

# AgReview

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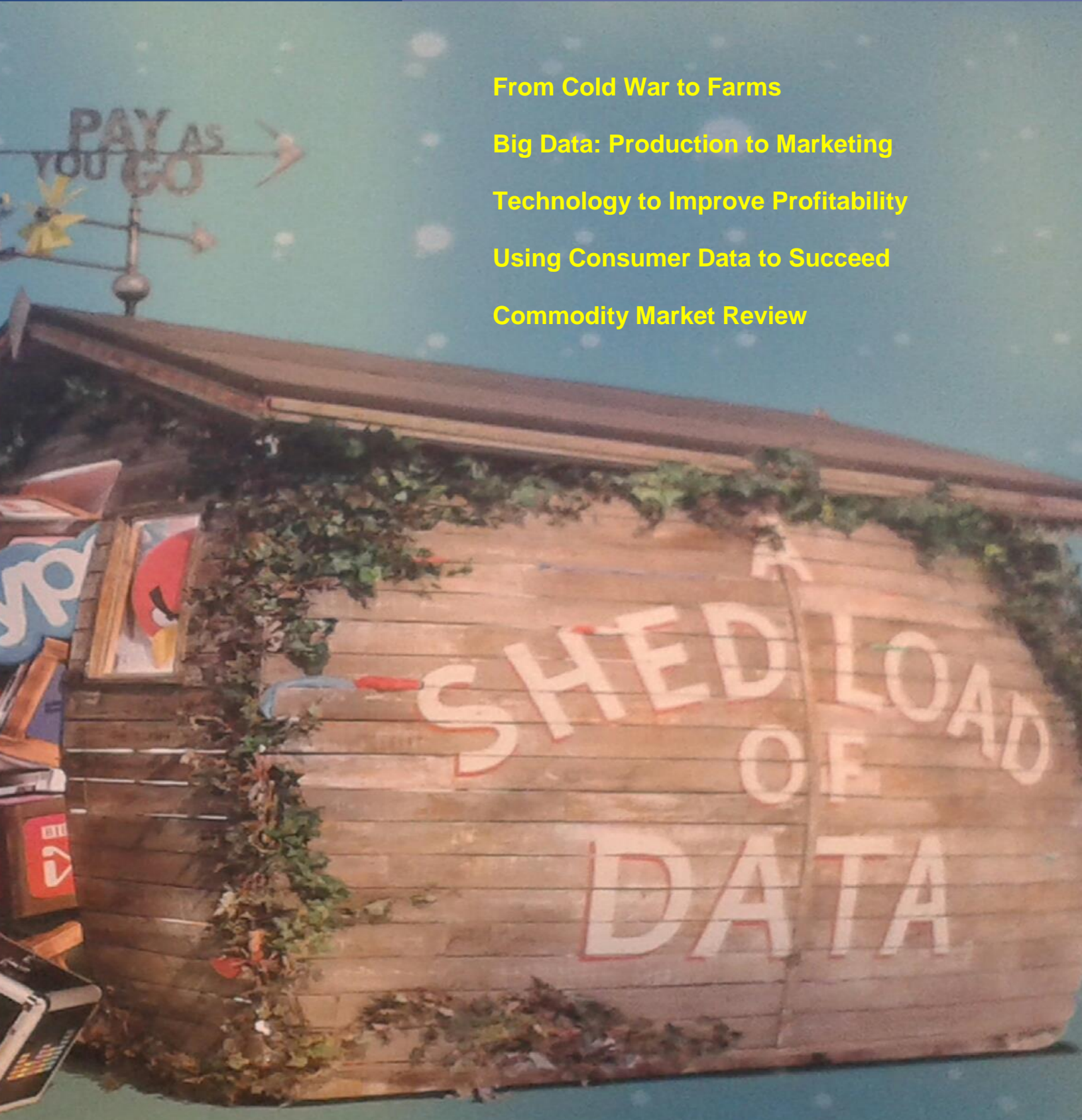
From Cold War to Farms

Big Data: Production to Marketing

Technology to Improve Profitability

Using Consumer Data to Succeed

Commodity Market Review



## ***WORLD PERSPECTIVES: AG REVIEW***

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What was, is,  
and will continue to be  
most important in the business world?



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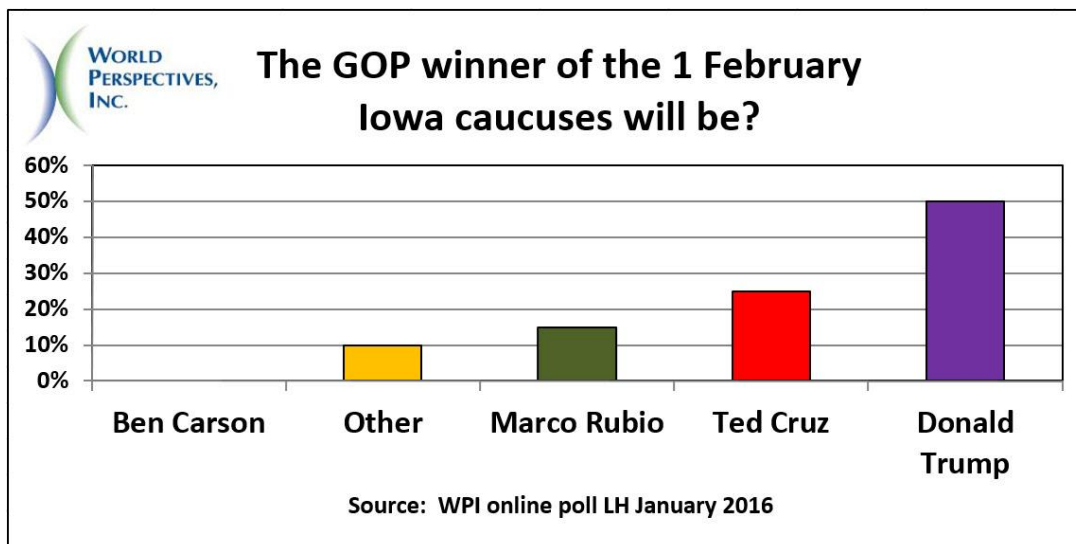
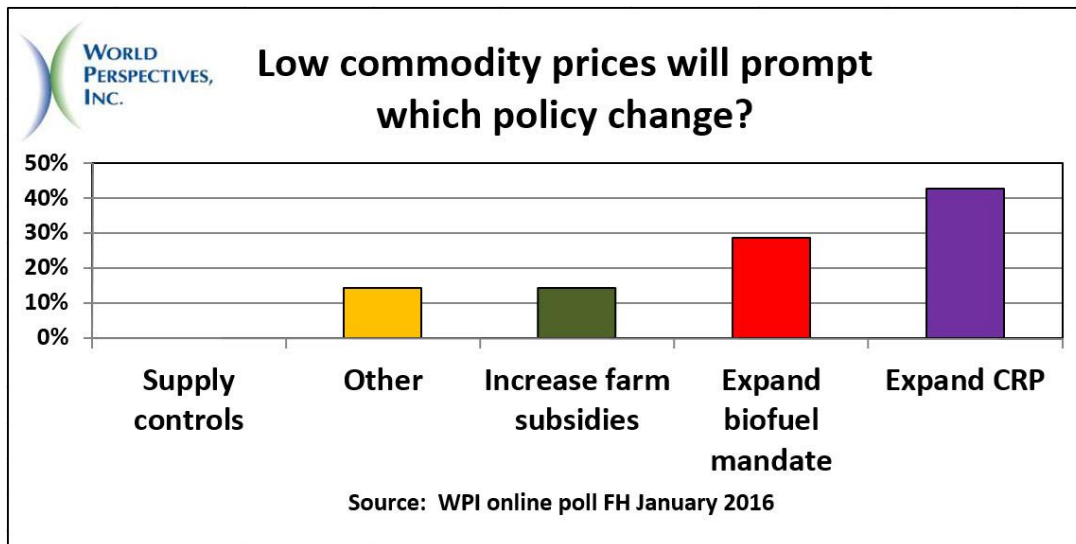
“You’ve got to go out on a limb sometimes because that is where the fruit is.”

— *Will Rogers*

<i>HARVESTED DATA</i>	
<b>The Year Ahead</b>	
<b>Top Issue</b>	38 percent of survey participants said that they expect the presidential election to be the top ag issue of 2016, while 25 percent indicated GMO labeling and 19 percent picked trade deals. <i>ZimmPoll</i>
<b>Financial Matters</b>	
<b>What’s in Your Wallet?</b>	44 percent of U.S. adults participating in a recent poll said that their personal financial situation was better than a year ago; 35 percent felt it was worse and 21 percent considered it to be about the same. <i>Gallup Poll</i>
<b>Food for Thought</b>	
<b>Big Yawn</b>	When asked their opinion of the new dietary guidelines, those polled seemed unimpressed with 63 percent indicating no one cares and 37 percent finding nothing new. <i>ZimmPoll</i>
<b>Satisfaction</b>	Pizza was selected as the ultimate comfort food by a majority of Americans surveyed (15 percent); chocolate and ice cream tied for second (7 percent each). <i>Harris Poll</i>

## WPI POLLING

Below are the results of two recent WPI polls. Visit [www.worldperspectives.com](http://www.worldperspectives.com) to cast your vote in our current survey.



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# FROM COLD WAR TO FARMS

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By Gary Blumenthal

**B**ig data refers to data sets that are so large and complex that they defy processing through traditional data management approaches. Data has actually been on a continuum of growth for many decades with numbers and numeracy leapfrogging one another along the way. Big data is hot, but it was not always that way in agriculture.

Prime farmland is geographically specific, whereas the machinery for manufacturing is readily transferred to where the lower-cost labor resides. U.S. manufacturing was forced to digitize in order to ensure its competitiveness. Precision agriculture, the figurative farm gate into big data, emerged out of the end of the Cold War when America's defense industry had excess satellite capacity and other newly available digital tricks. Companies were offering it on the cheap to agriculture, but it wasn't until the recent bull market that farmers began seriously investing in it. The technology produced the data that subsequently created the demand from farmers to protect their proprietary ownership of it as well as their right for fair compensation when it is used by third parties.

## Big Data Farming

There are about 30,000 farms (2.7 percent of all farms) in the U.S. employing big data systems in one way or another, and they produce over half of the food that is commercially consumed. Right now their machinery is connected to GPS and has sensors for everything from basic yield monitoring to soil condition analysis. Farmers can control the data and outputs, or they can employ one of several companies that offer to handle all of the backroom calculations. Next up will be the drones, which will replace the current hazardous job of aerial spraying from airplanes plus provide in-depth monitoring. All of this will improve yields and, consequently, sustainability and profitability.

## Real Biotechnology

Farming starts with the seed, and big data computational capacity has been complicit with new biological methods in developing today's hardier, more productive plants. Those worried about relatively benign transgenic changes of the past 35 years like glyphosate resistance will have even larger concerns ahead about the potential changes from new approaches such as gene editing via CRISPR/Cas9 or the use of synthetic biology for completely rewriting genetic code. Proponents see many positives such as designing microbes to eat excess levels of nitrogen and phosphorous in the water, thus reducing the hypoxia or "dead zones" in places like the mouth of the Mississippi River.

The advances in the use of technology and data have already received some recognition. For example, in the 2016 edition of the Millennium Project's State of the World, there is no reference to food security in the long list of concerns about where the world is headed. But critics see much darker outcomes in the future.

## HAL's Hell

No part of the data revolution has evoked greater concern than the field of artificial intelligence (AI). Worldly and big thinkers like Stephen Hawking, Elon Musk and Bill Gates have expressed concern that autonomous machines capable of continuous rewriting of its own software code eventually become our master rather than the other way around. Like the Hal 9000 computer in the science fiction thriller *2001: Space Odyssey*, the computer comes to know what is best for humankind. Note that when Arthur C. Clarke first wrote the story about HAL in 1948, he described the sentient machine as a "Heuristically programmed ALgorithmic computer."



Even if some future super HAL doesn't use synthetic biology to create zombies that take over the world, there are other concerns. Economic inequality is already increasing, and like Luddites in 1800 England, some envision a time when unemployment is widespread due to just about every imaginable task becoming automated. After all, technology adoption sweeps globally at a much faster pace than in the past at the same time retraining humans for employment adjustments remains a painfully slow process.

Experts describe AI's potential by envisioning the billions of sensors delivering data to a software code that will be faster and produce more change than Moore's Law, which says that computational capacity in transistors doubles about every two years. It will need to grow faster if it is to accomplish all that its proponents promise. Indeed, some say don't be fooled by all of the sexy talk, that there is far less I in AI than the technophobes contend. The gap is in connecting deterministic and probabilistic functions in a machine in the same way they interconnect in the human mind, and we already know how easy it can be to trick the human mind. That gap is why developers are on the cusp of delivering autonomous automobiles, ones still requiring regular input from humans, but are decades away from fully self-driving vehicles. Making a tractor stay within a designated field is far easier than a sensor differentiating a reflection from a real road hazard. Even more complex to program are the moral decisions that humans make on a daily basis.

Still, it is far sexier selling the threat than evincing the opportunity. In their book *The Future of Violence: Robots and Germs, Hackers and Drones: Confronting a New Age of Threat*, authors Benjamin Wittes and Gabriella Blum present a frightening story of technology run amok. Basically, data-heavy sciences like synthetic biology, nanotechnology and other emerging fields can be used for great harm by individuals with ill intent.

## Downsides for Agriculture

Not all farmers will be pleased with the use and outcomes from the data revolution. For one, its efficiencies are bound to speed the otherwise "natural" pace of consolidation in the industry. And while meat lovers say it ain't going to happen, big money is betting that computational biology will enable the efficient synthesis of proteins into very realistic meat equivalents, obviating the need for livestock farmers. Todd Janzen of Janzen Agricultural Law has his own warning about big data – that it is not overtly covered by the three common categories of ownership law: real, personal and intellectual property. At the same time, he observes that farm big data crosses over the different categories.

## ROW

Technology sales in the U.S. eventually hit a diminishing return as the market becomes saturated, and manufacturers say they will next target farmers in the rest of the world. The opportunity for big data in the emerging markets has opened up with the spread of cellular telephone technology. The near-term challenge is the availability of digital bandwidth to handle all of the data. Agriculture competitors like Brazil have been investing in physical infrastructure to better move crops to market, but according to the French technology publication *Monday Note*, half of Brazilian mobile devices lack a data plan. It goes on to say that data consumption in developing countries will rise six-fold over the next four to five years, but the cost will only drop by half.

Even Europe, which imposes all kinds of restrictions on technology from physical data servers that must be kept locally to the right to be forgotten on the Internet or bans on GMOs, recognizes the power of data to its agricultural sector. At a conference last month hosted by the Waterford Institute of Technology, EU Agriculture Commissioner Phil Hogan lamented that when it comes to digital innovation, "We have yet to witness a wider uptake in the broader farm community."

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# LINKING BIG DATA FROM PRODUCTION TO MARKETING

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By Dave Juday

**M**ajor League Baseball spring training is just around the corner; it will be here even before the 2016/17 crop year planting cycle. What's the relevance? Perhaps no other business has developed data analytics to the degree of professional baseball. Can the agriculture and food sectors follow this path? The trend in data analysis in baseball was dramatized by the 2011 Hollywood movie *Moneyball*. Its promotional blurb summarizes the plot as follows:

*Billy Beane, general manager of the Oakland A's, one day has an epiphany: Baseball's conventional wisdom is all wrong. Faced with a tight budget, Beane must reinvent his team by outsmarting the richer ball clubs. ... He recruits bargain-bin players whom the scouts have labeled as flawed, but have game-winning potential.*

*Moneyball* is based on a true story as chronicled by Michael Lewis, a columnist for Bloomberg and also the author of a number of analytical narratives that look deep into how markets work – or fail to work.

The question for agriculture is, are the trends in agricultural production and consumer demands for food heading in opposite directions? Production agriculture is focused on using data to increase output and improve efficiency, which is a vitally important exercise in a high capital and low margin business. However, the basic need for an adequate supply of food has been met, enabling consumers to now shift toward more complex demands including health, wellness, safety, social impact, experience, transparency and many others.

## Satisfying the Customer

In baseball, of course, fans love the big hit – the home run. And fans buy tickets so the sport has obliged. In the past year, college baseball changed the composition of the baseball to reverse a dearth of home runs. In professional baseball, the worth of the home run played a part in the era of players using steroids to increase their hitting strength. After that practice was largely eliminated, home runs dropped. This led to a salary premium for bigger, stronger players who hit homers. To sum, the change in baseball strategy has been driven by economics and business, and now agriculture requires a similar transformation.

## Economics of Agricultural Production

To apply this baseball analogy to agricultural commodities, economics has driven changes in production. Since the 1960s, there have been improved efficiencies to meet growing global demand such as heavier livestock and higher yields per acre from crops. Consider corn: production has risen 248 percent from 1960 to 2015/16, but acres have increased only 8 percent. The production per acre has grown from 62 bushels/ acre to more than 168 bushels/ acre.

U.S. Corn Production			
Crop Year	Acres Planted	Yield	Production
1960/61	81.43 million	62.4 bushels/acre	3.906 billion bushels
2015/16	88.00 million	168.44 bushels/acre	13.601 billion bushels

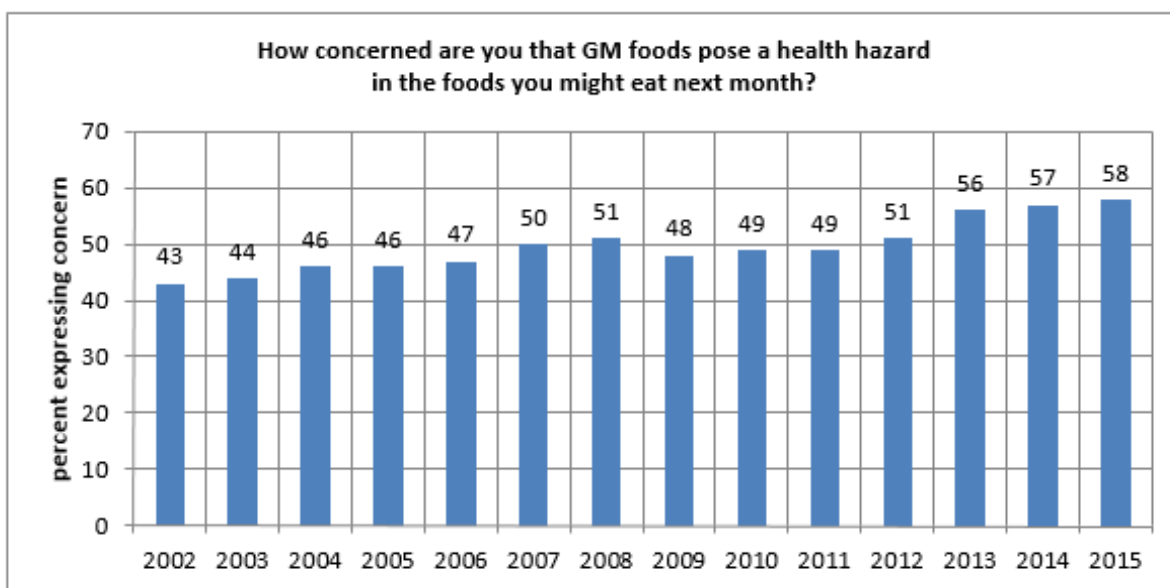
Source: USDA, WPI

In order to satisfy the market, corn acres have had to become “power hitters.” Had yield not increased, the U.S. would have had to add 130 million more acres of corn land at 1960 yields to grow the same 13.6 billion bushels harvested this year. Just as Billy Beane had to reinvent his Oakland A’s team with a tight budget, agriculture had to boost productivity per acre rather than expand expensive acreage.

One area where the analogy does not extend, however, is the means of production. Baseball has moved to the power hitter era to satisfy consumer demand. The move to bigger production in agriculture was first intended to satisfy demand by providing more supply, but consumer preference in an affluent world is constantly evolving. There are serious concerns among consumers about farm inputs,

environmental impact and, of course, GM crops, all tools adopted by agricultural producers to increase productivity. Thus, the question arises: what is the balance between effectively supplying the product and satisfying consumers’ expectations about how it is supplied?

For example, the consumer research firm NPD reports that the trend of consumers’ health concerns about GMOs is a serious issue. More and more consumers are worried about the health impacts of GM foods, warranted or not. Moreover, interestingly, that apprehension grows as efficiency in production holds food prices down. The only interruption in the growth of concerns about GM food was after food inflation took hold in 2009 and reached 5.4 percent, which was double the average of 2.7 percent for all the other years in this period.



Source: NPD

The production trend in livestock is obviously toward bigger animals. More yield per carcass is equivalent to higher yields per acre. At least in the beef sector, that efficiency trend is jibing with consumer demand in some respects. NPD reports that hamburger demand is growing. Burger sales in casual dining restaurants were up 3 percent in 2015. Burger King has countered McDonald’s all-day breakfast menu with hamburgers at breakfast hours. And this trend has been in place for a few years. In a 2014 study, Rabobank

reported “...starting in 2004 the price relationship between steaks and hamburger began narrowing.” This differential was at 2.7 in mid-2004, slid to 2.3 and is now at 1.7 with further declines possible. Rabobank also indicated in the study that it “...believes that retail ground beef consumption could in fact be as high as 60 percent of all retail beef sales.”

Indeed, despite high beef prices over a period that included the expansion of ethanol as well as

drought that increased feed costs and culled the beef herd, beef demand remained steady. Reacting to this demand, the beef sector did what it could to expand production, given a limited supply of cattle, by sending heavier animals to slaughter. The average live weight at slaughter was 1,237 pounds in 2007, but the monthly averages exceeded 1,330 in 2013 or about a 100-pound gain. From 1978 to 2013, slaughter weights grew 300 pounds with one-third of that gain coming in the last six years of that 26-year period. Although much can be attributed to heavier cattle placed on feed and feeding to heavier weights, herd management data analytics also played a role. Cattle breeds paid new attention to expected progeny differential (EPD) traits such as weight gain at weaning and at one year of age, while tests were developed for weight gain efficiency, and growth in calves was linked back to sires to drive decisions on which bulls to keep.

Because of the way a carcass is utilized, the added weight will vary in yields of middle muscle cut meats compared to ground beef. Over the past 40 years as cattle production and consumer demand have changed dramatically, that 300 pounds of live weight probably added 12 pounds of steak cuts and 60 or more pounds of typical grind meats for hamburger. That increased the hamburger supply at a five-to-one ratio over steaks. Moreover, with trends in liquidation because of drought, cow slaughter increased from 2005 as steer and heifer slaughter declined. That marginal change also trends to more hamburger supply. In this case, the added supply tied into consumer demand for hamburger.

## Big Data

Big data is a trend in both agricultural production and consumer marketing for agriculture and food. World Perspectives reported last year that Monsanto indicated as much as 7 gigabytes of data can be collected per acre with its current suite of sensors on harvesting equipment. That means that there are already 1.1417 exabytes of data available for collection between the U.S. corn and soybean crops, which were harvested from 80.7 and 82.4 million acres, respectively, in the 2015/16 crop year. An exabyte consists of 1

sextillion bytes or 1,000 bytes to the sixth power. To look at it another way, according to Purdue University, the average bushel of corn has 90,000 kernels in it. If kernels were equivalent to bytes, the number of data bytes that can be collected from today's harvest equipment is almost 1,000 times the number of kernels in a 13-billion-bushel corn crop.

On the marketing side, meanwhile, everyone is familiar with the loyalty card scanner technology in grocery stores that tracks consumers' purchases and offers coupons and specials based on purchasing preferences and trends. However, there is little qualitative data yet incorporated into such systems such as attitudes about label claims, production methods, etc. Some of that data could be extrapolated (i.e., consumers who buy organic products may be assumed to like organic claims for at least certain products), but that does not yet appear to be the case. According to NPD survey data, organic products are not widening their growth but instead are deepening their saturation. In other words, there are not more consumers buying organic products, but those who do are purchasing a higher volume.

In the restaurant business, data analytics are in full force. There is research into diner reaction to menu layouts, and even the fonts used for printing menus are researched to increase sales. As well, product descriptions are used to drive sales and sustain higher prices. Data is collected on consumer research regarding the most effective adjective so as to boost both sales volume and unit price. Credit card data is also being used by some restaurant chains to drive specials, much like the grocery loyalty cards.

There is no lack of data in the agriculture and food value chain, which is evidenced by the emergence of the term "big data." Moreover, the data is being employed for both production and marketing, and its full potential will start to be met when their analytics are linked together. Of the potential 7 gigabytes of collectible harvest data from field crops, how much of that could be used to link to consumer claims and meet demands? In short, the task of completing the big data revolution will fall to the intermediaries: grain handlers, processors and meat packers. The

burden and opportunity of big data management will come to the middle of the value chain in the form of traceability and identity preservation.

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# TECHNOLOGY TO IMPROVE PROFITABILITY

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*By John Baize*

**A**fter several years of making large profits, U.S. farmers are now facing a bleak period when just breaking even on this crop will be a challenge. Soybean prices have fallen sharply as multiple record crops in the U.S. and South America have resulted in a record-high global surplus. U.S. farmers have also particularly been negatively impacted by a strong U.S. dollar, which has driven down USD-denominated prices. Barring major crop losses in the U.S. or South America in the coming year, the period of low prices is likely to extend for at least a few more years.

So what can farmers do to boost their profitability? The first step is to use the vast array of information available on the Internet to identify premium markets for products such as specialty soybeans or ways to boost yields using existing technology. There have been many changes in the marketplace and in production technologies over recent years, and farmers need to keep abreast of these in order to maximize their profits.

Following are a few options many may want to consider:

**Improve Data Collection and Analysis.** Great developments in technology now allow farmers to collect and analyze information about their crops. Using GPS-linked yield monitors on combines, they can map out where the highest and lowest yields are in each field for cross-referencing with soil types and fertility tests. This data then enables them to apply their fertilizers at variable rates across their fields in order to avoid over-fertilization while applying more where needed. Farmers also can now use GPS-linked aerial drones to spot disease and insect outbreaks across their fields and determine where

treatments are needed. In the future, they will be able to use this technology to vary the seeding rate and seed varieties to maximize yields and reduce costs. All of the new data collection technology costs money, but it also provides farmers with the ability to make better decisions and raise their average yields in the future.

**Produce Non-GM Soybeans.** Rather than growing soybeans for the commodity market, farmers may want to consider cultivating specialty strains for niche markets. The easiest option may be to switch to planting non-GM strains for buyers offering a premium for them. An increasing number of companies are beginning to offer food products that contain non-GM ingredients. Campbell Soup Company has announced it will begin to include labels on its products indicating whether they contain GMOs, and restaurant chains like Chipotle are switching to using only non-GM ingredients. Some grain companies are offering farmers premiums for the supply of certified non-GM soybeans and other crops. To qualify, farmers will need to source soybean seeds that are guaranteed to not contain biotech content above a small acceptable level and then take the necessary actions to ensure the soybeans are not contaminated with any GM variety in plantings, harvest, transportation and storage. They can identify companies seeking non-GM soybeans by searching on the Internet or by asking local grain elevators and others for leads. There is potential to sell the non-GM soybeans for as much as a 10-20 percent premium. One place to explore on the Internet is: <http://soybeanpremiums.org/>

**Produce Food Grade Specialty Soybeans.** Most soybeans are used to produce soymeal for animal feed and soyoil for food and biodiesel production. However, there also is a market for special



identity-preserved soybeans used to make tofu, natto, miso, soy sauce, tempeh and other mostly Asian foods. Typically, these soybeans are non-GM, light-hilum varieties that manufacturers of the foods demand in order to make the highest quality products. Most of the demand for these food grade varieties is in Japan, Taiwan and elsewhere in Asia, but there also is some in the U.S. and Europe. Several U.S. firms currently contract with farmers to produce these specialty soybeans and offer attractive premiums for them. Once again, the Internet is the best search tool for identifying buyers.

**Produce Soybean Varieties with Higher Oil and/or Protein Content.** Most farmers select their soybean varieties based primarily on yield with consideration of disease resistance and maturity group. In some cases, however, they may be able to receive a premium by also using those that contain higher-than-average levels of protein and/or oil. Processors always want to acquire soybeans with higher oil content because soyoil's value is normally two to three times greater than that of soymeal. However, in geographic areas with low protein levels such as the upper western Corn Belt, processors often have difficulty producing soymeal that meets contract specifications. There they seek out soybeans with higher protein content to boost soymeal protein levels.

Farmers able to deliver soybeans directly to processors should determine whether they are willing to pay a premium for those with higher protein and/or oil content, understanding that not all will. It is certainly worth exploring as a potential way to boost the price. Most seed companies have data on the soybean varieties they use with respect to protein and oil content.

**Seek to Maximize Soybean Yields and Profitability.** For many years, most farmers have focused their management efforts more on maximizing their yields of corn and cotton rather than those of soybeans. They did this partially because many believed there was less potential to boost soybean yields than the other crops. In the last few years, though, some farmers have found they could sharply increase their soybean yields

profitably with better management. This is why more than a few are now achieving yields approaching or exceeding 100 bushels/acre.

Farmers have been able to boost their soybean yields by better variety selection, the use of additional fertilizer, the application of fungicides and insecticides, and micronutrients. Some also have had success with special seed treatments and inoculants as well as the use of biological soil additives. Farmers need to experiment in order to identify the practices that will pay off on their farms.

There are several ways to determine specific methods for raising soybean yields. A great deal of information is available on the Internet from universities, extension services and private companies. Additionally, several state soybean associations have held conferences for farmers to learn about steps that can be taken. Some consulting agronomists also have experience with ways to boost soybean yields and can be contracted to assist farmers. The possibility of increasing yields 20 percent or more will make it worthwhile for farmers to explore all of these approaches.

**Focus More on Global Market Information and Marketing.** It has been said that most farmers lose more money with poor marketing than they make by being excellent producers. This is probably correct for many who place too much emphasis on large yields and not enough on selling their crops for top dollar. With today's lower prices, farmers simply cannot afford to sell their crops at below-average prices.

To improve their marketing, farmers need to closely monitor U.S. and global supply/demand, weather and political events that may impact prices. They should subscribe to an agricultural news service and spend time every day using it as well as consider using a marketing service to advise them on how/when to sell their crops at above-average prices using futures, options and contract sales. In almost every year, there are opportunities to sell soybeans at prices well above the average on rallies. Failing to do so may mean the difference between a profit and a loss.

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# THAT IT SHOULD COME TO THIS: USING CONSUMER DATA TO SUCCEED

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By David Gregg

**W**ords, words, words.

Scholars perpetually debate the meaning behind this immortal line. Did the words that William Shakespeare's harried Hamlet read mean nothing of importance (much to the Prince's annoyance!) or were they instrumental in helping him to negotiate his existential crisis? Let's play amateur literary scholar. First – being optimists in a bear market – let us agree that not *all* is rotten in Denmark. Hamlet must have been trying to determine how the myriad of words he saw before him could somehow help him overcome great challenges.

Today agricultural exporters face no shortage of challenges. We are in a bear market storm that is not expected to lift anytime in the near term. The resulting financial pressures and budget scrutiny strain operations and intensify the endless search for efficiencies. Meanwhile, objectives stubbornly remain the same: exporting agricultural products to the global market. How can we solve this existential crisis?

Every castle has a library, and today's library is limitless. Data is everywhere, all around us, and successful organizations are learning how to parse the *data, data, data* and solve their own existential crises. Take consumer data, for example. Is it so voluminous and costly as to be insurmountable and consequently useless? Not hardly. Global consumer demands for food and agricultural products are refining at the same breakneck pace that farmers and the broader industry are producing higher-quality, more refined goods. Consumer preferences, perceptions and trends must be understood if

high-quality products are to meet their finicky demands in a timely fashion.

It used to be that consumer surveying represented a vast, expensive quagmire. However, times have changed. Global Internet access and the resulting "e-shift" have rendered consumer data just a click away. Accordingly, our clients have been retaining WPI's team to facilitate website gatekeeper surveys, whereby an extraordinary body of data is mined at relatively low cost. Website gatekeeper surveys pop up as an Internet user browses the Web, reads an e-news article, shops online, etc. They ask the respondent to complete a brief survey before returning to their chosen online activity. The result is detailed consumer demand data for a specific product in a far-flung global market – in a fraction of the traditional time and at a fraction of traditional costs. Importantly, there is relative validity to the data that is mined.

With this type of data, refined marketing approaches can be employed with credibility and a baseline against which to measure results. Indeed, WPI's clients are using consumer data to better market – and sell – their products across the world.

Worried that your target market is not connected enough? The expanding middle class generally has access to the Internet in many countries around the world, and it is this growing cohort of consumers that find high-quality agriculture and food products intriguing. In developed markets – take Canada, for example – WPI's team can conduct, compile and analyze survey data in the thousands of respondents for less than a dollar per survey. Whether you're selling sweet potatoes in

Belgium or poultry in Morocco, using survey technology to gather specific consumer data is a clear way to make sense of it all, efficiently invest limited resources, and ultimately move product to the right people for the right reasons.

*Data, data, data.*

Words were Hamlet's bread and butter. Let the smart employment of consumer data be yours. And this above all: to thine own data be true.

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# COMMODITY MARKET REVIEW

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*By Robert W. Kohlmeyer*

January 2016 was an unsettling month for financial and commodity markets. Unsettled markets tend to be volatile, and that was certainly true last month. Market prices seemed to move up or down from day to day with little fundamental explanation or consistency. Daily swings of 200 or 300 points in the Dow Jones Industrial Average, a popular measure of U.S. stock market activity, were common as the long-running bull market for U.S. equities faltered.

Crude oil is the most widely watched commodity market, and those prices have been falling for nearly 18 months as U.S. production soared because of the fracking revolution. This higher production significantly lowered U.S. dependence on imported oil and also added to world supplies at a time when world demand for oil was flat or in decline. The OPEC cartel, led by Saudi Arabia, decided not to support oil prices by cutting production but instead defend its market share even though that meant that the global crude oil market remained over-supplied. Crude oil futures prices traded above \$100/barrel in late 2014. Since then, they have fallen about 75 percent. The widely-watched CME Group March crude oil futures contract closed at \$38.17/barrel on 31 December 2015 and finished January 2016 at \$33.62/barrel. Last month, however, it traded from a high of \$34.82 to a low of \$27.56, a swing of more than 30 percent.

Much of the markets' turmoil during January stemmed from fears that the lack of growth among economies of important developed and developing countries might lead to a global recession. At the very least, poor economic performance by national economies would cause consumer and industrial demand for goods and services to retract, causing negative ripple effects to spread worldwide. With economies of the EU, Japan, China, Brazil, Russia, Canada and other countries showing slow growth or none at all, the

U.S. economy appeared to be a pillar of strength even though it had only averaged about a 2 percent increase in gross domestic product (GDP) since emerging from recession in 2010.

This image of comparative strength has made the U.S. dollar appear very attractive in relation to other major national currencies. The U.S. Dollar Index, which measures the USD against a basket of other currencies, reached a record high during 2015 and still remains close to that level. The U.S. currency has been supported by the U.S. Federal Reserve Bank raising its interest rate 0.25 percent in December after having left it near zero since before the 2008-09 recession in an effort to stimulate the U.S. economy. At the same time, other central banks were lowering their interest rates to zero or even to negative levels in order to encourage the circulation of money in their economies.

Commodity markets, including grain and soy futures markets, can be greatly influenced by macro-economic factors as translated by financial markets, and January provides a good example of this. Daily price moves for wheat, corn and soybean futures contracts often were in the same direction as world equity markets, crude oil prices and other commodity markets but in the opposite direction of the U.S. dollar. The assumption is that since nearly all of world grain trade is transacted in USD, its strength is bearish for grain and soy prices because it raises U.S. grain prices to overseas buyers. Conversely, a weaker U.S. dollar lowers that cost to those buyers and thus is bullish.

The comparatively strong U.S. dollar and weaker currencies of other major grain- and oilseed-producers such as Brazil, Argentina, Russia, Ukraine and Canada have the perverse effect of keeping crop prices to farmers in their local currencies relatively high and attractive in those countries. This encourages them to maintain or

even increase their planted area and production, thus countering any incentive for U.S. farmers to cut production due to very low USD prices for grains.

Obviously, grain markets do not trade in an economic vacuum. What may be happening in a broader economic context can influence demand, supplies and the incentives to produce crops. And as markets have become globalized, the factors that can influence them have become global as well. During January, the short-term price direction of grain and soy futures markets were often, although not always, determined by that taken by financial markets. Market participants had to sort out what among the ever-present outside influences were truly important to the basic fundamentals of supply and demand. It often seemed during January that those fundamentals were in conflict with broader macro-economic influences, leading to abrupt price moves, changes in price direction and general market confusion. This undoubtedly provided speculators with opportunities for good profit potential, but it also created a difficult environment for commercial interests seeking to offset or hedge risks by using futures markets in the usual manner.

### **Final Crop Production Estimates and Quarterly Grain Stocks Reports**

Perhaps the most anticipated event for grain traders last month came on the 12th when USDA released its January U.S. corn and soybean production estimates and estimated stocks of U.S. grains and soybeans as of 1 December 2015 as well as updated supply/demand estimates. Normally, USDA's January production estimates are its final ones for that crop year. The quarterly stocks estimates help all analysts to interpolate how much grain was used during the September-November quarter, the first quarter of the U.S. corn and soybean crop year and the second quarter of the U.S. wheat year.

USDA estimated that U.S. corn production for 2015/16 totaled 13.601 billion bushels from a national average yield of 168.4 bushels /acre. That is the third-largest corn crop and the second-

highest average corn yield ever. U.S. soybean production was put at 3.930 billion bushels from an average yield of 48 bushels/acre. This is the second-biggest soybean crop and highest average soybean yield on record. These may all be big numbers, but they all were lower than USDA's last previous estimates from November 2015. As such, they surprised the market since the widely-held pre-report consensus opinion was that January's final numbers would be slightly larger than those from November. The smaller crop sizes gave markets a sharp though short-lived bullish jolt.

The quarterly stock estimates for corn and soybeans were very close to expectations, indicating that usage during the September-November quarter was without surprises. Wheat stocks were higher than predicted, which suggests that the volume used for animal feed during the quarter was less than USDA forecast. This bearish signal was offset by USDA's surprisingly small estimate of U.S. planted winter wheat area, which was 2.9 million acres below last year and the lowest since 2010.

However, the theme conveyed by the January reports from USDA was that supplies of grain and oilseeds in the U.S. and the world as a whole are plentiful, especially in countries competing with the U.S. for export demand. Unfortunately, demand is relatively flat, and predicted world trade of grain and soybeans in 2015/16 is likely to decline. The result will be that U.S. and world stockpiles will be growing. To put it simply, grain and soybeans supplies are growing, but demand is not keeping pace. This leaves too much supply chasing not enough demand, which has already applied considerable downward pressure on prices and will likely continue to do so. Price pressure from a fundamentally bearish supply and demand outlook for grain and soybeans has periodically run into macro influences that have provided short-term support for those prices. The conflict between the push and pull from two contrasting influences has contributed to the grain and soy markets' sometimes erratic behavior in January. Following is a closer look at the corn, soybean and wheat markets:

## Corn

Corn futures have been confined in a trading range of not much more than \$0.20/bushel. In rounded numbers, the CME March corn contract closed at \$3.59/bushel on 31 December and at \$3.72/bushel on 29 January for a modest \$0.23 gain. Its high and low prices for the month were \$3.48 and \$3.72, respectively. Unlike the rest of the market, corn prices moved in small increments and narrow trading ranges. Falling crude oil prices kept pressure on ethanol production margins, although the volumes of ethanol produced and corn consumed in the process have largely kept up the pace needed to meet USDA's forecast.

However, the lack of exports is a problem. World corn demand and corn trade are predicted to decline slightly in 2015/16, while abundant supplies in Ukraine, Argentina and Brazil have transformed them into aggressive corn exporters at prices well below U.S. offers. U.S. corn export commitments are running about 26 percent behind last year, signaling that the U.S. has a decreasing share of a declining world corn market. USDA has already cut its U.S. corn export forecast for 2015/16 a few times, most recently this month, but a further reduction seems likely.

## Soybeans

The soybean futures market was earlier supported by concerns that dry weather might curtail Brazilian production. Then the rains came to the dry northern and central parts of the country, and another large soybean crop appears in the offing. Argentina turned dry at the end of January, but soil moisture appeared adequate. Chances are good that the two countries will combine to harvest a record South American soybean crop.

Soybean futures prices have ebbed and flowed on changing perceptions about South American soybean prospects as well as other macro-influences. In rounded numbers, the CME March soybean contract ended 2015 at \$8.64 and closed out January at \$8.82 per bushel, a mere \$0.18 difference. However, January prices swung between a low of \$8.53 and \$8.85 per bushel. Export demand had held up fairly well. Although total export commitments are running slightly behind last year, they are in line with USDA's latest forecast. With harvest already underway in northern Brazil, world demand (including China's) is rapidly shifting southward. U.S. soybean exports may struggle to keep up the pace needed to meet USDA's prediction.

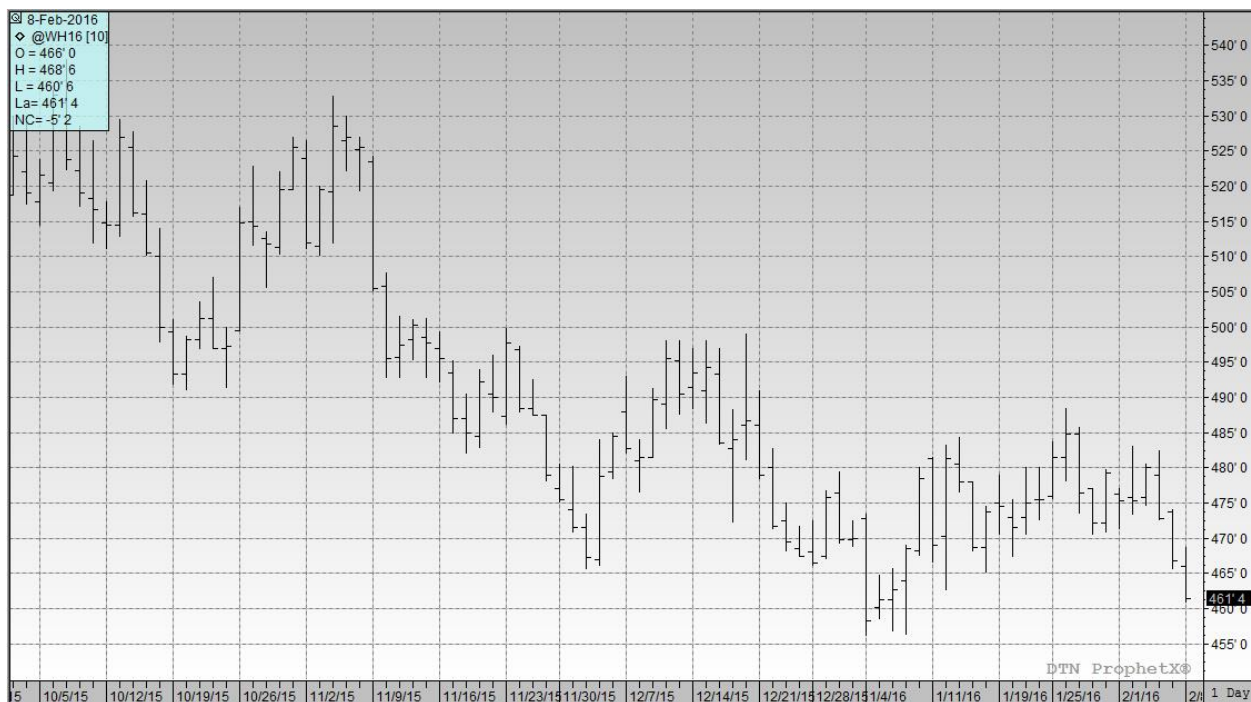
## Wheat

The supply/demand outlook for U.S. wheat has been bad and promises to remain dismal for the balance of 2015/16. Domestic demand is not growing and will probably be less than last year. The real story is the lack of export demand. U.S. wheat prices have been tens of dollars per MT above those of other origins throughout the crop year. Russia, Ukraine and the EU have been fighting to capture what wheat demand appears, leaving the U.S. left with only specialty buyers or those located so geographically close as to overcome the U.S. price disadvantage. USDA is already forecasting that this year's U.S. wheat exports in 2015/16 will be the lowest volume since 1971, and a further reduction in that forecast may be necessary. It appears that the U.S. will carry out ending stocks of wheat from 2015/16 that will be large enough to entirely cover U.S. domestic demand in 2016/17.

The CME March wheat contract gained a net of about \$0.09 during January while swinging between \$4.56 and 4.89 per bushel. However, U.S. wheat futures markets and their high prices have been largely irrelevant to world wheat traders.



### March Chicago Wheat Futures Prices



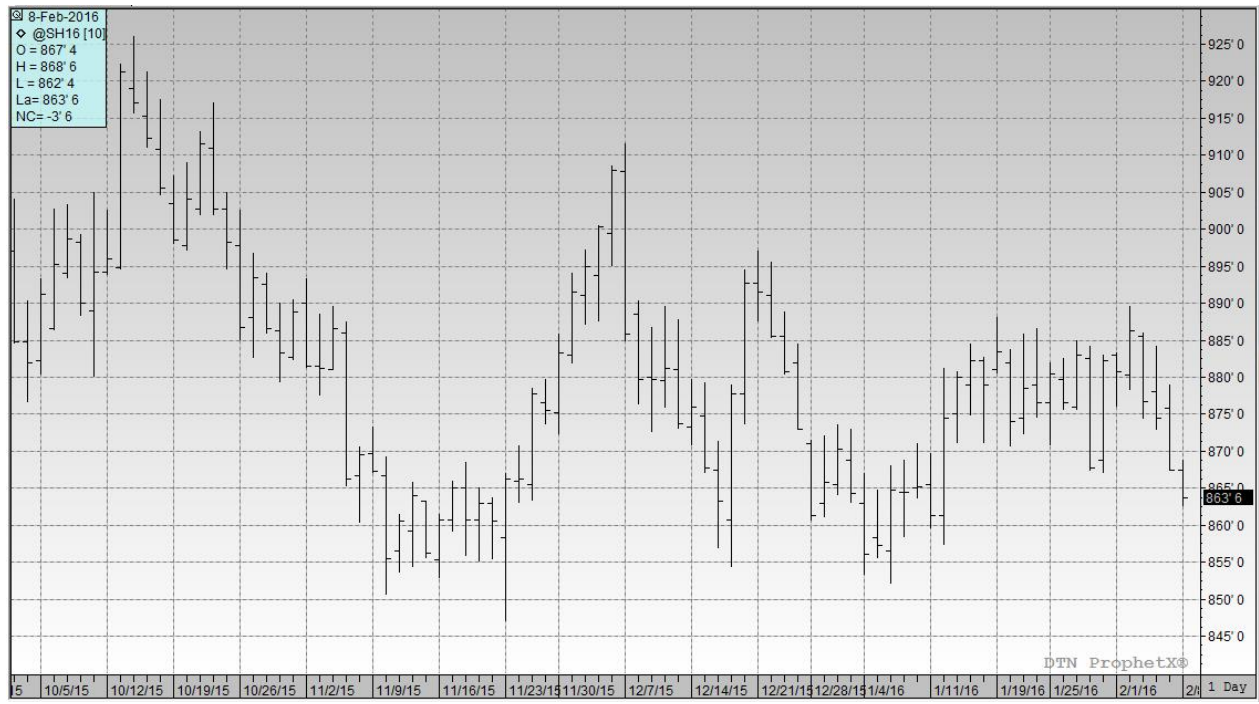
Source: Prophet X (2/8/2016)

### March Corn Futures Prices



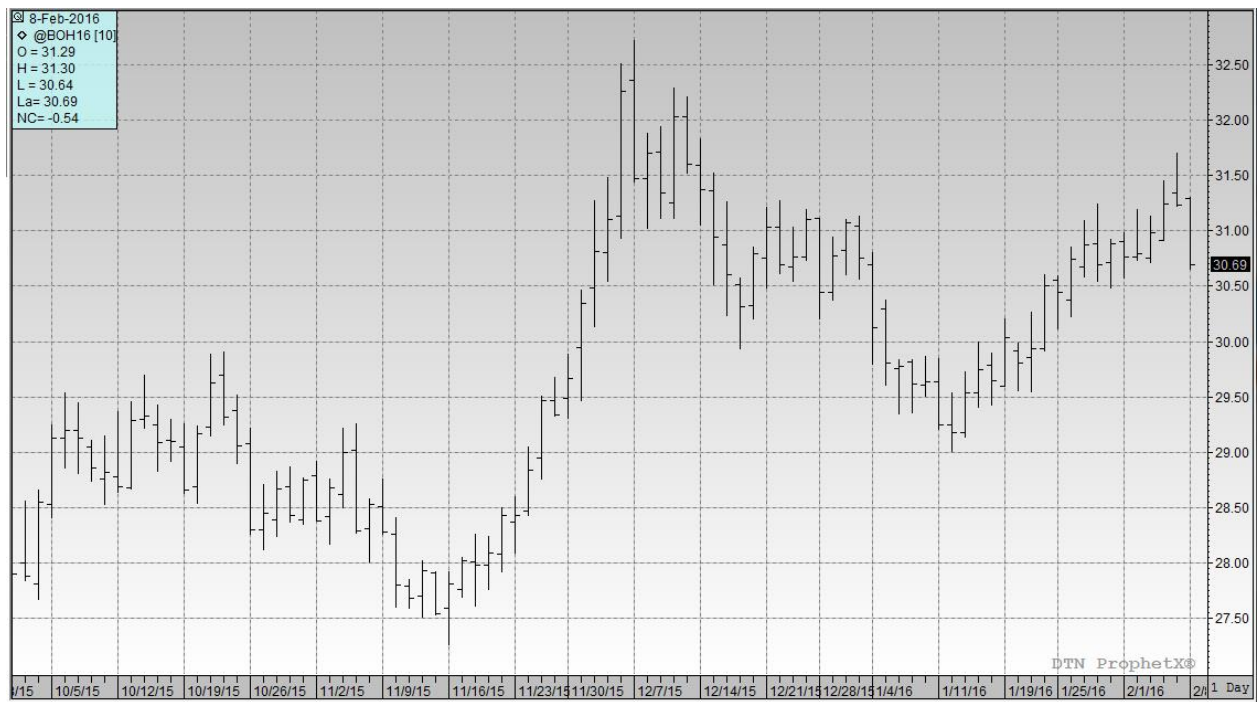
Source: Prophet X (2/8/2016)

### March Soybean Futures Prices



Source: Prophet X (2/8/2016)

### March Soyoil Futures Prices



Source: Prophet X (2/8/2016)

### March Crude Oil Futures Prices



Source: Prophet X (2/8/2016)