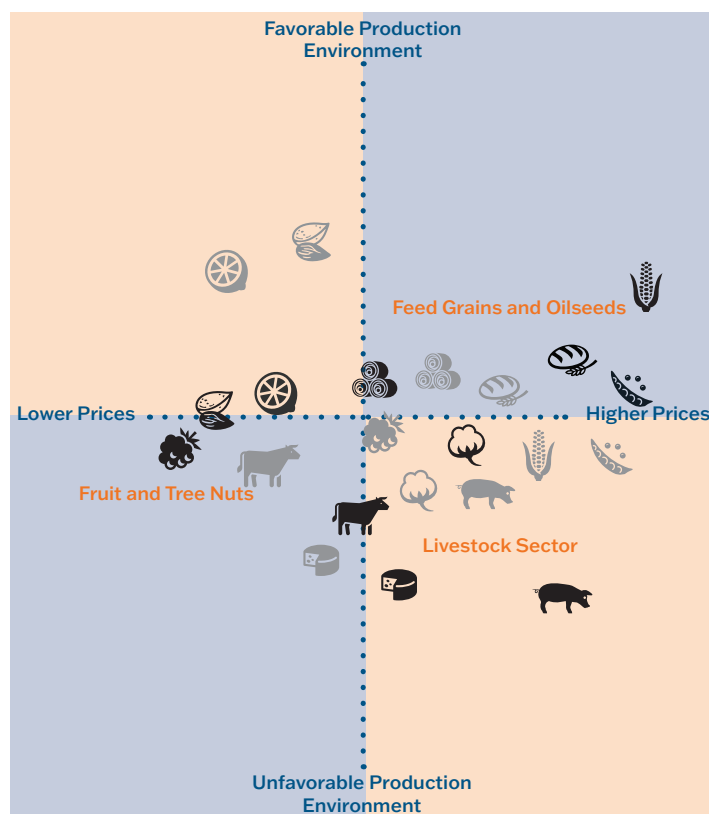
of topics, including an overview of conservation practices in farming, the response of global supply and demand in our second year of COVID-19, and a revised look at farm incomes in 2021. Resource conservation and management are taking center stage in the current administration, a topic that should be a key area of focus for farmers, ranchers, and lenders to understand current opportunities and challenges better. While the economic recovery looks very promising for the ag sector today, we know that conditions can quickly shift. As the saying goes, change is the only constant in this world. However, through careful study and preparation, change can be anticipated and managed to better the operation, the people in it, and the planet.

A great summer to all,



Jackson Takach, Chief Economist

PRODUCTION AND MARKET PRICE PERCEPTUAL MAP



Winter 2020 | 2021



Summer 2021



ALMONDS

CATTLE/CALVES

CITRUS

CORN

COTTON

DAIRY

HAY

HOGS

SOYBEANS

WHEAT

WINE GRAPES

CLIMATE PATTERNS AND EXTREME WEATHER

(resource 1, 2, 3, 4, 5, 6,)

Key Highlights

The frequency and severity of extreme weather events have threatened producer incomes across the country.

Over the long term, producers are likely to see acres removed from production, increased insurance premiums, and greater yield variability.

Over the near term, producers will likely experience increased farm expenses to mitigate weather impacts.

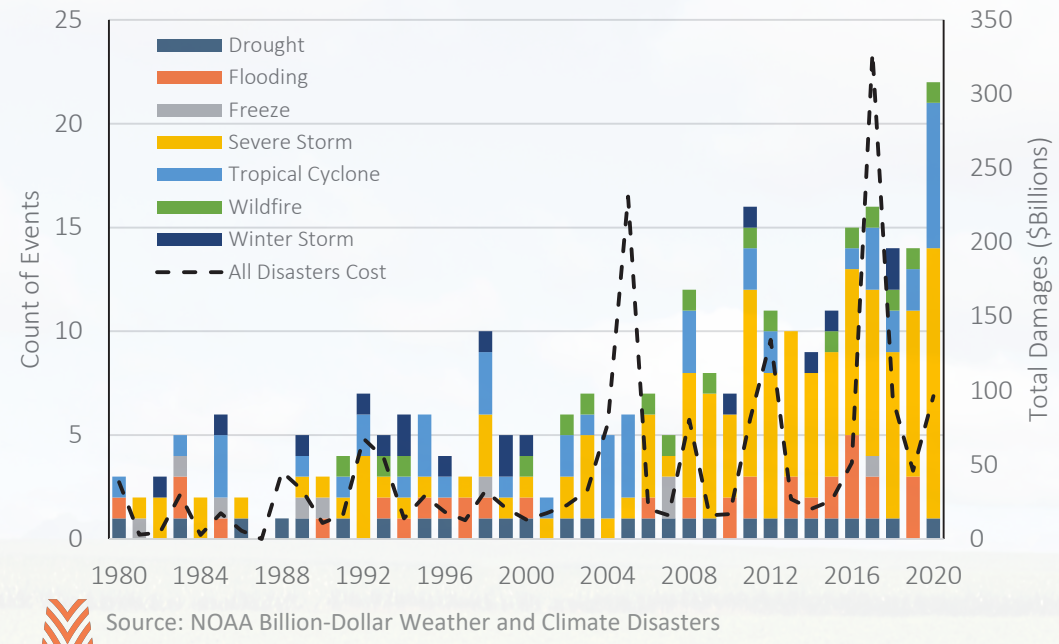
In recent years, America's farmers and ranchers have been buffeted by extreme weather events. These events led both Secretaries Purdue and Vilsack to the same conclusion: that climate change is a serious risk to American producers' bottom line. Some of these risks are already being realized in the form of recent historic floods and fires. Other risks, like widespread heat stress from rising temperatures, may still be far off. While producers are already adjusting to changing weather patterns, the greatest impacts to production likely have yet to occur.

EXTREME WEATHER EVENTS The most immediate climate threat to America's producers is from extreme weather events. The number of catastrophic weather events has steadily increased from an average of two per year in the 1980s to over 20 last year. These events are not exclusive to any one region. In the last three years,

every major growing region has experienced at least one type of extreme weather event. The increasing frequency and cost of these events means higher potential for failed crops, prevented acres, lower yields, or more expenses to mitigate these risks.

While climate change is not the sole cause of any one weather pattern, it exacerbates most weather challenges producers face. The National Oceanic and Atmospheric Administration has found that temperature increases lead to greater rainfall, making a bad flooding year like 2019 even worse. Rising temperatures can also increase the wind speed and size of hurricanes, threatening more producers in the south and southeast. Even cold weather events, like the February freeze in Texas, may be made worse by warming temperatures. Warm winters can lead to greater polar wind variability, allowing arctic winds to push further south than they would have otherwise.

Figure 1: Billion Dollar Weather Events



These events are already threatening producer incomes. Farmers reported more than 19 million acres in prevent plant in 2019, more the double the prior record. USDA Risk Management Agency data find that corn and soybean indemnities for weather-related loss reached new highs in the last few years. This increase in weather-related crop loss indicates that producers are already seeing some impacts from a changing climate.

PRODUCTION RISK Not all climate risk is immediate. A broader long-term risk stems from impacts to yields from heat stress. To date, the Environmental Protection Agency ("EPA") has found that temperature increases over the last century have been lowest in major agricultural regions like the western Corn Belt and around the Gulf of Mexico. Many of these areas have experienced no more than one degree of warming Fahrenheit between 1900 and 2020. Conversely, the West Coast and

northern Great Plains have seen some of the highest temperature increases over this time, which has contributed to recent drought and wildfire challenges.

Over time, these increased temperatures can pose many problems for producers. The USDA has estimated that total acres for corn will fall between 7 and 12 percent by 2080 as temperatures rise, with many non-irrigated acres projected to need to convert to irrigated acres. Revenue protection program premiums are forecast to more than double in many regions. Yield variability will increase as less-predictable weather patterns lead to greater variation from year to year.

This does not mean that producers have seen these risks yet, or that all producers will experience the same challenges. A review of corn growing degree days (GDDs) in parts of the country that the EPA says have seen the greatest warming does suggest rising temperatures. Figure 3 shows GDDs over the last few decades for a county in northern Minnesota. The last decade was the warmest on record, and 2021 has started at a historic pace. However, a review of county average yields finds that the warmest years have also been some of the county's best for corn yields, suggesting limited evidence of heat stress. In short, this area is so far north that the additional GDDs may have not been negative for corn yields, even if that is not true for more southern growing regions.

Other commodities or regions will see some changes in the near term as producers seek to mitigate climate change risk. The USDA ERS estimates that warming temperatures will cost the dairy industry between \$80 and \$200 million per year in heat-stress related production loss by 2030. Most dairies will also see higher energy expenditures as they use more cooling mechanisms. For crops, higher temperatures have contributed to the widespread adoption of drought-tolerant variants, leading to higher seed costs. The premium on irrigated acres is likely to continue to rise as drought and water access issues impact producers. For many commodities, climate changes will manifest first as increased production expenses rather than as direct impacts on yields or yield variability.

For many years, climate change was perceived as a homogeneous force that would lead to universal impacts, such as flat temperature increases or changes in sea level. The reality has been much more nuanced. America's producers have experienced a stable climate for the last 250 years that is likely to give way to increased volatility as temperatures rise. Producers will be able to mitigate much of that risk, but the costs will eat into producers' bottom lines even in years where volatile weather doesn't impact yields. As always, farmers and ranchers will have to be aggressive and innovative to adapt to a changing environment.

Figure 2: Corn and Soybean Weather-Related Indemnities, 1995 – 2020

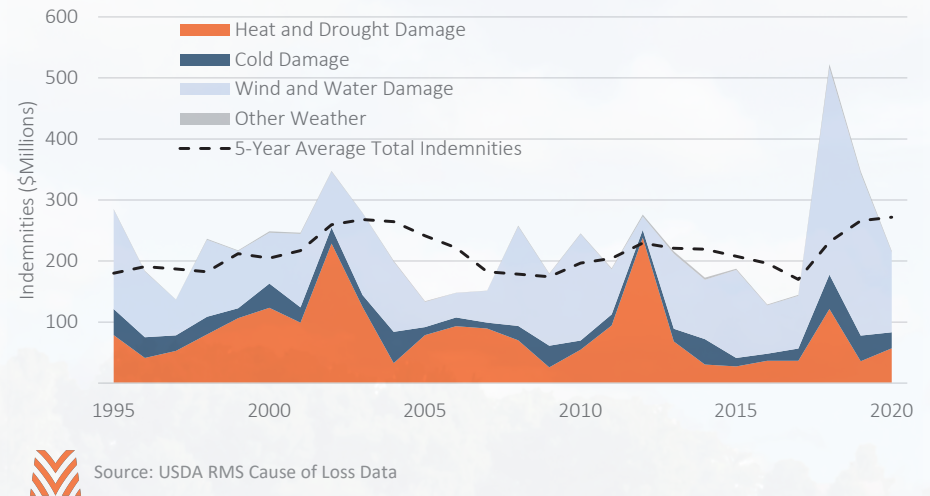
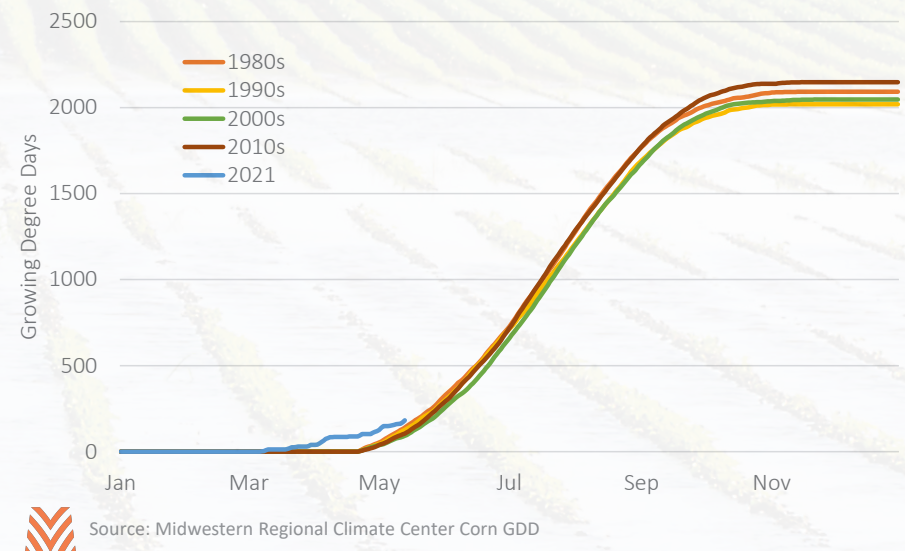


Figure 3: Growing Degree Days Over Time in Roseau County, Minnesota



THE GLOBAL ECONOMIC RECOVERY AND IMPACTS TO U.S. AGRICULTURE

(resource 7, 8, 9, 10)

Key Highlights

Economic recovery in many Asian countries is driving a surge in U.S. ag exports.

Some ag products, like tree nuts and fresh fruits, are lagging in sales due to economic conditions in India and Canada.

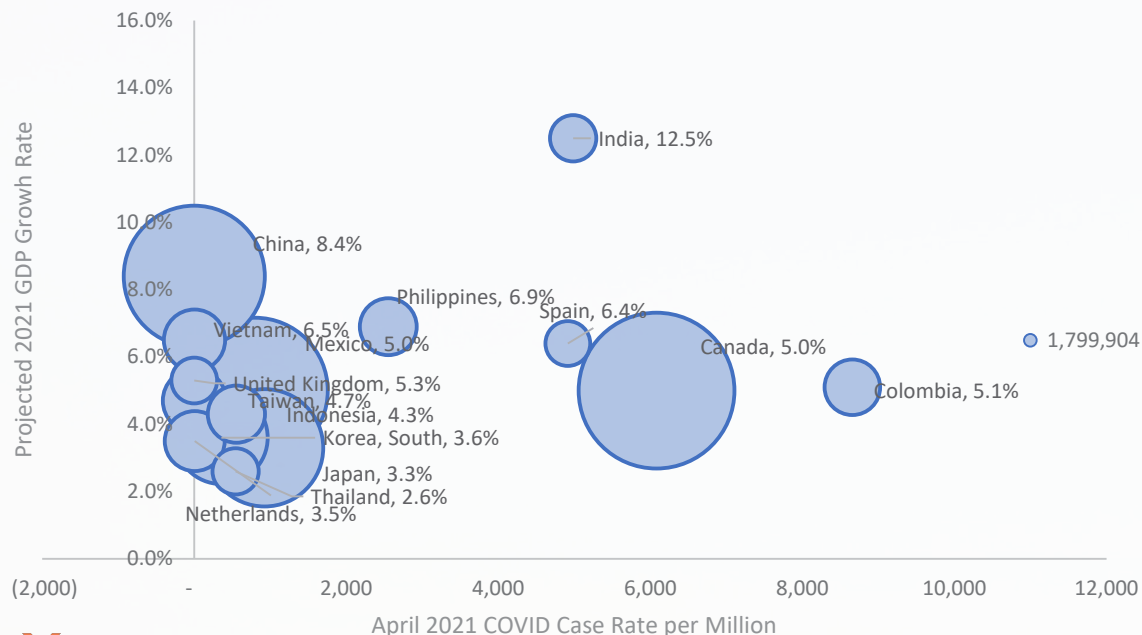
Still, foreign competition remains stiff, with limited disruptions to other top ag exporting countries.

As more and more countries start to suppress the COVID-19 pandemic and begin an economic reset, impacts to U.S. agriculture will be wide and varied.

Demand for U.S. food and fiber is driven in large part by economic development; as per capita incomes rise, so does the demand for high-value products like animal proteins, fruits, nuts, and other processed consumer goods. Meanwhile, the development of protein markets in foreign countries drives the demand for U.S. grains, oilseeds, and other feeds.

A widespread global economic recovery would be a growth driver for American farmers, as evidenced by the global economic rebound in 2010 that drove up U.S. ag exports by 20% by 2011. Conversely, a slow or uneven global recovery could disadvantage some producers, depending on where the recovery stumbles and what U.S. products that country consumes. Meanwhile, since competition is an important driver

Figure 4: Top U.S. Ag Export Destinations by 2021 COVID Case Rate and GDP Outlook



Source: IMF April 2021 Outlook; Johns Hopkins University Coronavirus Data

for U.S. producers, one of the biggest variables of how the recovery will impact them will depend on how well producers in other countries fare. The trajectories of both COVID-19 and economic recoveries in other countries could advantage or disadvantage U.S. producers in the near term.

DEMAND The export demand story has mainly been positive in 2021. Five of the top six export destinations are experiencing double-digit or higher growth rates in ag exports in the first three months of 2021 compared to the same period in 2020. China is leading the pack, with an impressive 164% increase in the value of exports in 2021. Other Asian nations, like Japan, South Korea, and Vietnam, are also experiencing a large jump in demand for U.S. food and fiber. As Figure 4 demonstrates, these countries

tend to have low or virtually no current COVID-19 circulation and also have a healthy economic outlook from the International Monetary Fund (IMF). Mexico is the fifth importer experiencing a sizable demand expansion, and they too are experiencing relatively low COVID-19 circulation in early 2021. Much of the demand growth has centered around bulk commodities like corn and soybeans, but there have been some increases in consumer-oriented and intermediate goods. Higher prices are a big component of the growth, but the quantity of these exports is also up double-digits in most cases.

While the outlook for most of our top export destinations is positive, some are still facing challenges. Canada, a perennial top-three consumer of U.S. ag exports, experienced a surge in COVID-19 cases in

April 2021. The outbreak is keeping commerce muted and reducing the outlook for economic growth in 2021. Exports to Canada are up only 5% in 2021, with sizable drops in fresh vegetables, beverages, and tree nuts dragging down sales. India also had a large spike in COVID-19 cases, hospitalizations, and deaths in the early months of 2021. India is routinely a top importer of U.S. almonds and fresh fruit, but export values are down 32% and 77% in 2021, respectively. Vaccination rates in Canada and Spain picked up considerably in April and May 2021, but India and Colombia still lag and may continue to see health and economic stress into the second half of 2021.

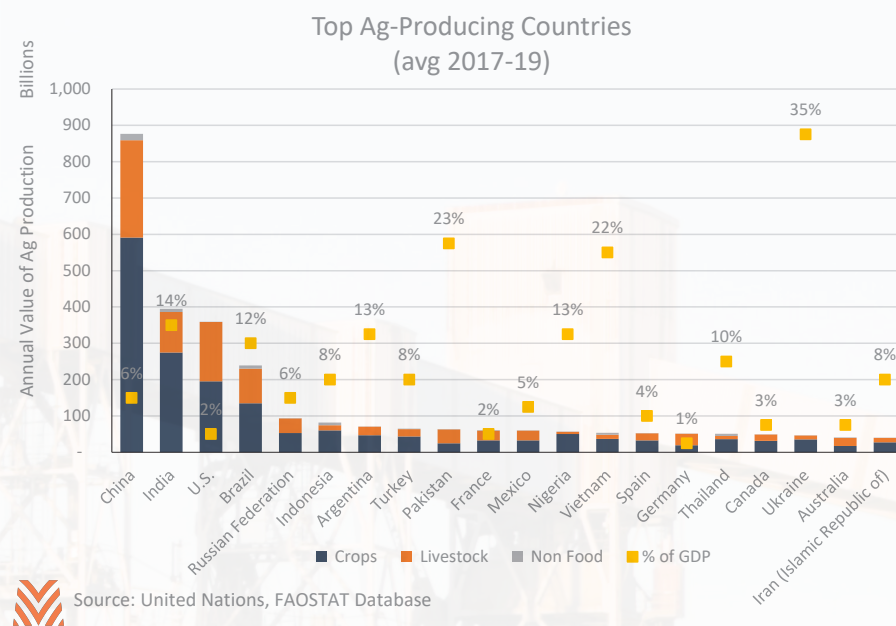
FOREIGN COMPETITION While U.S. agriculture depends on foreign markets to drive demand for food and fiber, they also compete for that demand with other, foreign producers.

Figure 5 shows the top 20 agricultural-producing countries by the average value of farm and food production between 2017 and 2019. When looking at the chart, it is important to keep in mind that China and India produce most of their crops for self-sufficiency and do not export a high percentage of their output (less than 10%). Alternatively, the U.S. and Brazil each produce significantly more food and fiber than is required for domestic consumption and have a food trade surplus.

Brazil is the U.S.'s largest competitor for global food and fiber sales. The size of ag-producing countries falls off significantly after Brazil, with many similarly-sized ag economies between \$75 and \$50 billion annually. Of these, Argentina, Ukraine, and Australia have the greatest overlap in trading partners and agricultural products. COVID-19 and economic challenges continue to delay full recoveries in Brazil and Argentina. However, their output for the 2021 growing season remains at record levels, despite weather issues. Australia has almost no cases of COVID-19, and Ukraine's levels mirror those in the U.S., so the recoveries are not likely to be shaken terribly by a viral resurgence.

This context will help shape these nations' actions as the global pandemic continues to wane. Nations with high GDP concentration in agriculture have been more sensitive to policy changes that could threaten production and transportation. However, agriculturally-focused economies are also often poorer and are further behind in their vaccination efforts. Like India, these nations may be threatened by outbreaks in 2021. This results in populations that are more susceptible to major outbreaks this year, but governments that are more sensitive to how policy decisions impact agriculture.

Figure 5: Top Ag-Producing Countries



OUTLOOK Because competition looks to stabilize, demand becomes the more significant driver of U.S. ag export growth in 2021. The speedy bounce in economic activity across much of the Pacific Rim should provide a strong lift to U.S. ag export demand for the balance of 2021. Grains and oilseeds are looking to be the largest beneficiaries of the rebound, with record-setting sales to China in the early months of the year. Beef sales to Mexico and Canada could struggle to gain until recoveries in those countries pick up, perhaps later in the year. Meanwhile, tree nuts could have a tough export year with slow sales in India and shipping channel constraints to other Asian countries. Cotton sales

to India are sluggish, but they have picked up in China, and there is a positive outlook for the remainder of the year. While the shifting tides of the pandemic and recovery make it harder than usual to predict the shape of the global economy this year, the indicators discussed here generally support the USDA's projection of a record year for U.S. agricultural exports.

Key Highlights

The USDA recently announced higher payments and new incentives designed to enroll 25 million acres in the Conservation Reserve Program (“CRP”).

CRP acres often follow market forces; few corn belt acres are expiring now, as few corn and soybean producers would have been enrolling during the supercycle era.

Western Plains states may have some incentive to enroll CRP acres while the corn belt does not; winter wheat and sorghum totals most likely to be hit by enrolled acres.

The Conservation Reserve Program (“CRP”), which offers annual payments to producers in exchange for their removing environmentally sensitive land from production for up to 15 years, has become a subject of renewed interest at the USDA. The CRP has seen several changes in recent years, including increased enrollment caps, higher payment rates, and greater contract flexibility. The USDA is currently offering higher payments and other incentives in a push to entice producers to enroll the maximum-allowable 25 million acres. With current enrollments at just over 20 million acres, there are questions about whether the USDA can hit its intended target—and how this current push might impact agricultural markets.

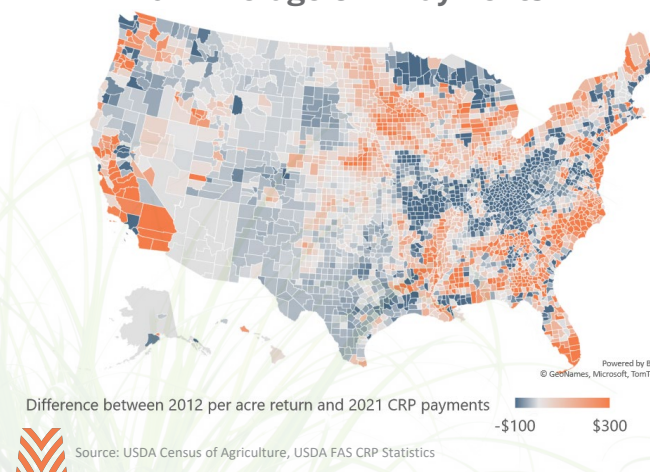
One factor working against the 25 million acre goal is that total enrollments declined over 2020, due in part to the large number of acres whose CRP contracts expired last year. The over 5 million acres that expired were heavily concentrated in the western Plains states, ranging from Montana to Texas. In these areas, it was common for more than a quarter of all enrolled acres to expire last year. Meanwhile, few acres from the Corn Belt region expired. Many CRP acres expiring in 2020 would have been enrolled around 2010, when sudden increases in corn and soybean prices may have led to fewer enrollments in that region. While current market conditions may not entice new CRP enrollments in the Corn Belt, total CRP acres in that area may not decline significantly over the next few years.

Another factor working against new enrollments is the fact that, like in the supercycle era, cash grain prices are seeing strong returns that may dissuade producers from enrolling acreage into CRP programs. One way to get a sense of how enticing new CRP enrollments may be is to compare the 2012 Agricultural Census implied per acre returns against the current average

2021 CRP payments. While there are some differences between the markets in 2012 and today, there are enough similarities in the grains markets to glean some insight. Figure 6 shows this at a county level. Areas that are deep orange may be less likely to sign up for CRP, given current market strengths. However, there are areas around the country where CRP payments may be more competitive, such as in the South or western Plains regions.

This map suggests that the USDA may be able to reach its target of enrolling 25 million acres, though it is unlikely to make great strides in corn and soybean territory. The regions that see the most expiring contracts today, like around Texas and Montana, are also the ones where the economics of CRP enrollment look good for local producers. This has some minor implications across commodities. Corn and soybean production are unlikely to decline as a result of the new CRP programs. However, sorghum and winter wheat areas may be more likely to enroll acres. While the consistent returns of a CRP program may be enticing to some producers, it's hard to pass on \$6 corn.

Figure 6: Difference Between 2012 Average per Acre Return and 2021 Average CRP Payments



Key Highlights

Regenerative farming refers to a set of practices that help improve and rebuild soil health.

Adoption of related practices is increasing, as is consumer interest in regenerative ag.

Economic benefits of regenerative agriculture include reducing machinery and nutrient costs and increasing yields that can translate into land value appreciation.

DEFINITIONS AND BACKGROUND Farming, by its very nature, is a resource-intensive activity. Feed, seed, fertilizer, water, labor, and equipment are all important variables to producers' success or failure, but land and soil are critical for things that grow in the ground. In recent years, practices relating to improving soil health have been gaining popularity with farmers and getting noticed by consumers and investors. Researchers and agronomists label these practices "regenerative agriculture."

The benefits of regenerative practices include reducing the cost of production (e.g., by reducing the need for applications of nutrients and chemicals), increasing the organic matter in cropland soils, and improving the performance of fields in the event of extreme weather, like drought. These boons for producers are leading to some serious and growing interest in regenerative agriculture, as seen in Figure 8. In the USDA's 2017

Figure 7: List of Common Regenerative Practices

- **Low and No-Till Farming**
- **Diverse Crop Rotations**
- **Cropland and Livestock Integration**
- **Cover-Cropping**

Census of Agriculture, farmers reported over half of all acres were in either no-till or reduced-till, a sizable increase from the prior census in 2012. Meanwhile, cover-cropping (the practice of planting off-season, less profitable crops to protect soil from erosion) is performed less often, although the practice has still nearly doubled since 2012.

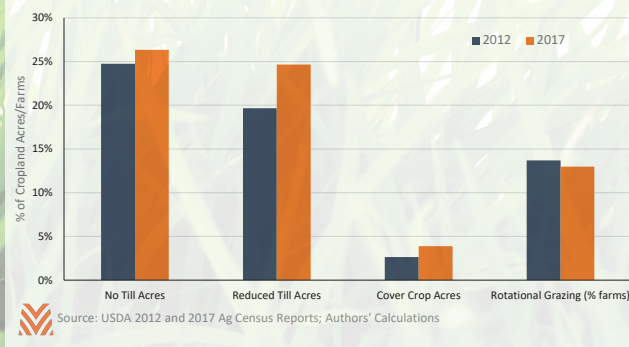
ECONOMICS Regenerative practices can contribute to some serious production and financial benefits for producers that engage in them. For example: because these practices improve soil health and reduce costs of nutrient application and machinery use, they directly contribute to farm profitability. American Farmland Trust studied the use of regenerative practices on nine farms and calculated the average net benefit to each was more than \$66,000 per year. For grain farms in the study, the average improvement in profitability was almost \$40 per acre. And there may be some indirect financial benefits coming for regenerative agriculture producers, too, with consumers and investors getting behind brands sourcing from such farms. Big brands like PepsiCo and General Mills are currently investing in programs to identify and incentivize regenerative farms.

Meanwhile, for lenders and landowners, the long-term financial incentives for regenerative practices are more subtle but still accessible. Soil quality affects the yield potential of the land, which therefore affects its value. Regenerative practices can help circumvent poor soil quality, helping to avoid the erosion of property value and helping to lower collateral risks and credit costs for borrowers and lenders.

An industry is still forming around regenerative agriculture, even as existing policies and standards are relatively limited. Multiple organizations are defining and standardizing the practices and metrics to certify activities, such as the Carbon Underground, Regenerative Organic Alliance, and Leading Harvest.

As markets and standards form, the economic benefits of these practices could continue to build further. Until the standards solidify, these organizations and others provide good literature and background to help producers, lenders, and investors understand and experiment with regenerative practices.

Figure 8: Usage of Regenerative Practices



Key Highlights

Many semi-arid and arid production regions will see new water constraints in the coming decade, which will depend on the speed of local water depletion and state policy.

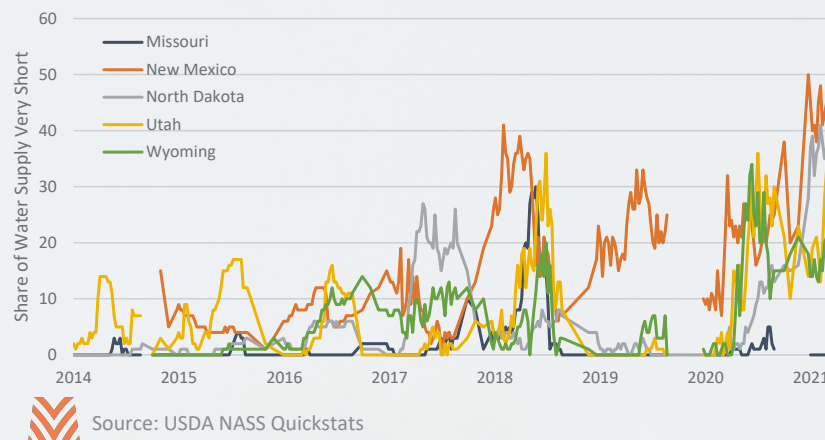
Some groundwater depletion is evident across almost every major growing region, though the worst impacts are still far off for most producers.

Water will likely play a larger role in farm expenses and land values in the future.

American producers have been adjusting to changing water supplies for decades. The USDA estimates that, even as total irrigated acres increased between 2013 and 2018, total water use declined 6%. This suggests that producers became more efficient in their irrigation methods, such as by using pressure sprinklers or drip systems. Even as technology has helped producers to become more efficient in how water is dispersed, issues with water access have been mounting, especially for producers in arid or semi-arid regions. Many farmers will face increasing constraints in the coming years, and more regions may become subject to new water conservation programs.

Risks related to water accessibility will range from the long term to the very short term, depending on the region. In general, though, water supplies have tightened considerably across the country.

Figure 9: Share of Water Supply “Very Short” for Select States, 2014 – Present



One of the nation's largest sources of fresh water, the Ogallala Aquifer, spans from the northern Great Plains down to northern Texas. The aquifer has seen considerable depletion since it first became an important resource for producers. However, most estimates believe that peak production is still several decades away, given current practices. This allows producers in this region some time to transition to more sustainable practices in the least disruptive way possible. Other areas have similar long-term risks. In Georgia, the USGS has found that water tables in major farming areas have fallen consistently over the last few decades. Water access has already led to lawsuits between Florida and Georgia that have reached the Supreme Court. These have been settled for now; in April 2021, the Supreme Court issued a ruling that select agricultural impacts in Florida could not be attributed to water misuse in Georgia.

In California, producers face a very different and more pressing reality. The Sustainable Groundwater Management Act (SGMA) is already leading to reductions in acre-foot allowances from local irrigation

districts. Some districts have already experienced zero acre-foot allotments, which may lead to farmland transition if water continues to be scarce. Meanwhile, USDA NASS measurements have found that states from North Dakota to New Mexico are currently experiencing their shortest water supply on record.

While water has always been an important consideration for producers, water rights may become paramount in the coming years. Local policies will play a key role as state governments decide how to address declining water tables. Tightening supplies may harm crop yields or increase farm expenses, depending on how producers address shortages. In areas of chronic water undersupply, water may become the primary determinant in land values. This is already true in parts of California, where land with strong water access can see premiums up to 100% over county averages. California's challenges may never occur in other regions, but producers and lenders in arid and semi-arid regions should recognize the potential for more permanent water constraints in the future.

Key Highlights

Cold conditions in the Midwest are likely to end in June; wet conditions are probable for the eastern Corn Belt.

The Southwest and the West Coast are likely to see persistent dry and hot conditions as snowpack melts off early.

Northern Plains conditions are forecast to return to average precipitation and temperature by mid-summer.

Heading into summer, weather conditions have remained sharply divided across America. Some Plains states and the Southwest continue to experience extreme drought. Meanwhile, much of the Corn Belt states have experienced cool, wet weather to start the growing season. However, current outlooks suggest a convergence across the country in the coming months.

Extreme drought conditions remain across the West Coast, Southwest, and northern Plains areas, though conditions are improving in the Plains. In the West, much of the 2020-21 snowpack is already gone, which signals drier conditions and a prolonged wildfire season. Pastureland in this region is very poor. Rain over the middle part of May has led to improving moisture conditions in the Plains, though soil conditions remain dry.

Over the next three months, the Plains states are forecast to return to near normalcy, while the Southwest and West Coast may see more severe conditions. Plains state forecasts suggest near-average precipitation and temperature. The Southwest is forecast to see the greater high temperature anomalies and drought in the coming months, though all states along the West coast are forecast to see hot and dry conditions.

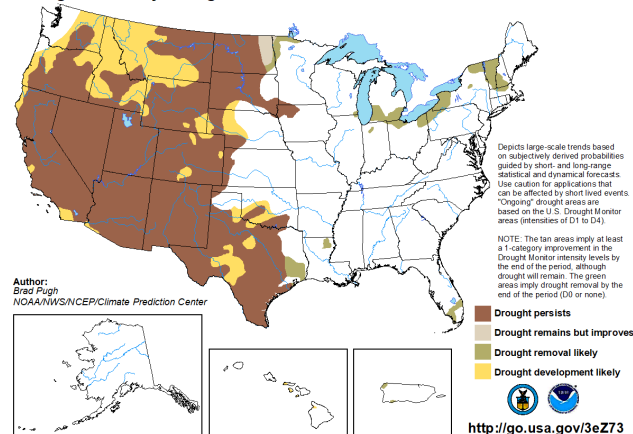
In the Corn Belt, a swath of warmer weather will offset some of the cooler temperatures that have led to fewer growing degree days. Wetter weather should persist through the Corn Belt over the next three months; forecasts do not currently indicate flooding risk. Temperatures should warm modestly in the region through the middle of the summer. By July, much of the Corn Belt is expected to be experiencing warm and wet conditions.

Few immediate weather patterns indicate risk from extreme weather events. The only current exceptions are in the lower Mississippi Delta, where heavy rains have the potential to lead to flooding conditions over the coming month. Meanwhile, drought conditions and heat in the West threaten to lead to another historic wildfire season.

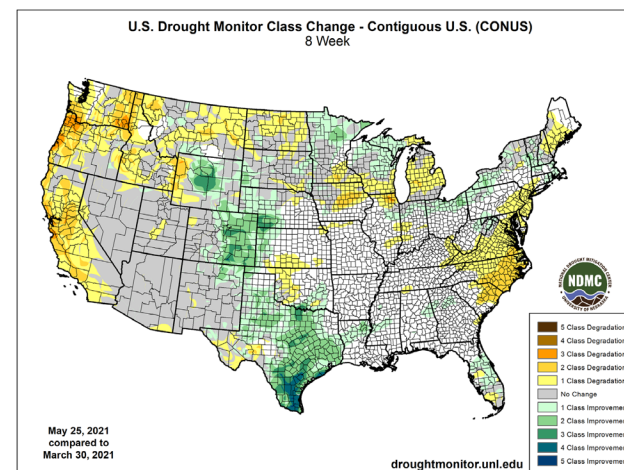
Seasonal Drought Outlook

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for April 15 - July 31, 2021
Released April 15



Drought Monitor Class Change



CORN AND SOYBEANS

(resource 25, 26, 27, 28, 29, 30)

Key Highlights

Prices for corn and soybeans are just under supercycle territory for old crop corn, soybeans; stocks-to-use ratios are projected at record lows for soybeans and very low for corn.

Producers are seeing some cost increases on inputs like pesticides and fertilizer, but they should capture most of the higher revenue.

Tight supplies will keep old crop prices high, but there are some indications of higher production for 2021/22 corn and soybeans, which have softened new-crop futures.

Corn and soybean prices have continued their rapid ascent through spring, touching heights not seen since the supercycle era. Ending stocks-to-use ratios are forecast to be at historic lows at the end of the 2020/21 crop marketing year for soybeans and near record lows for corn. While global supplies are not as drawn down, markets have shown strong reactions to any changes in supply or demand due to very tight stocks. Poor growing conditions around the globe and some unexpected strength in biofuel demand have accelerated recent price increases.

Even though this is good news for farmers who successfully raise a crop this year, producers may not capture the entirety of these high market prices.

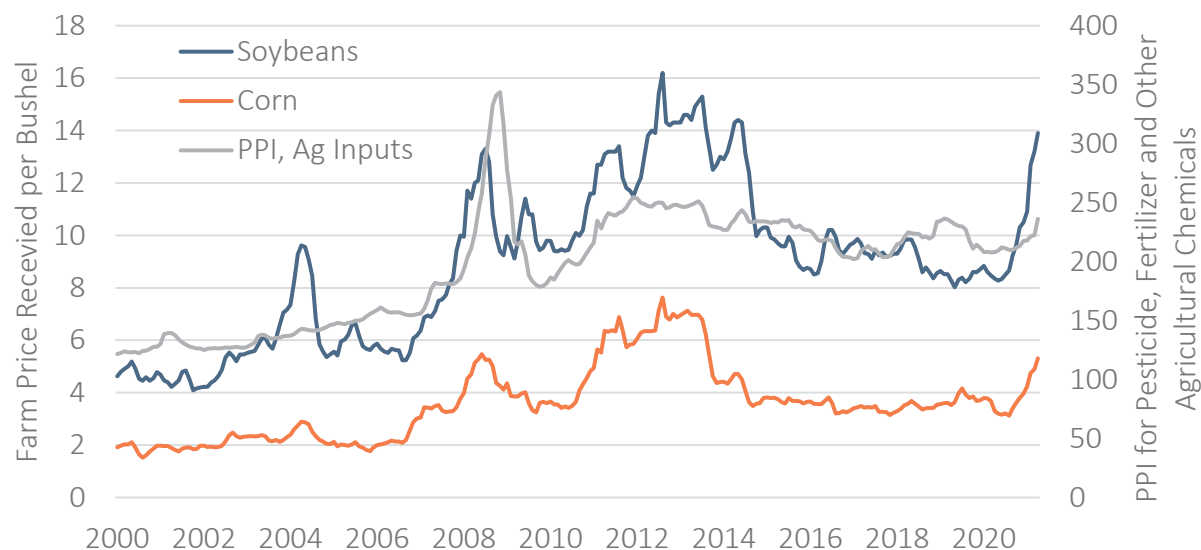
During periods of rising corn and soybean prices, costs of fertilizer, pesticides, and other inputs rise in tandem. For example, pesticide and fertilizer price indices rose 5% in Q1 2021 against where they were in Q1 2020. This increase alone suggests a \$10 increase in operating expenses per acre of corn, assuming producers used the same number of inputs as the prior year. Current USDA forecasts for the 2020/21 CMY suggest that producers will gross on average \$200 more per harvested acre of corn than they did in the 2019/20 CMY. While farmers may see some increases in operating expenses due to inflationary pressure on inputs, they should capture most of the higher prices.

The good news for producers is that these already strong prices may run up further. In early May, near-term corn futures shot up on news that corn use

for fuel alcohol in March had risen to 420 million bushels. Rising ethanol prices have more than offset rising corn prices, meaning that corn use for ethanol may outpace the USDA's current projections and place a further strain on tight corn supplies. The U.S. Energy Information Administration's Short-Term Energy Outlook forecasts that oil prices will remain near current levels through at least 2022, implying some stability for ethanol prices. Those same forecasts indicate that motor gasoline consumption will rise above summer 2020 levels, even though current forecasts are below pre-2020 levels.

Producers are getting additional good news from overseas. Major growers like Brazil have seen dry weather patterns that have cut into expectations for soybean and second corn crop production. Figure 11

Figure 10: Farm Prices Received for Corn and Soybeans and PPI for Select Agricultural Inputs



Source: USDA NASS Quickstats, U.S. Bureau of Labor Statistics Producer Price Index program

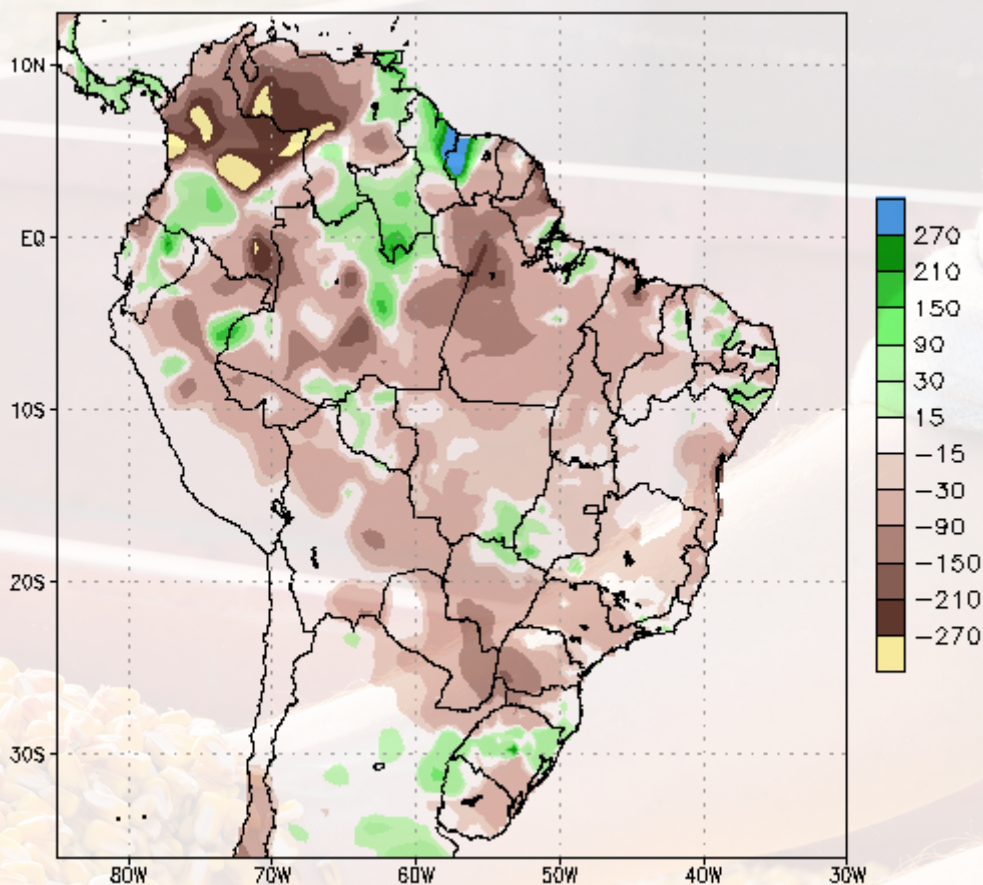
shows rainfall in South America relative to historic averages. Important growing regions like Mato Grosso do Sul and Paraná have seen severe shortages in rainfall, leading to very poor crop conditions. This will have the most impact on Brazil's second corn crop, the Safrinha, which is predominantly harvested in May and June. Final production numbers are unlikely to reach earlier estimates, meaning that supplies will be very tight through the upcoming U.S. harvest.

However, there are growing signs that production for the 2021/22 crop marketing year could surpass expectations for both corn and soybeans. Initial World Agricultural Supply and Demand Estimates (WASDE) yield forecasts for the 2021/22 CMY point towards considerable increases in yields for both corn and soybeans. There have also been indications that far more acres could have been planted than estimated by the USDA's initial planting intentions report. Despite corn farm prices received forecast over a dollar above 2020/21 CMY estimates, the latest WASDE report suggests that total acres will be almost unchanged from 2020/21 levels. A similar story has emerged for soybeans.

Commodities markets have already started to anticipate this additional production as industry forecasts point towards far more acres. Futures for new crop corn and soybeans have fallen well off-peak, even as old crop contracts remain near-record prices. USDA will update their 2021/22 CMY acreage estimates on June 30, and there is likely to be considerable volatility depending on the divergence between that update and private sector estimates.

Regardless of the June acreage report, corn and soybean producers can still expect strong incomes

Figure 11: South American Precipitation (MM) Between May and June 2021 vs. 1981 – 2010 Average



Source: CPC Unified Precipitation Analysis Climatology

for the 2021/22 crop marketing year. Record Chinese purchases for both corn and soybeans have left global stocks near historic lows, and South American production has been weak. A weak dollar has further bolstered already strong exports. Ethanol prices imply profitability for those producers for corn prices as high as \$8 per bushel. While corn and soybean producers might not see prices at supercycle heights for the 2021/22 CMY, most producers should expect to sell at levels well above breakeven through at least the start of the 2022/23 harvest.

Key Highlights

Record feedlot inventories and high slaughter weights have meant that producers have not seen the benefits of rising beef cutout prices.

Despite tepid markets, ranchers are motivated to send cattle to slaughter due to high weights and feed costs; total U.S. beef production is forecast to hit a record high in 2021.

Low global production, existing trade agreements, and surging domestic demand will help to stabilize inventories by the end of 2021.

For cattle and calf ranchers, 2021 is forecast to look a lot like 2020, at least until late in the year. While many commodities have seen surges, cattle futures have been stubborn in recent months, despite improving restaurant demand and choice cutout prices. High feedlot inventories and slaughter weights have put downward pressure on prices, as ranchers are incentivized to push more cattle through to slaughter. Cattle also have not seen the export market surges that many other commodities have seen in recent months. In short, cattle markets are likely to face difficulties until inventories normalize by year end.

The amount of potential production in the cattle pipeline is near all-time highs. The number of cattle on large-scale feedlots in March was the second highest

it has been since the late 1990s. Inventories climbed through the end of 2020, despite rising feed costs. These cattle are large, with dressed weights close to where they were in April 2020, at the height of slaughter disruption from the pandemic. This historic amount of beef in the pipeline prevented producers from seeing the full benefits of recent sharp rises in beef cutout prices.

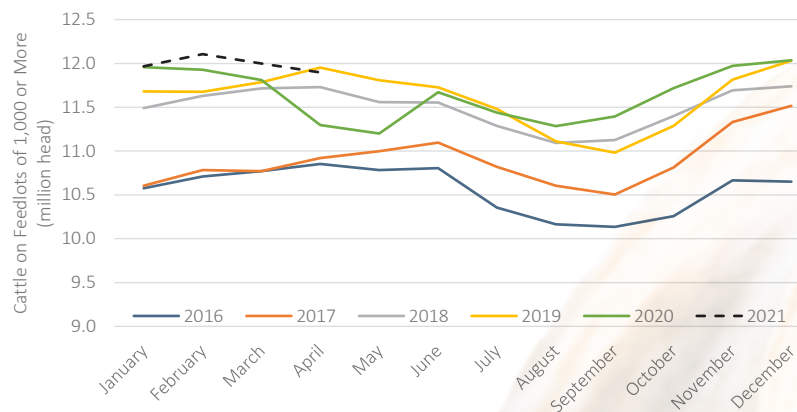
Ranchers have been trying to work through this inventory. Beef production in the first quarter of 2021 matched the robust pace achieved in the first quarter of 2020. This pace would have almost set records but for disruptions in slaughter from the February storms that impacted much of the country. Ranchers have also seen rising feed costs for both alfalfa and corn, though alfalfa's gains are not as extreme as corn's. Between this and high dressed weights, producers are opting to send cattle to slaughter rather than waiting for the market to fully recover. This has led to forecasts for record total production of beef in the U.S. for 2021.

While beef is less exposed to export markets, it has seen less upside than anticipated at the start of 2020

in the immediate aftermath of several positive trade developments. Chinese and Korean beef purchases have been robust, but weak exports to Mexico, Japan, and elsewhere have lowered total export volumes. Beef will also see slower growth in developing export markets, like those in Southeast Asia and South America, as discretionary incomes in such countries have fallen in the wake of the global recession.

However, there is some hope for 2022. Beef supplies from major exporters like Australia and New Zealand have been tight, and trade agreements negotiated before 2020 still may lead to more beef exports in the future. Domestic consumption is likely to surge in the second half of 2021, which would help to soak up high production. While it will take time to work through the historic inventory backlog producers are facing, there is a strong possibility for good market conditions by the end of the year.

Figure 12: Number of Cattle on Feed by Month, 2016 – 2021



Source: USDA NASS Cattle on Feed Report

Key Highlights

Grape producers of all kinds saw steep declines in crush volumes in 2020; California winemakers saw revenues decline by up to a third.

New bearing acres suggest that grape producers are trying to cut back on production, but these cuts may not impact total production for several years.

All indications are that the service sector will have a resurgence in 2021, which will provide significant lift both for table grapes and wine.

Of all the commodities impacted by COVID-19, grapes may have seen the most strain. The collapse of the restaurant and hospitality industries had severe impacts both on table grapes and wine. Producers who had relied on service sector outlets for their products had to reroute through grocery stores, which was challenging for smaller winemakers. Data released over the last two months paint a picture of an industry that saw declines in 2020. In California, average prices for wine and table grapes fell through 2020, despite lower crush totals. The combination of these factors implies revenues that were up to a third lower than prior year totals. In Washington state, wine producers did not see price declines, but also saw crush totals fall to recent lows.

These numbers suggest significant oversupply in the grape sector last year, and new USDA NASS data indicate that producers may be adjusting. In 2020,

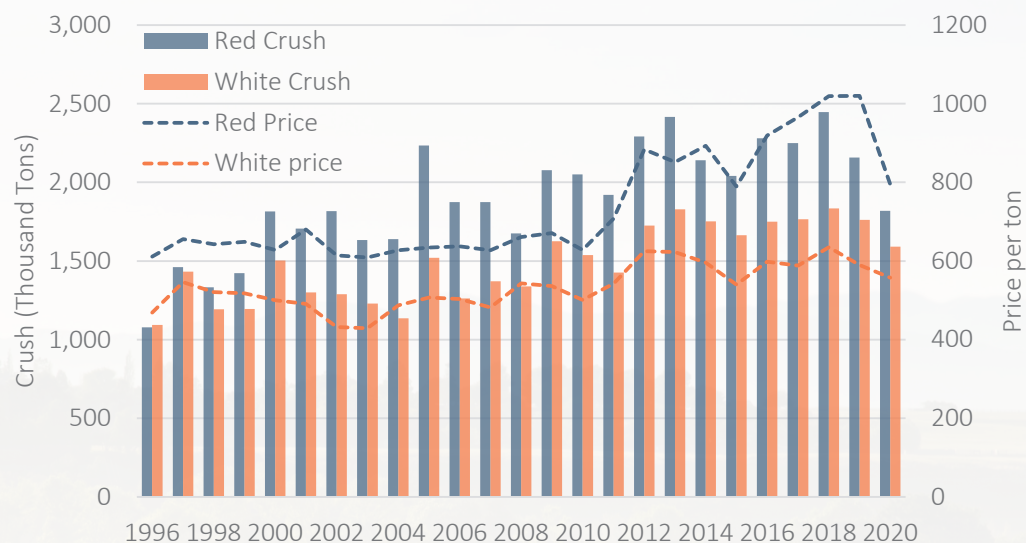
non-bearing acres fell more than 10% for both table and wine grapes. This indicates that producers may be scaling back on newly planted acres, which will reduce future supply. However, as grape vines take up to three years before first harvest, this reduction in new acres will have little impact on 2021 production. Over the short term, grape producers will need more help from the demand side.

Initial data suggest good news for grape demand in 2021. According to Google mobility data, more than half of states have already returned to pre-pandemic retail mobility levels, and some were well above baseline as consumers have flocked back to bars and restaurants. In March, retail sales at restaurants and bars were within 5% of pre-pandemic levels and had seen sharp upward swings from prior months. Many restaurant

owners still believe the best is yet to come. The National Restaurant Association's index of expectations found that expectations for the second half of 2021 are the highest since they began collecting data in 2003.

All of this points to potential strong demand for grapes of all kinds through the end of 2021. USDA AMS has already seen an uptick in grape imports, which may signal greater winemaking activity. While total wine export values remained low through February 2021, the average price has risen to pre-pandemic levels. Some of this may be due to the resilience of high price products, but on average it signals a strengthening industry. In short, all grape producers are likely to see some benefit from the recovering service sector—which many Americans, including the authors of The Feed, intend to support heartily in the coming months.

Figure 13: California Wine Crush and Average Prices, 1996 – 2020



Source: USDA NASS California Grape Crush Report

ANALYST'S CORNER: FARM INCOME FORECASTS IN A CHANGING ENVIRONMENT

(resource 41, 42, 43, 44)

Key Highlights

The USDA ERS releases their farm income forecast three times per year; they have recently devised a method that would allow for more frequent updates using WASDE data.

Futures-derived prices suggest that cash receipts will fall below supercycle era receipts but will still be stronger than any other year.

Given high government payments and current low farm expense forecasts, producers have the potential to see very strong net cash income in 2021.

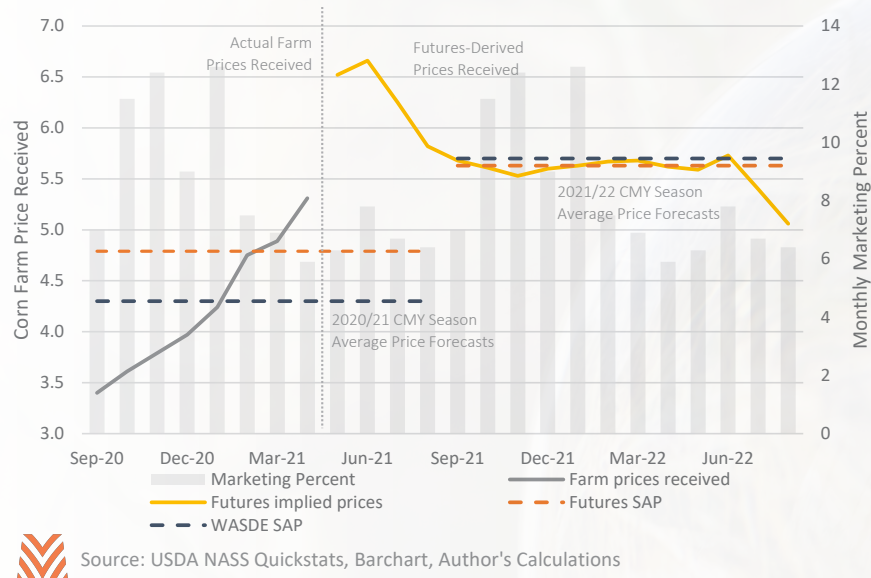
Last year was a lesson in humility for agricultural economists who forecast farm incomes, including the authors of The Feed. After historic low prices were forecasted for many commodities, markets saw a resurgence. In a single year, we saw the most agricultural exports ever in a single month, record government payments, and large production revisions. This shifting environment led to large swings in forecast incomes for 2020.

Luckily, in response to this change, the USDA's Economic Research Service (ERS) released a whitepaper that outlined a means to update farm income forecasts between their major releases to better account for

changing market conditions. By taking a few additional pieces of data, we can get some sense of how strong incomes may be for 2021.

FUTURES-DERIVED PRICES While many components of net cash farm income are difficult to forecast continuously, it is easier to account for changes in cash receipts for major commodities. At a national level, the ERS estimates cash receipts as the average farm price received times total use, excluding on-farm use. The World Agricultural Supply and Demand Estimates (WASDE) provide monthly forecasts of production and farm prices for commodities that cover more than 75% of total cash receipts. These data can be used to replace cash receipt forecasts for these major commodities at a national level and can give some insight into how farm income forecasts are changing. However, while animal products have prices for the 2021 calendar year in the

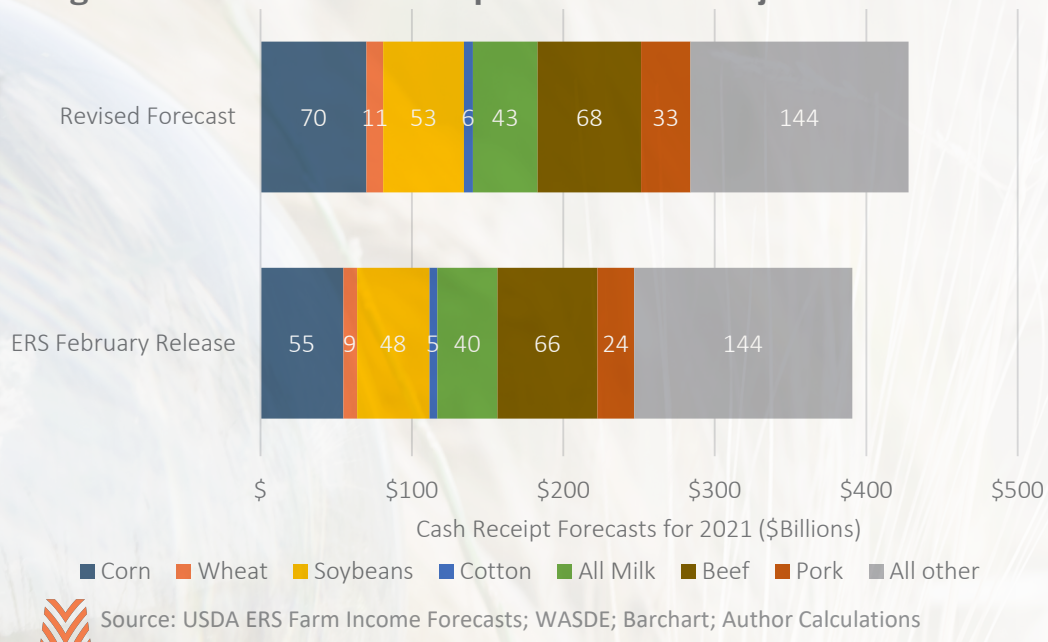
Figure 14: Using Futures Data To Forecast Season Average Corn Prices for the 2020/21 and 2021/22 CMY



latest WASDE, there is one challenge for crops. Crop calendar year incomes for 2021 require forecasts for both the 2020/21 crop marketing year (CMY) and the 2021/22 CMY. Producers will receive income based on the shares of both 2020/21 and 2021/22 CMY crops they sold during the calendar year 2021. The latter CMY does not have WASDE forecasts until midway through the year.

ERS' Market and Trade Economic Division (MTED) has a potential solution. MTED creates season-average price (SAP) forecasts through a combination of actual farm prices received and futures markets. By combining these data with historic monthly marketing weights and basis, we can forecast a season average price so long as there are futures data. As an example, Figure 13 represents how this would apply to corn prices at the beginning of June. For the 2020/21 CMY, the season average price

Figure 15: Revised Cash Receipt Estimates for Major Commodities



is a function of both actual farm prices received and futures prices. The 2021/22 CMY is derived exclusively from futures prices.

The 2020/21 CMY SAP of \$4.79 represents a divergence from the May WASDE, which forecast corn farm prices received at \$4.35. However, the current futures-derived SAP for the 2021/22 CMY is within 7 cents of the May WASDE forecast. In volatile markets, these futures-derived prices may be preferable due to their ability to react to changing circumstances. Still, there are limits to the use of futures-derived prices. If basis points widen in a high price environment, this model may overestimate SAP. Marketing percentages may change as we've seen with larger Chinese corn purchases at the beginning of the calendar year. This reliance on historic data over current marketing and basis information means that the WASDE forecasts

are preferred in low price volatility environments where available.

UPDATING CASH RECEIPTS Now that we have price information, the next phase is to look for total use forecasts for the 2021/22 CMY. Once again, the WASDE provides 2021 use forecasts for animal products. Like with prices, there are no total use forecasts for 2021/22 CMY crops during the first part of the calendar year. We bypassed this issue by taking the USDA's preliminary forecasts for the 2021/22 CMY, released during the annual Ag Outlook Forum. As new data become available, such as revised planted acres or yields, these figures can be adjusted, until a formal forecast is released in the WASDE.

With revised price and use data, we can now begin updating the cash receipt totals used in the ERS

forecast. However, not all data can be used in the same fashion. Crop cash receipts can be substituted directly as the share of 2020/21 and 2021/22 CMY crops sold during 2021. Animal products are slightly different. The ERS' measure of cash receipts differs from what is contained in WASDE. The ERS' recommendation in their whitepaper to address this problem was to index the value of total use in the latest WASDE against the WASDE data that would have been available at the time of the last ERS release. With this information, we can now create revised cash receipt forecasts, as shown in Figure 14.

The changes to these commodities alone would represent an additional \$37.2 billion in cash receipts over the USDA ERS' February forecasts. If realized, this would lead to cash receipts of \$428 billion in 2021, well below supercycle peaks but strong by any other measure. While this does not tell what net cash income will be in 2021, we may assume that many other components will stay the same. Government incomes will likely be high this year due to residual payments from the ad-hoc programs of 2020. Select expenses, like interest and property taxes, will likely not change much in the USDA's August release, though other expenses like feed, seed, and fuels may see gains. If we hold all other portions of cash income constant, producers would see almost \$165 billion in net cash income in 2021, higher even than in the supercycle era.

There are many reasons this may not occur. If producers increased their acreage after the prospective planting report, cash grains may see far higher production. High grain costs may lead to a surge in feed expenses. Other scalable inputs may rise as producers seek to take advantage of high commodity prices. However, all data point towards a strong-to-great year for farm incomes in 2021.

RESOURCES

The information and opinions or conclusions contained herein have been compiled or arrived at from the following sources and references:

- 1 National Oceanic and Atmospheric Administration, Billion-Dollar Weather and Climate Disasters: Overview (<https://www.ncdc.noaa.gov/billions/>)
- 2 National Oceanic and Atmospheric Administration, ClimateWatch Magazine (<https://www.climate.gov/news-features/blogs/beyond-data/its-not-heat-its-humidity>)
- 3 USDA RMA, Cause of Loss Historical Data Files (<https://www.rma.usda.gov/SummaryOfBusiness/CauseOfLoss>)
- 4 USDA ERS, Climate Change and Agricultural Risk Management Into the 21st Century (<https://www.ers.usda.gov/webdocs/publications/93547/err-266.pdf?v=6813.4>)
- 5 USDA ERS, Heat Stress and Dairy Productivity (<https://www.ers.usda.gov/amber-waves/2014/november/greater-heat-stress-from-climate-change-could-lower-dairy-productivity/>)
- 6 Midwestern Regional Climate Center, Corn GDD (<https://mrcc.illinois.edu/U2U/gdd/>)
- 7 USDA Office of the Chief Economist, World Agricultural Supply and Demand Estimates (<https://www.usda.gov/oce/commodity/wasde/>)
- 8 Food and Agriculture Organization of the United Nations (<http://www.fao.org/statistics/en/>)
- 9 International Monetary Fund World Economic Outlook April 2021 (<https://www.imf.org/en/Publications/WEO/Issues/2021/03/23/world-economic-outlook-april-2021>)
- 10 USDA FAS Global Agricultural Trade System (<https://apps.fas.usda.gov/gats/default.aspx>)
- 11 AgWeb, USDA to Open CRP Enrollment With Higher Payment Rates, New Incentives (<https://www.agweb.com/news/policy/politics/usda-open-crp-enrollment-higher-payment-rates-new-incentives>)
- 12 USDA FAS, Conservation Reserve Program Statistics (<https://www.fsa.usda.gov/programs-and-services/conservation-programs/reports-and-statistics/conservation-reserve-program-statistics/index>)
- 13 USDA NASS, Quickstats (<https://quickstats.nass.usda.gov/>)
- 14 American Farmland Trust Soil Health Case Studies (<https://farmland.org/project/quantifying-economic-and-environmental-benefits-of-soil-health/>)
- 15 USDA Tillage Intensity and Conservation Cropping in the United States (<https://www.ers.usda.gov/publications/pub-details/?pubid=90200>)
- 16 USDA Agricultural Resources and Environmental Indicators, 2019 (<https://www.ers.usda.gov/publications/pub-details/?pubid=93025>)
- 17 USDA 2017 Census of Agriculture (<https://www.nass.usda.gov/AgCensus/>)
- 18 USDA NASS, Irrigation and Water Management (https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Irrigation_and_WaterManagement.pdf)
- 19 USDA ERS, Irrigation & Water Use (<https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/#trends>)
- 20 USGS, Water-Level and Recoverable Water in Storage Changes, High Plains Aquifer, Predevelopment to 2015 and 2013-15. (<https://pubs.usgs.gov/sir/2017/5040/sir20175040.pdf>)
- 21 The Wall Street Journal, Supreme Court Backs Georgia in Water Dispute With Florida. (<https://www.wsj.com/articles/supreme-court-backs-georgia-in-water-dispute-with-florida-11617313257>)
- 22 USDA NASS, Weekly Weather & Crop Bulletin (WAOB) (https://www.nass.usda.gov/Publications/National_Crop_Progress/)
- 23 National Oceanic and Atmospheric Administration, Long Range Forecast Dashboard (<https://www.weather.gov/phi/extended#extend>)
- 24 National Weather Service, Weather Prediction Center Extended Forecast Discussion (<https://www.wpc.ncep.noaa.gov/discussions/hpcdiscussions.php?disc=pmdepd&version=0&fmt=reg>)
- 25 U.S. Bureau of Labor Statistics, Producer Price Index program (<https://www.bls.gov/ppi/>)
- 26 USDA Foreign Agricultural Service, Production, Supply and Distribution Database (<https://apps.fas.usda.gov/psdonline/app/index.html#/app/home>)
- 27 USDA ERS, Commodity Cost and Returns (<https://www.ers.usda.gov/data-products/commodity-costs-and-returns/>)
- 28 U.S. Energy Information Administration, Short-Term Energy Outlook (<https://www.eia.gov/outlooks/steo/>)
- 29 USDA NASS, Grain Crushings and Co-Products Production (<https://usda.library.cornell.edu/concern/publications/n583xt96p>)
- 30 Barchart, Soybean Futures Market New and Commentary (https://www.barchart.com/futures/quotes/ZS*0/futures-prices?viewName=main)
- 31 USDA ERS, Livestock, Dairy, and Poultry Outlook (<https://www.ers.usda.gov/webdocs/outlooks/100721/ldp-m-321.pdf?v=5747.3>)
- 32 USDA ARS, Cost of Forage Production (https://www.ars.usda.gov/ARSUserFiles/50901500/research_summaries/RS96_pdfs/RS96-14.pdf)
- 33 USDA AMS, National Weekly Cattle & Beef Summary (<https://www.ams.usda.gov/mnreports/lswwcbs.pdf>)
- 34 USDA NASS, Cattle on Feed (<https://usda.library.cornell.edu/concern/publications/m326m174z>)
- 35 USDA NASS, California Grape Crush (https://www.nass.usda.gov/Statistics_by_State/California/Publications/Specialty_and_Other_Releases/Grapes/Crush/Final/2020/2020_final_grape%20crush.pdf)
- 36 Washington State Wine, 2020 Washington Wine Grape Production Report (<https://www.washingtonwine.org/trade/documents>)
- 37 USDA NASS, California Grape Acreage Report, 2020 Summary (https://www.nass.usda.gov/Statistics_by_State/California/Publications/Specialty_and_Other_Releases/Grapes/)
- 38 Google, COVID-19 Community Mobility Reports (<https://www.google.com/covid19/mobility/>)
- 39 National Restaurant Association, Restaurant Performance Index (<https://restaurant.org/downloads/pdfs/research/index/rpi-february2021.pdf>)
- 40 USDA FAS, Global Agricultural Trade System Database (<https://apps.fas.usda.gov/gats/>)
- 41 USDA ERS, COVID-19 Working Paper: A Timely Tool for Evaluating Financial Conditions in Agriculture: USDA Forecasts of the Value of Production in the Face of COVID-19 (<https://www.ers.usda.gov/publications/pub-details/?pubid=100176>)
- 42 Barchart, Corn Futures (https://www.barchart.com/futures/quotes/ZC*0/futures-prices)
- 43 USDA Ag Outlook Forum (<https://www.usda.gov/oce/ag-outlook-forum>)
- 44 USDA ERS Farm Income Forecast (<https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/>)

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Issue No. 22