

Survivorship, Shocks, and Feed Risk Management: Pre-, Peri-, & Post- (insert Black Swan event here)

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Abstract

The future direction of financial and commodities markets are inherently impossible to predict by any one individual on a consistent basis. Not all information is present to have a certainty of what price a commodity or stock will have at a future point, and even if it is, there are market forces both internal and external to the specific stock or commodity in question that may lead to price direction that is counter to analysis.

The concept of a shock to a market is sometimes used synonymously with the term “Black Swan”, a concept introduced by Nassim Taleb. Black Swans are surprising new information that lead to shocks to a market. They are inherently unpredictable, but it is predictable that they will occur. Taleb posits that the goal is not to predict Black Swan events, but rather to set up an organization or risk management strategy to be antifragile, or able to not only withstand but even to thrive in the face of shocks.

This presentation and article will not dive deep into the sorts of antifragile strategies that an agricultural firm might employ. It will provide some historical context of how agricultural commodities tend to behave, as well as current information of supply and demand. Using this information, agricultural firms can embark

upon their own discovery of how to apply the information to their own businesses and organizations to make themselves antifragile.

Introduction

Grain markets tend to be “bottom-feeders”. They are characterized by periods of time, usually comprised of several years to even more than a decade, of relatively low volatility and comparatively low prices. During these times of stability, a demand structure is established to utilize cheap surplus grain quantity. Then, voila! There is a supply shortage or a significant demand introduced which pushes prices higher for a period of time, sometimes months but sometimes years. These periods of higher prices are often marked by uncertainty, some demand destruction, and the increase of supply to meet demand.

The Commodity Boom of the 2000s (Figures 1 and 2) was, in part, a recognition of the significant increase in global demand that China would impose on many commodities (Figure 3 and 4) as a result of rapid increases in per capita income. In reality, China’s increase in demand started in the 1990s, but it took several years for markets to recognize that commodities were “cheap” in relation to their potential as a result of increased global demand for commodities. In August of 2006, the nearby September corn futures contract bottomed at

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\$2.17/bu. In June 2008, it hit \$7.79; then it bottomed in September 2009 at \$3.02, then reached \$7.99 in June of 2011 and finally hit corn's all-time peak of \$8.49 in August 2012 during a severe drought across the US.

After this peak, prices remained relatively volatile but always trended lower until late 2014, at which point the corn market entered an extended period of relative stability. From September 2014 through November 2020, the corn trading range was from \$3.01 to \$4.68/bu, with the majority of time spent between \$3.50 and \$4.25/bu.

The lowest point reached from September 2014 through December 2020 was achieved in April 2020, when nearby corn reached \$3.01/bu. Exactly one year later, in April 2021, corn reached its highest mark in 8 years, touching \$5.95/bu.

The story of soybeans is slightly more complex, with some legitimate shortages leading to higher prices in 2016, but the overall pattern is similar to corn. After the 2000s Commodity Boom and drought-driven boom in 2012, the soybean market settled into a comfortable trading range from 2014 through 2020, only to explode in late 2020 and into 2021.

The Similarities and Differences of Corn and Soybean Markets

The United States has been one of the leading corn and soybean producers, and sources of demand, for decades. An increase in planted acres in South America over the last 20 years has decreased that share of production that the US accounts for, as has, to a lesser extent, increases in corn production in the Black Sea Region.

In 2018, the US accounted for 34% of global corn production and was far-and-away

the largest producer, producing 53% more corn than the second largest producer, China (392.5 million metric tonnes vs. 257.3). That same year, the US accounted for 35% of global soybean production. However, the US was eclipsed by Brazil, which accounted for 36% of total soybean production.

Although the US share of global production of both commodities is similar, two significant differences exist. First, China is the largest domestic user of soybeans, produces little of its own, and Brazil produces much of what China demands. Second, the United States is the largest domestic user of corn and China, the second-largest domestic user of corn, is also the second-largest producer of corn. This means that the soybean market is just as dependent on growing conditions in South America as it is on growing conditions in the US and that the soybean market is very dependent on Chinese demand. Although the corn market will be impacted by both South American growing season weather and Chinese demand, it is not to the extent of the impact that these same events have on the soybean market.

Current Outlook

Both domestic and global stocks for corn and soybeans have been reduced over the last 12 months. The domestic soybean stocks-to-use ratio stands is hovering around 4%, which essentially means that the US will be out of soybeans by early summer and will likely import some soybeans from South America into places of high use and close to ports, such as North Carolina, the Texas Panhandle, and California. The domestic corn stocks-to-use is now less than 10%. Although corn might not be imported, supply is tight.

Was this predictable, a shock, or both?

In retrospect (as is the case oftentimes with markets), the current move up was somewhat predictable, but still difficult to foresee.

First, there had been several years of large supply and low prices, and demand had grown in response to the cheap supply of corn.

Second, there was pent-up demand that was bound to emerge coming out of a pandemic, and the economic phenomena of pent-up demand proved to be true once again. China, in particular, has demonstrated incredible demand as its economy re-opens.

Third, the 2019 US crop was smaller than previous years due to flooding, and the 2020 crop was smaller yet due to a combination of COVID-induced smaller acres planted, the Derecho storm that hit Iowa, and moderate-to-severe drought across the Western Corn Belt.

Finally, there was the COVID-induced overfeeding of cattle and pigs as meat processors reduced plant capacity, and in some cases, shuttered plants for weeks to combat COVID spreading among workers, which meant bigger animals eating more feed for longer periods of time. In the case of live cattle, it took nearly a full year to completely offset this effect and get harvest weights back down to the same level as the prior year.

Where does the market go from here?

First, it is important to recognize that although the world supply of corn and soybeans are tighter than they have been over the last several years, both markets have a higher stocks:use ratio than they did in the Commodity Boom of the 2000s (Figures 5 and 6). That said,

the prolonged bear market that occurred from 2014 through 2020 may be over, and volatility may continue to occur.

South America production of soybeans in the 2021 growing season is large; the safrinha corn crop, which is a significant source of S.A. corn production, is currently in its growing season and its ultimate production is still unknown.

The US drought monitor shows prolonged drought in the Mountain West and Southwest areas of the United States, as well as parts of the Northern Plains. However, the current moisture situation does not have a strong correlation to final corn and soybean yield. Nonetheless, given the tight old crop stocks of both corn and soybeans, the grain markets will likely remain volatile, with high highs and the potential for low lows, depending on rainfall.

On March 31st, the USDA released projected corn and soybean acres for the 2021 growing season (Figure 8). Estimates from the report for both corn and soybean acres planted were below analysts' projections, especially for corn. The USDA will update actual planted acres in subsequent reports. Historically the USDA has rarely increased final planted acres of all principal crops (corn, soybeans, and wheat combined) by more than 0.5% over its initial (March) first projection; decreases of more than 0.5% occur more frequently (Figure 7). It is likely that the current acreage projections are close to the final USDA figures for planted acres.

The current corn acreage estimate is 91.144 million acres, and the current soybean estimate is 87.6 million acres. If national yields are big, these acreage numbers are sufficient to bring grain prices lower and replenish stocks to a decent extent; neither acreage number is likely large enough to drop corn and soybean prices to year-ago levels.

What to Do?

As stated in the abstract, prices of commodities are inherently impossible to consistently predict. Not all information for future price moves may currently be known to all market participants, and even if it is markets can still move in surprising fashions. John Maynard Keynes is quoted as saying “The market can stay irrational longer than you can stay solvent.”

That said, there are a few options worth exploring.

New crop prices

The first is to look at the prices of new crop corn and soybeans. At the time of this writing, December 2021 corn sits at \$5.04/bu and November 2021 soybeans sits at \$12.61/bu. Although these prices are certainly higher than dairy farms have been accustomed to over the last several years, they may represent an opportunity to buy.

Call options

A second option is to employ call options, which are akin to insurance premiums that protect the premium holder in the case that prices move higher. The advantage to call options is that they protect against higher prices while also allowing a purchaser of call options to participate in lower prices should the market move lower. If the market does indeed move lower, all the purchaser loses is the premium paid.

The disadvantage of call options is that they are expensive. As of this writing, December 2021 corn call options are \$0.50/bu, meaning that corn would have to fall more than \$0.50 for the call to be a better decision than simply purchasing corn at \$5.00/bu futures price.

Be defensive, buy breaks

This strategy is not that different than what most dairy producers might typically choose to do. Essentially, it is a strategy of being opportunistic and buying feedstuffs in 6 to 12 week intervals. Dairy producers are already over half done using the 2020 corn and soybean crops, meaning that much of the pain of this price shock has already been digested and incurred. Prices could certainly go higher during the Summer of 2021 if the growing season has weather challenges or demand picks up substantially, so purchasing at least some of projected summer needs makes sense, and the market is providing the opportunity to purchase those months at a discount to the nearby contract. By the middle-to-end of summer, the prospects of the 2021 corn and soybean crops will be known and a 2021 feed purchasing plan will have more information. Furthermore, the adage that “expensive corn leads to expensive meat and milk” will likely hold true yet again, meaning that at some point of 2021 or 2022, milk and meat prices will be high enough to offset some of the increase in grain prices.

Follow an established methodology of buy and sell signals

Several consultants exist in this space that have developed relatively reliable methodologies to buy at periods of relatively low prices. These methodologies often incorporate technical influences, money flow, and seasonality into their algorithms and can both beat the market average and take some emotion out of the decision. Another alternative would be to simply buy a set amount at a regular interval so that a producer at least gets the market average and no worse. Again, one goal of these strategies is to remove emotion from the decision, as well as the innate human desire to “be right” or outguess the market.

One seasonality consideration is that late summer and early fall are historically the cheapest times to purchase corn, soybeans, and other feedstuffs, such as distillers grains and fiber sources. This is not always the case but holds true 70 to 80% of years. That said, the years in which it is not the case can have significant declines post-harvest.

Remember the future is unknown, so be antifragile!

The basic tenant of antifragility is that unpredictable things will happen, and consequently, organizations need to set themselves up to be antifragile and have the ability to withstand shocks. The relevance and application of this concept is open to interpretation for each firm. As the concept of antifragility pertains to risk management for dairy farms and other firms in animal agriculture, a starting point for this mental exercise may be as simple as following a basic formula:

Risk = Probability of Threat x Consequence

Firms can conduct a thought experiment using this methodology with regards to grain prices. A possible version of this thought experiment could be to ask the following questions:

“How likely is \$7.00/bu corn? What impact would \$7.00/bu corn have on my business?” “How likely is \$4.00/bu corn? What impact would \$4.00/bu corn have on my business?”

These exercises can act as starting points for ideation and critical thinking, which are both important aspects of establishing an antifragile organization and antifragile risk management approach. They can also be quantified to guide decisions. If the predicted negative impact

(again, probability x consequence) of higher grain prices is of greater magnitude than the total predictive positive impact of lower prices, a firm may decide more aggressive purchasing is required. Contrarily, if a firm is positioned such that the negative impact of \$7.00/bu corn is not as of great a magnitude as the positive impact of \$4.00/bu corn, it may decide that aggressive purchasing of grains is not beneficial to its organization. And perhaps more importantly, this exercise can lead to brainstorming of ways to set the organization up to be more insulated from shocks (both positive and negative) to grain prices and/or milk prices going forward.

Conclusion

Global grain inventories are lower than they have been in several years, and this surprisingly (or unsurprisingly, depending on your ability to forecast future events) occurred during a pandemic year. This drawdown in stocks was due to both decreased production in key agricultural areas, most notably the US, and to increased demand led by both the reopening of economies and the actions of Federal reserve banks across the world to pump trillions of dollars into locked-down economies.

Future prices will be significantly impacted by the 2021 growing season in the US and other key areas of production, such as the SA *safrinha* corn crop and the Black Sea region. Demand will, of course, play a significant role. Chinese demand for energy feedstuffs appears to be approaching all-time highs, and other sectors of the US corn and soybean demand structure, such as ethanol and the milk and meat industries, will likely continue to fuel increasing demand for feedstuffs as well.

However, future prices are inherently unpredictable. There may be shocks that push prices significantly higher or lower. As a result, dairy farms that purchase corn and soybeans should look at current and deferred prices of feedstuffs and take an internal inventory of how those prices affect their profitability, while also considering how shocks that move those prices higher or lower might impact their situation.





Figure 1. Continuous corn chart of 2016 through 2021.

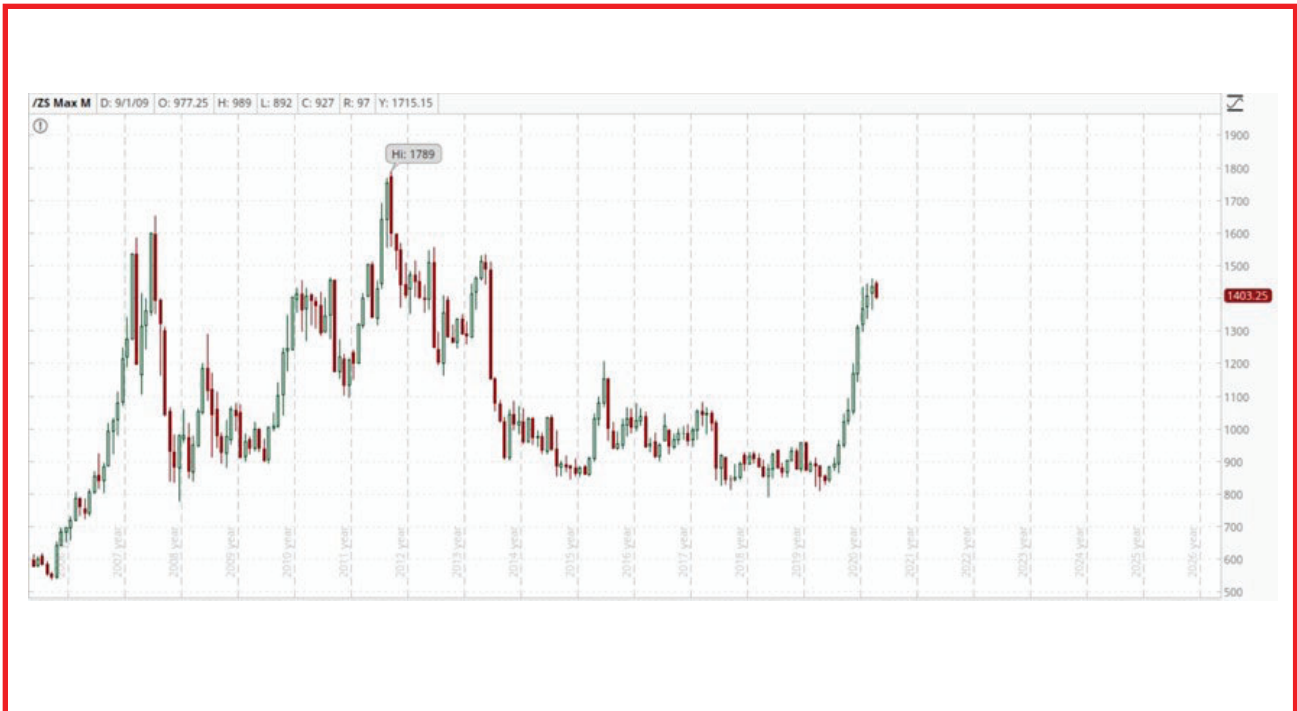


Figure 2. Continuous soybean chart of 2016 through 2021.



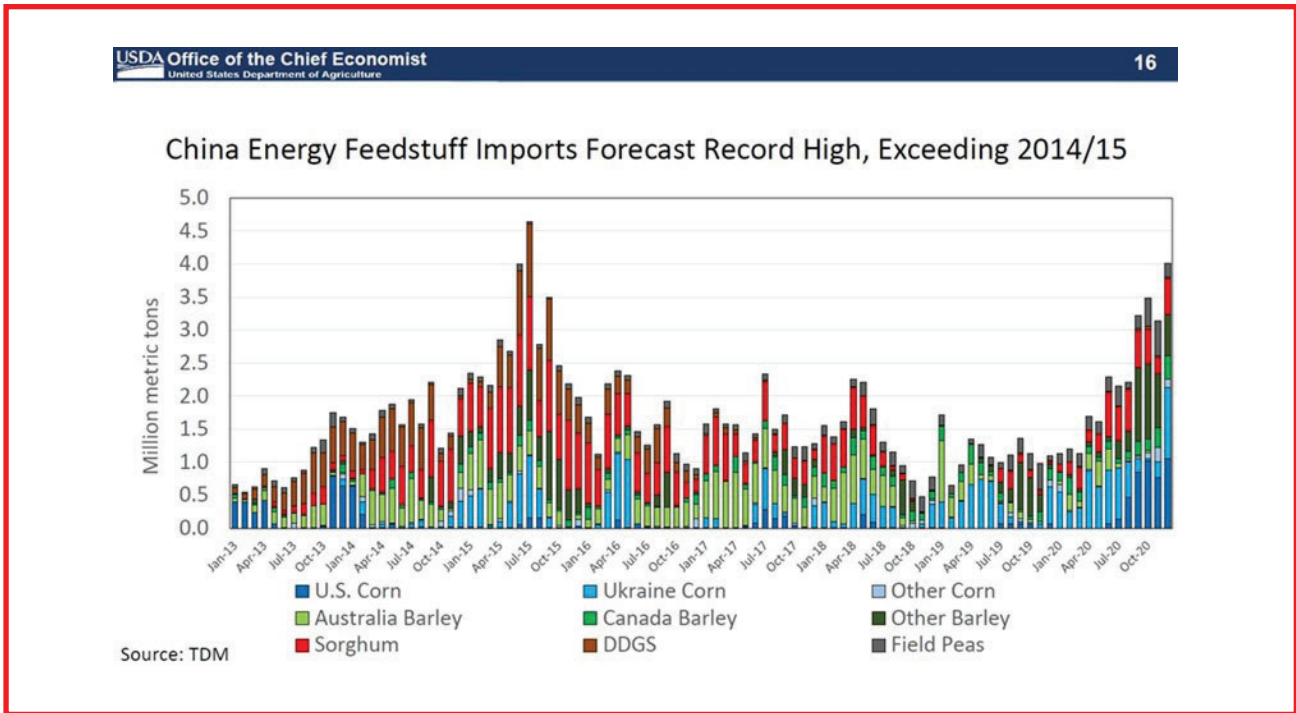


Figure 3. China energy feedstuff imports 2013 through 2020.

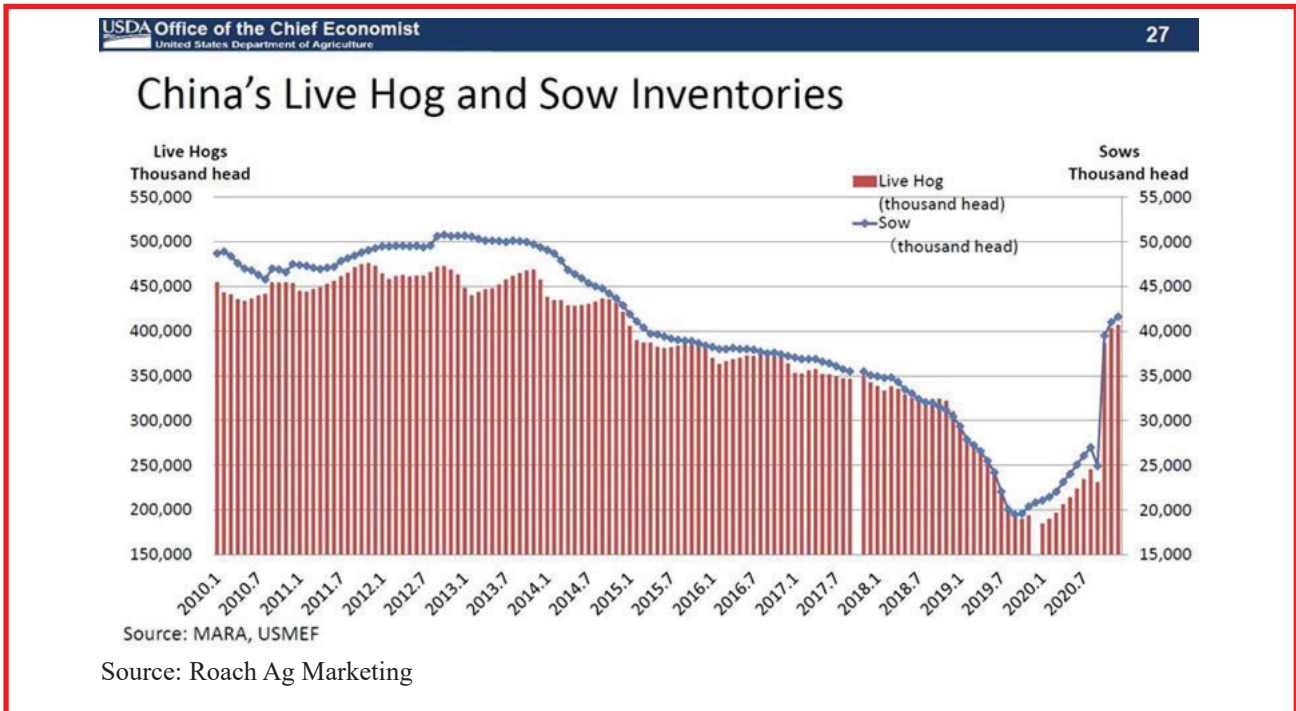


Figure 4. China live hog and sow inventories 2010 through 2020.



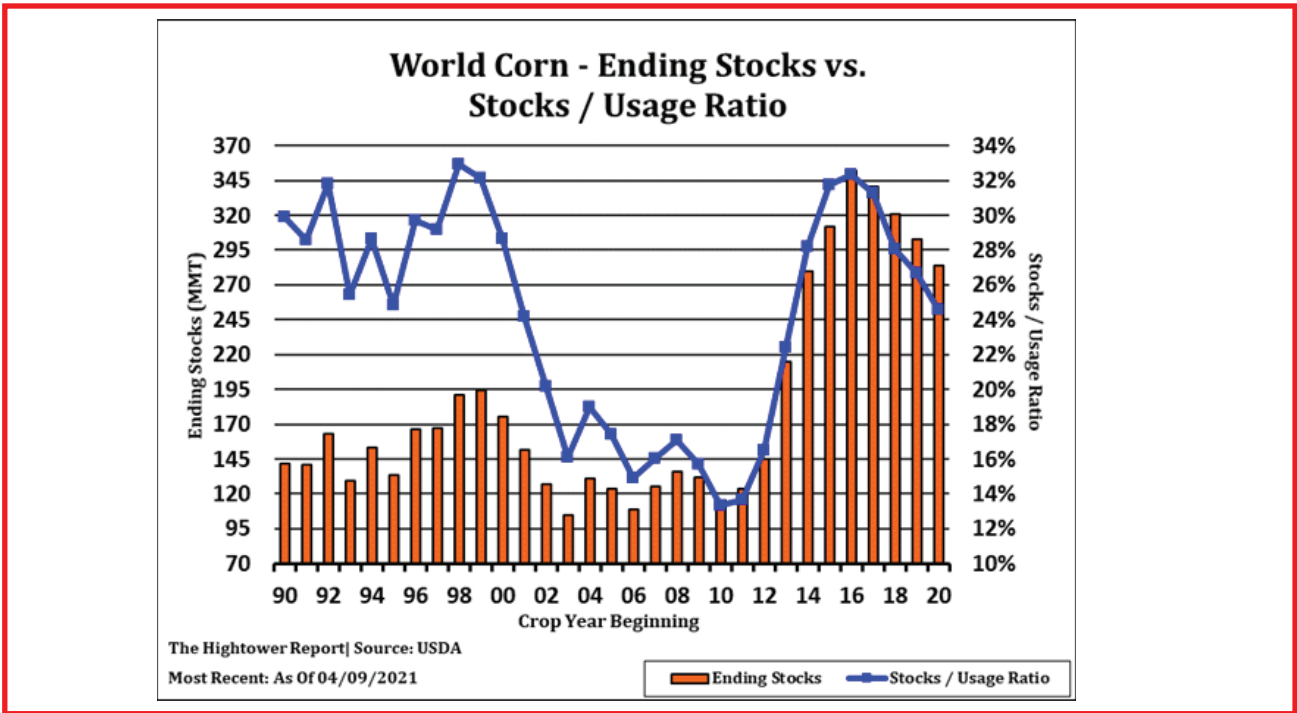


Figure 5. World corn ending stocks versus stocks:use ratio 1990 through 2020.

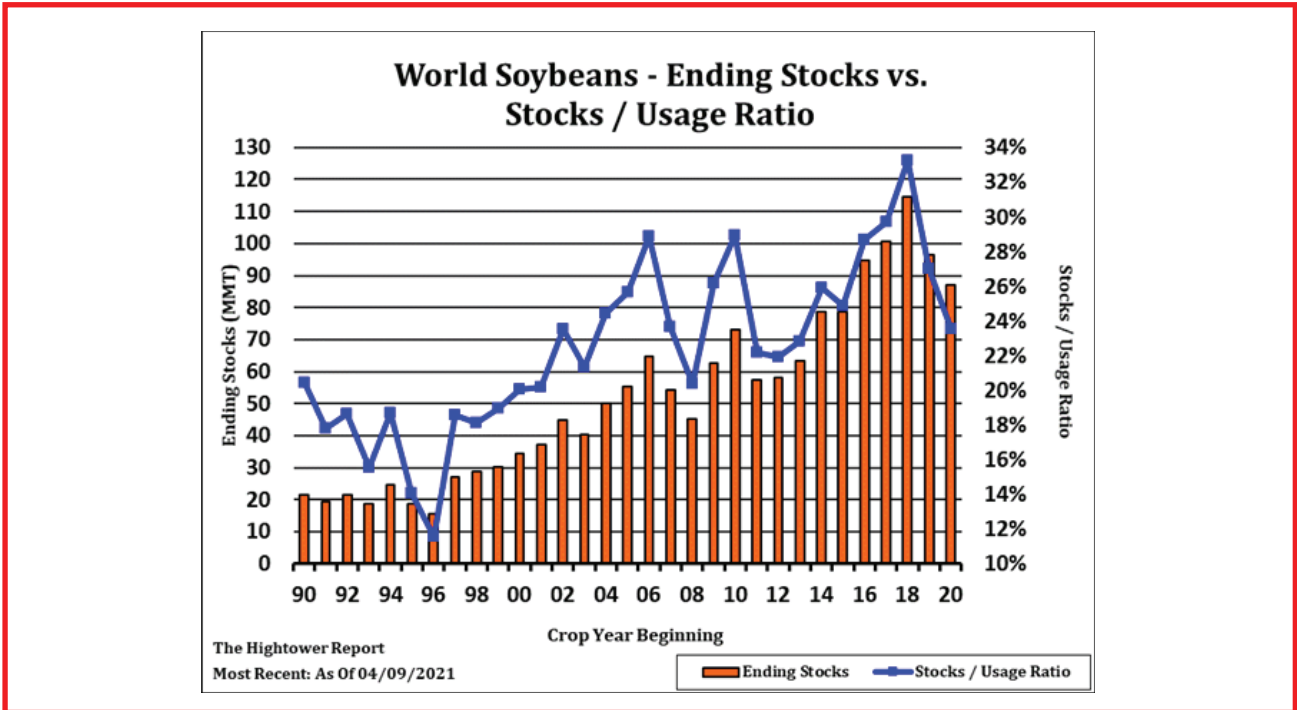


Figure 6. World soybean ending stocks versus stocks:use ratio 1990 through 2020.



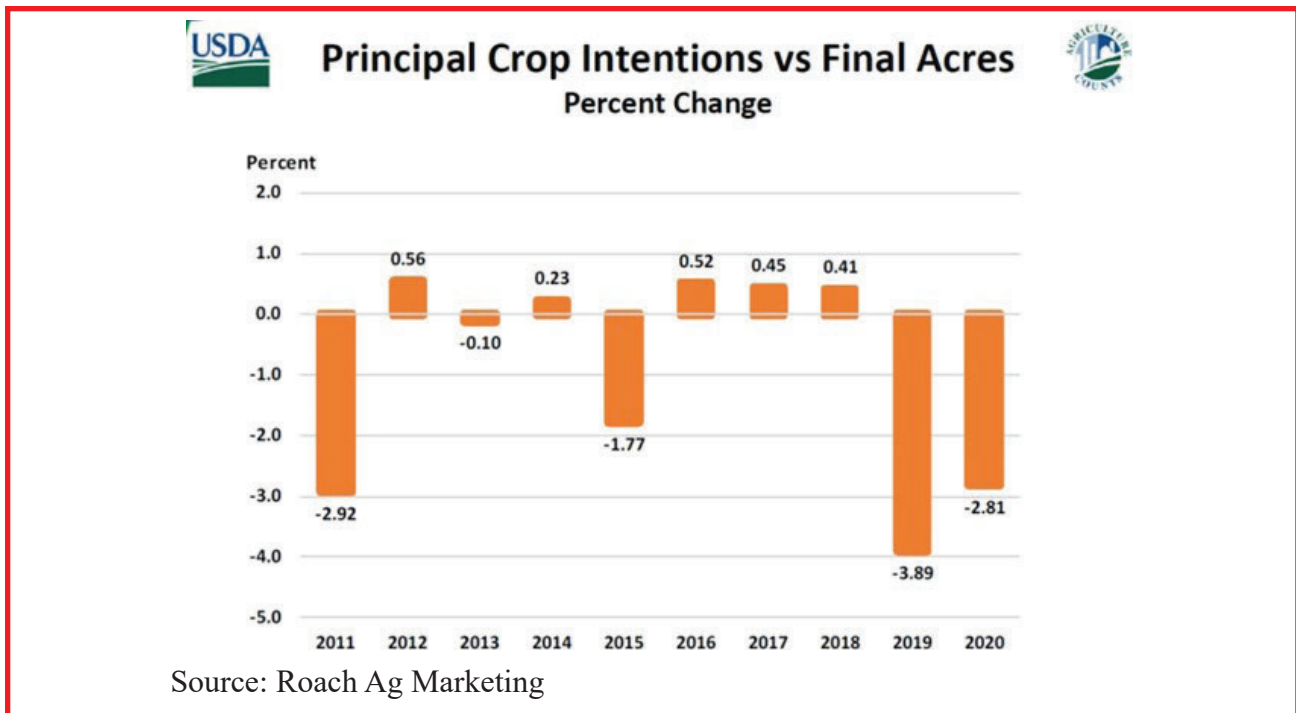


Figure 7. USDA principal crop intentions versus final acres 2011 through 2020.

2021 USDA Prospective Plantings (in million acres)

| | USDA Mar 2021 | Average Trade Est. | Range of Trade Est. | USDA Mar 2020 Intentions | USDA 2020 Final |
|---------------------|---------------|--------------------|---------------------|--------------------------|-----------------|
| Corn | 91.144 | 93.208 | 92.0-94.5 | 96.990 | 90.819 |
| Soybeans | 87.600 | 89.996 | 86.1-91.6 | 83.510 | 83.084 |
| All Wheat | 46.358 | 44.971 | 43.0-46.4 | 44.655 | 44.349 |
| Winter Wheat | 33.078 | 31.811 | 30.4-32.2 | 30.775 | 30.410 |
| Other Spring | 11.740 | 11.644 | 10.9-12.86 | 12.590 | 12.250 |
| Durum | 1.540 | 1.641 | 1.3-2.2 | 1.290 | 1.684 |

Source: Roach Ag Marketing

Figure 8. 2021 USDA prospective plantings.

