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An Exploration of Crop Markets: A Deeper Look Into the USDA Crop Baseline Projections

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Abstract

This report complements the *USDA Agricultural Projections to 2027* report released in February 2018 by providing a roadmap of the process for generating the U.S. Department of Agriculture's long-term projections. In particular, the report explains the expectations of the main drivers of the major crop markets, including corn, soybeans, wheat, cotton, rice, and sugar. The primary interactions between these crop markets are explored to provide a deeper understanding of the long-term projections. By outlining the assumptions and reasoning behind these projections, the report enables inferences on how the projections might change under varying circumstances.

keywords: USDA Baseline Projections, crops, markets, corn, soybeans, wheat, cotton, rice, sugar

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Contents

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An Exploration of Crop Markets: A Deeper Look Into the USDA Crop Baseline Projections

Introduction

Every year, the U.S. Department of Agriculture (USDA) releases a set of 10-year projections of the supply and use and trade tables for crops and livestock, both domestically and internationally. While USDA releases a large amount of data and information, there is little room for explanation of the reasoning behind the projections. Discussion of the various markets, how they work, what the main drivers are, the assumptions used to generate the projections, and how the markets interact with each other is limited due to various constraints and the need for conciseness. In this report, we examine the baseline projections from *USDA Agricultural Projections to 2027* that were developed in 2017--using the November 2017 *World Agricultural Supply and Demand Estimates* (WASDE) report as the starting point--for the major crop markets in greater detail.

Understanding how the major crop markets work and interact, and the assumptions underlying their expected performance over the next 10 years, allows a deeper understanding of both the projections and how crop markets work in general. Given that the projections are for the coming decade, the point estimates released will almost certainly need adjustments as conditions change. Armed with knowledge of how the projections were generated, the reader can infer how they might change under varying circumstances that were unforeseen when USDA generated them.

This report—which covers the commodity markets for corn, soybeans, wheat, cotton, rice, and sugar and touches on some of the minor feed grains—explains the main circumstances that, in the fall of 2017, were expected to drive these markets for the next 10 years. Major interactions between the crop markets are explored to provide a fuller understanding. The report provides a general roadmap of the process by which the long-term projections, starting with the 2017/2018 marketing year, are generated, and can be considered a companion piece to the report *USDA Agricultural Projections to 2027* developed in late 2017 and released in February 2018.

Setting the Stage

Following the 2012 drought, conditions returned to more normal weather patterns, yields began to rise, and, with increased supplies, prices began to fall. In the 2016/17 crop year, conditions came together to support record yields for many of the major crops. The following crop year generated even higher corn yields, and for other crops like soybeans, wheat, and cotton, yields remained among the highest recorded. Back-to-back bumper crops boosted stocks and placed heavy downward pressure on prices.

While high production in one part of the world might offset lower production elsewhere, for the 2016/17 and 2017/18 crop years this was not generally the case. Crop production was high globally, generating supplies in excess of local demand for a variety of crops across a wide swath of countries. For example, corn and soybean production in South America and wheat production in the Black Sea countries, in particular Ukraine and Russia, saw record production, placing further downward pressure on prices and making it more difficult for U.S. producers to export their goods.

Foreign markets are increasingly important for many of the commodities. Agricultural research and development has produced rapidly increasing yields–particularly for major crops like corn, soybeans, and wheat–with the associated benefit of generating abundant supplies. While yield trends do not show any sign of slowing down in the near future, domestic demand for the commodities grows less quickly than yields–often reliant on domestic population growth. Depending on the commodity, this means that U.S. producers are relying more and more on global outlets for the crops they produce. The relative strength of the U.S. dollar in relation to the currencies of export competitors and import markets is highly relevant to this search.

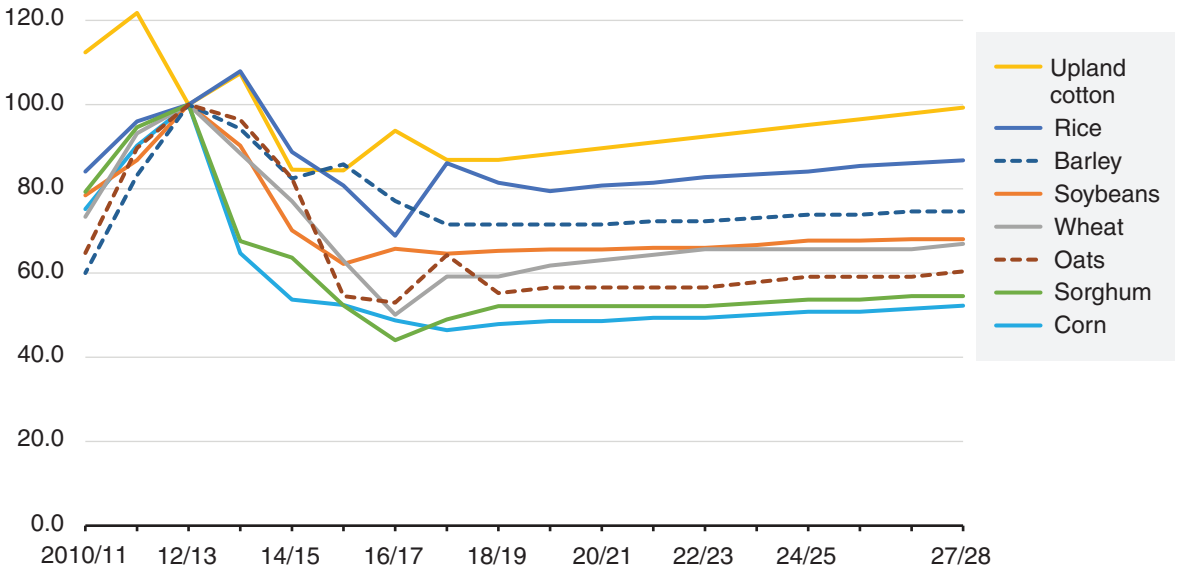
In the 2017/18 marketing year, U.S. producers exported roughly 13 percent of the corn, 51 percent of the soybeans, and 57 percent of the wheat they produced. More than two-thirds of U.S. cotton production and more than 55 percent of rice production were also sold outside the United States. Foreign competition has grown substantially in the meantime, and even though export volumes are expected to remain steady or even to slowly increase, the United States generally is expected to lose global market share across a variety of commodities. Producers in different regions can leverage their advantages, often through lower land costs, such as in Brazil, or in lower transportation costs due to being closer to markets, as with Black Sea grain exporters.

As a result of both domestic and international markets having generated excess supplies for many commodities over the past several years, many crop prices in 2016/17 and 2017/18 fell to levels not seen since the 2006/07 crop year. For a large number of farmers in the United States, this meant that the period of high prices they enjoyed just over 5 years ago had ended, and they had entered a new period of low agricultural prices (fig. 1). Net farm income for U.S. farmers dropped almost in half, from almost $124 billion in 2013 to just over $63 billion in 2017, reducing farmers' incomes.

Figure 1

Commodity prices have dropped relative to the 2012/13 marketing year and are expected to grow slowly over the next 10 years

Index of commodity prices, setting 2012/13 = 100



Source: Calculations based on historical data from USDA, National Agricultural Statistics Service QuickStats, projected data from USDA, and *USDA Agricultural Projections to 2027* (2018).

Between 2010/11 and 2017/18, variable costs per acre in the United States generally rose initially and then dropped for the various crops (table 1) after 2015/16. The variable costs have a wide range, depending on the commodity. Upland cotton and rice both have variable costs much higher than many of the other crops, which could make it a difficult decision for a producer to switch into either of these crops. The risk of large losses is thus greater than for the other crops–especially for upland cotton, which does not provide large net returns even if the crop does well. Despite these drawbacks, cotton requires less water and is more drought-resistant, which can make it an attractive crop to grow in certain regions. While rice appears to provide a relatively higher net return if farmers produce a good crop, only a limited amount of land is suitable for rice production, and even that land requires substantial fixed costs for irrigation and leveling.

Due to lower commodity prices, net returns per acre have dropped since the 2013/14 crop year, though not all crops have experienced this to the same degree. This has caused changes in the spread in net returns among the various commodities. For example, in 2013/14, the spread was $154 per acre between corn and wheat, in favor of corn. By 2017/18, the difference declined to $134 per acre, making wheat relatively more attractive than in 2013/14, even though the overall level of net returns still favored corn. In contrast, the spread between corn and soybeans increased from $42 per acre to $55 per acre, making soybeans more attractive. Not surprisingly, soybean acreage grew the most steadily over the period. Relative net returns and the inherent risks associated with producing the crops all play into producers' decisions and lead to linkages across the crop markets.

Table 1
Historical U.S. variable costs and net returns

Marketing year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
				Variable costs per acre ($)				
Corn	289	335	352	359	360	337	334	329
Soybeans	134	139	175	183	184	174	173	173
Wheat	105	124	129	130	129	117	116	115
Upland cotton	478	480	522	512	532	512	512	516
Rice	466	546	555	629	628	569	567	566
Sorghum	147	136	147	148	147	137	135	134
Barley	132	194	192	199	197	172	170	169
Oats	96	114	122	115	118	106	105	103
				Net returns per acre ($)				
Corn	501	578	496	347	273	271	253	232
Soybeans	358	386	401	389	296	256	320	287
Wheat	158	192	230	193	133	96	89	98
Upland cotton	284	366	291	275	105	64	180	135
Rice	388	479	572	625	387	342	186	404
Sorghum	213	188	167	107	126	115	82	84
Barley	150	175	238	233	188	209	216	165
Oats	67	86	117	126	100	43	31	51

Source: Calculations based on USDA, Economic Research Service, Costs and Returns data and USDA, *USDA Agricultural Projections to 2027* (2018).

The Major Linkage Between Crops: The Competition for Land

While developing the baseline estimates for a particular crop takes other crop markets into account, discussions tend to focus on the major supply and use variables for a single commodity. Linkages between commodity markets tend to revolve around competition for acres and often depend on relative prices and net returns, which are based more fundamentally on variables like yields and weather patterns that can help to build up (or draw down) supplies.

Many crops compete for land, including land that farmers use to follow recommended crop rotations to maximize yields and diversify risks. While aggregate land use does not shift dramatically from year to year, changes in plantings do occur and can lead to large changes over time. For example, soybean acreage has been increasing, and the latest set of projections is the first in which soybean plantings are expected to eclipse corn plantings (in crop year 2019/20) to take the top spot in U.S. agriculture in acres planted.

Historically, producers have planted the most U.S. acres to corn. It is thus not surprising that corn interacts with, and has linkages to, the largest number of other crop markets. We therefore begin with a discussion of the linkages to corn. We follow with a discussion of linkages to soybeans, and wheat – which in turn covers the linkages between the six major crops examined in this report.

Linkages to Corn

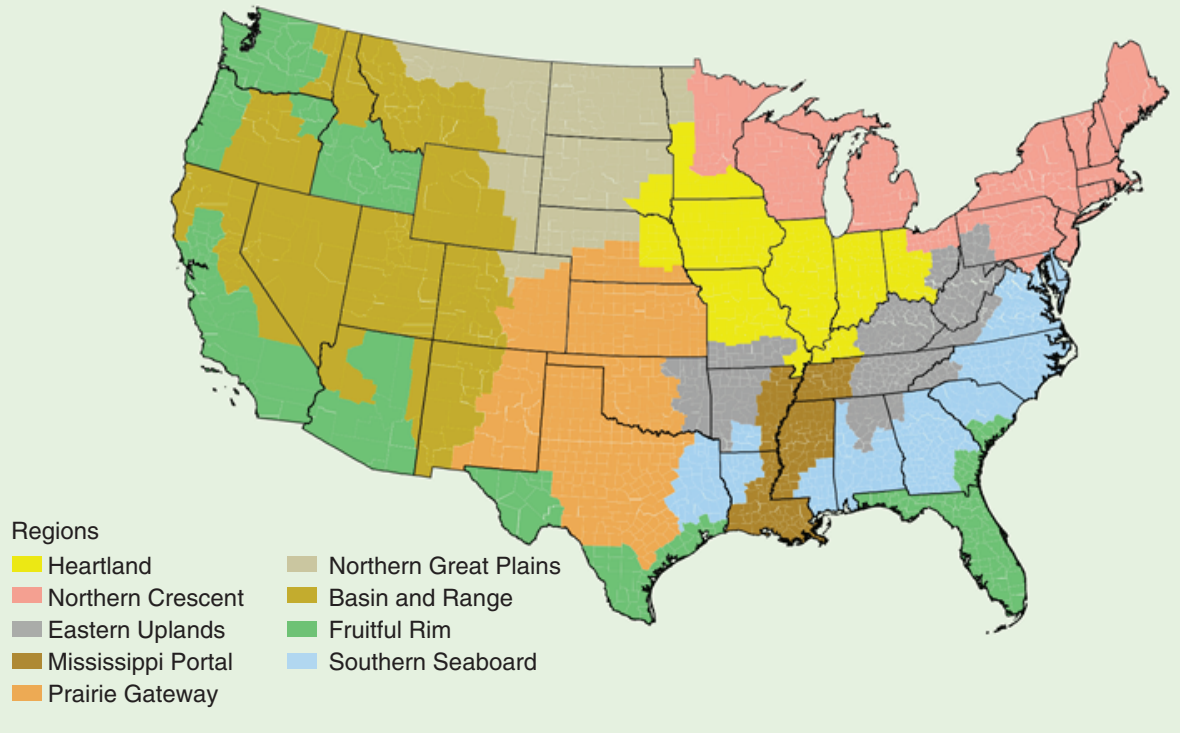
Corn's main competitor for acres is soybeans, primarily in the Heartland, Northern Crescent, and Northern Great Plains regions (fig. 2). However, this "competition" belies the fact that the two crops are complementary in nature. Producers have traditionally planted the largest number of acres to corn in the United States. While soybeans started as a minor crop, it has grown to one of the largest, in considerable part due to its nitrogen-fixing agronomic properties, making it an ideal crop to rotate with corn to replenish soil nutrients and break weed and pest cycles. As a result, the interplay between corn and soybeans remains important in understanding how the markets for these commodities function.

Current and expected high-ending stocks suggest that corn prices are likely to remain relatively low over the next decade, increasing from $3.20 in 2017 to $3.60 per bushel by 2027 (in nominal dollars). The slow growth in prices suggests that net returns for corn will also remain relatively low over this period, ranging from $236 per acre in 2018 to $320 by 2027 (table 2). Meanwhile, due to rising demand for livestock feed, global soybean demand continues to grow. China, in particular, is a major player in the soybean market, and continued expected growth in the middle class in China (and in other emerging markets) is expected to translate to higher consumption of animal proteins, resulting in higher prices and returns for soybeans.

Soybean returns are expected to range from $279 per acre to $326 per acre over the next decade, suggesting that farmers have incentives to plant soybeans instead of corn (table 2). However, despite the higher returns, soybeans' benefits as a rotating crop inhibit farmers from planting them as a successive-year, long-term strategy. The long-term advantages of rotating crops will likely outweigh the short-term gains of monocropping. Therefore, despite the short-term economic incentives to move away from corn, it will likely remain one of the top planted crops throughout the projection period.

Figure 2

Farm resource regions



Sources: Ralph Heimlich, 2000. *Farm Resource Regions*, Agricultural Information Bulletin No. (AIB-760). U.S. Department of Agriculture, Economic Research Service.

Table 2

Projected returns over variable costs

Commodity	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
						Dollars per acre					
Soybeans	287	279	284	287	293	296	303	314	317	323	326
Corn	232	236	247	248	262	266	276	288	291	306	320
Cotton[1]	135	142	150	156	164	170	177	184	192	199	206
Rice	404	363	337	349	356	370	374	379	392	401	408
Wheat	98	100	110	114	120	126	126	126	126	127	132

Source: USDA, *USDA Agricultural Projections to 2027* (2018).

[1]Upland cotton.

Nevertheless, the acres planted to soybeans are expected to surpass those planted to corn for the first time early in the projection period. The difference between the two crops over the last several years has been narrowing, reflecting the shift in relative profitability. Last year, a comparatively high ratio between soybean and corn prices translated into 6.7 million acres more of soybeans. Similarly this year, soybean prices have remained favorably high compared to corn, but considerations for crop rotations may prompt a less-dramatic change in sown acreage. A net gain of 900,000 acres is expected for 2018/19 soybean planting versus the 2017/18 record, with much of the increase likely at the expense of corn acreage.

While soybeans remain one of the largest competitors for corn, the expected decrease in corn acres over the next decade is likely to support some expansion in wheat-planted area, most likely in the Northern Great Plains and the Prairie Gateway (fig. 2). The national average for wheat net returns is expected to be roughly 42 cents to a dollar of corn in 2017/18. By the 2020/21 marketing year, the ratio of net returns is expected to rise to 46 cents to a dollar of corn. With limited export prospects, low domestic demand growth, and high-trending yields, producers could move away from planting corn toward lower cost alternatives such as wheat. Wheat also fits well into a rotation with soybeans. While not likely to have a major impact on crop plantings, it is expected that wheat acres will increase as interest in planting corn diminishes.

Although the bulk of corn is produced in the Heartland (fig. 2), corn is also grown in areas further south that can support cotton and rice production. The competition for acres between rice and corn is most sharply experienced in the Mississippi Portal region (fig. 2), the largest growing area for rice in the United States. Per acre net returns for rice drop sharply the first 2 years of the baseline due to declining prices, then increase an average of 2.4 percent a year for the remainder of the baseline, in 2027/28 exceeding 2017/18 net returns by just 1 percent. This is important because the per acre cost of production for rice is substantially higher than for corn, making corn a more attractive planting option for many growers given the small projected increase in rice prices. U.S. corn prices are projected to increase 9 percent over the baseline period, just 1 percentage point lower than the increase in corn variable costs. Combined with rising corn yields, per acre net returns for corn increase 36 percent over the 10-year period. Although net returns per acre for rice exceed the net returns for corn in each year of the baseline, the difference narrows. In addition, because of its much higher production cost, rice has more downside risk for financial loss than corn if prices drop unexpectedly after planting.

Corn also competes with cotton for acres in the South, primarily in the Southern Seaboard and Mississippi Portal regions and to a lesser extent in southeast Texas (fig. 2). Recent high prices have increased upland cotton acreage. In 2017/18, the ratio of net returns of cotton to corn was almost 60 cents to a dollar of corn. Over the projection period, cotton net returns are expected to grow at a faster rate than net returns for corn, with the ratio growing to 64 cents per dollar of corn by the 2022/23 marketing year, with the expectation it will peak at around 66 cents to the dollar in the 2025/26 marketing year. One factor that could make it difficult to switch from corn to cotton is the high variable cost associated with cotton production–1.5 to 2 times higher than for corn–along with net returns that tend to be lower than those generated by corn.

Competition for acres is one of the most likely linkages between crop markets; however, it is not the only margin on which crops can compete. Sugar is an example of a crop that competes indirectly with corn byproducts produced by wet mills (high fructose corn syrup, or HFCS, as well as other sweeteners such as glucose and dextrose) as an input for food production. Since 2008, one of the main drivers for the trend in increased sugar consumption has been higher corn prices from increased global demand and domestic demand for ethanol, making sugar a more cost-effective ingredient for use in foods both as a sweetener and a preservative. Simultaneously, food manufacturers have increased their focus on package labeling, and some consumers' preferences have been shifting away from HFCS to refined sugar. As corn prices continue to drop, HFCS may become more competitive as a sweetener in food and beverages, although consumer preferences are likely to play a role here as well.

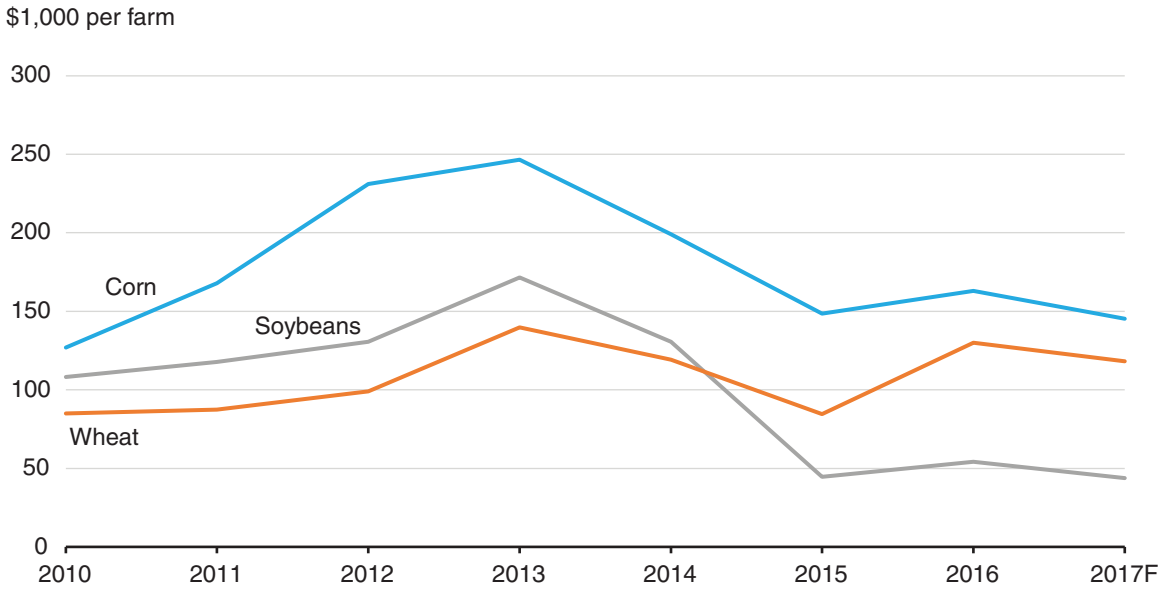
Sugar is produced from both sugarcane, which grows primarily in Florida and Louisiana, and from sugarbeets, which are produced in more northern climates and make up the largest source of domestic sugar. Sugarbeets are typically grown on valuable, highly productive land—often irrigated, particularly in the Western growing regions. For agronomic purposes, sugarbeets are rotated with other crops such as corn, soybeans, lentils, and wheat – which suggests again that relative returns can affect which crops are grown. While the other crops have relatively open markets, the sugar market is heavily regulated with trade quotas, marketing allotments, and loan programs, which have the potential to influence production incentives. However, particularly when alternative crops have relatively low returns, sugarbeets are often viewed as a stable and important source of income. Current projections suggest that sugarbeet plantings are expected to increase through the 2019/20 marketing year and to start to decrease thereafter due to higher projected production costs.

Linkages to Soybeans

While soybeans are strongly linked to corn, they have linkages with other crops as well. Competing with wheat mainly in the Prairie Gateway, the Heartland, and the Northern Great Plains and undergoing a price decline of more than $1 per bushel during each of the 2014/15 and 2015/16 wheat marketing years, net cash income earned by wheat farmers dropped by nearly two-thirds (figs. 2 and 3). Returns to soybean production also fell during the period, though less than for wheat production, which provided soybean farmers a higher average net income and created incentives to switch from wheat to soybeans. In the subsequent 2016/17 marketing year, total U.S. wheat planted area fell by 3.5 million acres while total soybean sowings rose by 6.8 million acres.

Figure 3

U.S. farm business average net cash income dropped after peaking in 2013[1]



[1]All figures in nominal (current) dollars.
Sources: USDA, Economic Research Service, Farm Income and Wealth Statistics.

Spring wheat is expected to stage a comeback due to a strong demand for higher protein wheat, reflected in increased prices. Furthermore, weaker soybean prices due to expanded oilseed stocks and farmer reluctance to plant back-to-back soybean crops support expectations that spring wheat is likely to displace some soybean acreage in the Northern Plains. Overall, the wheat-to-soybean ratio of net returns is 34 cents to a dollar of soybeans in 2017/18, and this is expected to grow to nearly 40 cents to the dollar by the end of the decade. While wheat does not command the net returns of soybeans, it is expected to become relatively more attractive over the next 10 years.

In the 2017/18 marketing year, the ratio of rice to soybean net returns lies at roughly 1.4, making rice more attractive. However, continued global increases in demand are expected to increase soybean net returns while increasing incomes, particularly in emerging economies around the world, and to shift consumption from rice to wheat. The ratio of net returns drops to a low of 1.2 in marketing year 2024/25 and is expected to remain below 1.25 for the remainder of the projection period. This suggests that soybeans become more attractive – particularly in the Mississippi Portal region of the United States (fig. 2).

The other major crop in the South, cotton, can also compete for acres with soybeans in the Mississippi Portal and Southern Seaboard (fig. 2). With a current net return of nearly 47 cents to a dollar of soybeans, soybeans provide a healthier return and may encourage some producers to switch to them, especially given the much higher variable costs involved in producing cotton. However, over the next 10 years, cotton net returns increase to almost 65 cents to a dollar of soybeans. This narrows the gap between the two crops, and cotton becomes increasingly attractive.

Linkages to Wheat

While wheat competes for land with corn and soybeans and can be used as feed when the wheat-to-corn price ratio drops far enough (meaning either corn prices are high, wheat prices are low, or a combination of the two), wheat also competes for land against cotton in some regions–primarily in the Prairie Gateway (fig. 2). Over the projection period, it is expected that cotton returns will remain favorable. The ratio of net returns of cotton to wheat in the 2017/18 marketing year lies at around 1.37 and becomes more favorable to cotton, rising to over $1.55 of cotton for every $1 of net returns of wheat by the end of the decade. After an expected drop in 2018/19 for cotton, plantings of both cotton and wheat are expected to increase over the next decade, making it less likely that producers will switch from one crop to the other and more probable that other land will be pulled in to produce these crops.

Land that could be pulled into wheat production could come from producers growing dry peas, chick peas, and lentils. A key export market for these crops, India, has imposed a 50-percent import tariff on pulses, which is expected to make it more difficult for U.S. producers to compete and would make spring wheat a more attractive alternative.

Deeper Exploration of the Commodity Markets

Understanding a commodity market requires more than just the linkages that exist between markets. Yield trends, domestic demand, carryin stocks, export opportunities, growing global incomes, and other similar factors and trends help to explain the current (and future expected) state of a commodity market. This section explores those major drivers behind the expected trends for the main crop commodities over the next decade for the USDA projections.

The Corn Market

To date, corn has commanded the largest number of planted acres of any crop. While not the only feedstock (see box for sorghum), it is one of the primary crops used to feed livestock in a world that continues to increase its demand for meat. Although feed is one of its main uses, corn is versatile and is used to produce a wide variety of products, including ethanol, sweeteners, and building materials. Large ending stocks, increased competition from Brazil and Argentina, and yields that continue to grow are some of the key factors driving the corn market.

Ending stocks for corn are the largest they have been in over 20 years, and they continue to grow. This places downward pressure on prices, limiting the incentives to plant more acres in the future. Domestically, the largest growth component for corn currently comes from the feed and residual category (fig. 4). As the population continues to grow, meat consumption is expected to grow as well, particularly for poultry. Over the next 10 years, feed and residual uses are expected to grow nearly 13 percent.[1]

Other categories of corn use, however, including ethanol demand, remain comparatively flat. The ethanol market is relatively mature. The ethanol component of gasoline is assumed to remain steady at 10 percent, while alternatives such as E-15 and E-85 are expected to remain niche markets, contributing little to ethanol use. Moreover, gasoline consumption is expected to decline, primarily due to increased vehicle fuel efficiency, and to be further constrained by lower estimates for miles driven, based on assumptions about economic factors, changes in driving habits, the number of drivers, and gasoline prices. As the population and economic growth both expand, the number of miles driven tends to increase. However, many drivers also reduce mileage as they shift to public transport or, in the case of younger people or those in urban settings, manage almost completely without automobiles.

Prospects for the other food, seed, and industrial categories are mixed. During the long-term, domestic production of HFCS is expected to continue a slight downward trend as sugar supplies remain strong and competitive. Shipments of HFCS to Mexico, a major destination, are expected to continue to moderate as sugar is a more economical alternative. Use in soft drinks in the United States is projected to continue a downward trend.

[1] Because there are no survey-based data on feed use of corn, the category “feed and residual” is calculated by subtracting the estimated uses in all other categories from total use. In part, the growth in feed and residual will be due to the residual factor, which tends to become larger as crop size increases.

Sorghum

Sorghum and corn are both major feed grains but they differ in important ways. U.S. sorghum production is much smaller, equivalent to roughly 3 percent of the corn crop. Feeding qualities and alternative uses mean that sorghum is generally priced around 90-95 percent the price of corn. However, sorghum does have qualities that make it a very desirable commodity under certain market and policy conditions. On the production side, sorghum has drought-resistant characteristics that corn does not. It is also a non-GMO crop, which appeals to some markets, including Europe and China.

China is the largest importer of sorghum from the United States. Chinese producers require feed for their expanding livestock industry; when the Government imposed a Tariff Rate Quota on corn, which did not apply to sorghum, high domestic corn prices made imported sorghum an economical feed substitute.

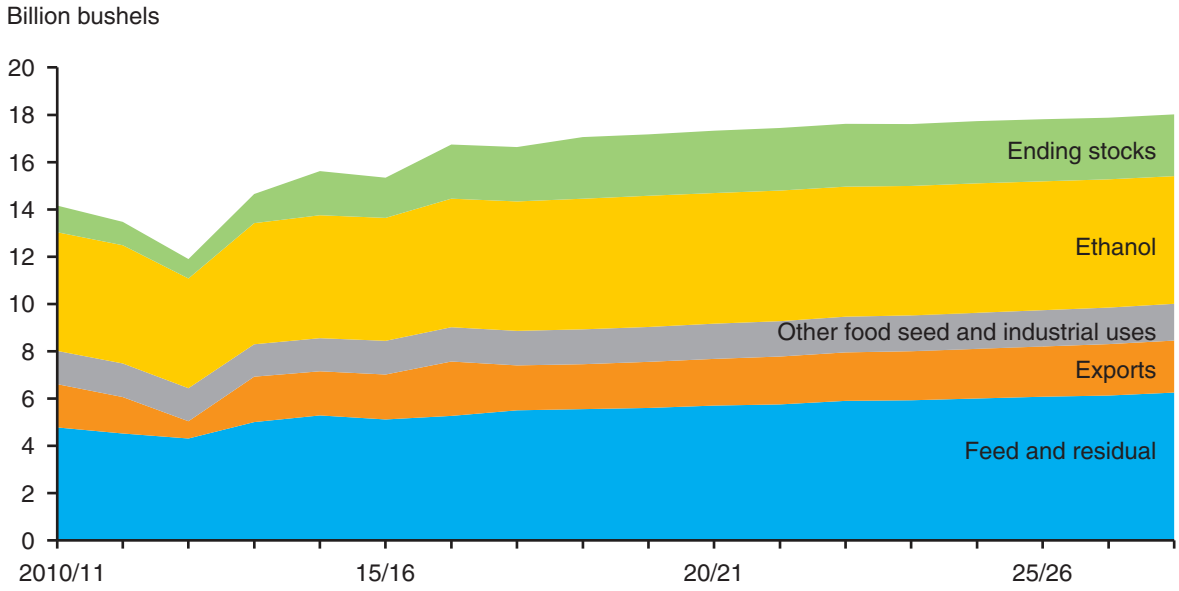
Sorghum production slips during the first baseline projection year, 2017/18, then recovers and is expected to remain steady at a higher level during the rest of the baseline period, driven primarily by the demand from China. In addition to China, Mexico and Japan are significant destinations for U.S. sorghum; over the course of the baseline period, these countries are expected to remain steady importers. Mexico is near U.S. sorghum-producing areas, and Japan is relatively price-insensitive and sources most of its sorghum from the United States due to its high quality.

When the USDA projections were generated, the price of sorghum was expected to reach near-parity with corn in 2018/19, with strong expected demand from China providing support. As a result, for the remainder of the baseline period, the sorghum-to-corn price ratio was projected to be high by historical standards, around 0.95 to 0.97. Planted acreage would be supported as a consequence.

Recent policy developments (after the release of the *USDA Agricultural Projections to 2027* report), however, suggest that the market in China is in flux. Less than 2 weeks after the U.S. imposed tariffs on washing machines and solar panels in early 2018, Chinese officials launched an antidumping probe into U.S. sorghum exports. On April 18, 2018, China's Ministry of Commerce stated that Chinese importers of U.S. sorghum would have to place a 178.6 percent deposit in anticipation of antidumping tariffs. On May 18, 2018, China's Ministry announced it would drop its antidumping duty and countervailing duty investigation, reopening the market to U.S. exporters. However, these actions have the potential to disrupt the trade of sorghum between the two nations and create uncertainty for farmers, who may choose to produce other crops instead.

Figure 4

Growth in U.S. corn utilization is primarily driven by the feed and residual category



Note: Marketing year 2017/18 onward is projected.
Sources: USDA, National Agricultural Statistics Service, QuickStats and USDA, *USDA Agricultural Projections to 2027* (2018).

Starch production from corn, used in building materials and paper products, is expected to remain steady over the projection period. During the baseline, annual housing starts are expected to grow from 1.3 million to over 1.6 million per year, but this is likely to be offset by reduced use in some paper products. Unmodified corn starch is the most common starch, used in the manufacture of corrugated board, coated and sized paper, paperboard, adhesives, salad dressings, beer, canned foods, and dry food mixes (such as puddings, cakes, baking powder, and other products such as molding starch and laundry starch). Less commonly, modified starch is used to produce starch paste to treat yarns and cloth and paper for the printing industry and dextrins, used in the chemical, pharmaceutical, and food markets. Cornstarch can also be used to produce dextrose, which is expected to increase gradually as food uses expand when population, while industrial uses, such as enzyme production, continue their growth pattern of the past 5 years.

The Global Market for Corn

Global demand for corn continues to grow. Rising global incomes mean that diets are shifting away from traditional sources of protein such as beans and backyard livestock and toward products supplied through cold-chain processing of domestic production and sales in fast-food venues, especially in urban areas. This translates to an increase in demand for feed, in which corn plays a large role. Corn exports are expected to increase by roughly 16 percent over the next 10 years, growing from 1.9 billion bushels to 2.2 billion by 2027. However, despite the increase in exports, global demand will rise faster, and overall, the United States is expected to lose some of its share of world trade. Brazil corn production–particularly from its second-crop corn–along with production in Argentina and Ukraine, among other countries—is expected to continue expanding, leading to increased shipments from these countries.

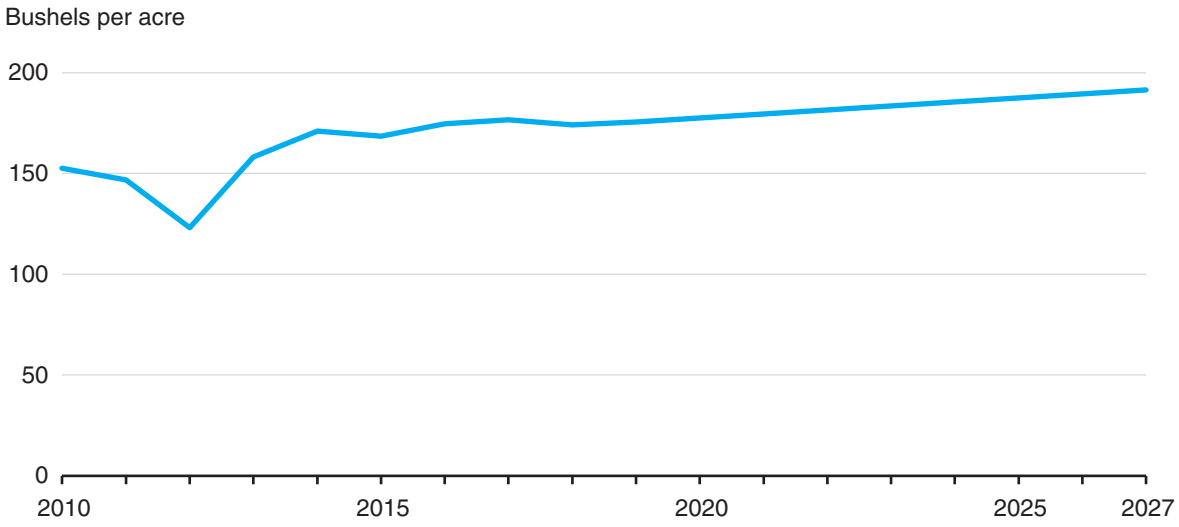
Over the next 10 years, Mexico is expected to retain its position as the leading corn importer in the world, with most of its imports coming from the United States. Mexico imports corn for both feed and food uses, with much of the food use consisting of white corn. Japan is the second-largest global importer, also purchasing a large share of its imports from the United States. However, corn consumption has stabilized in Japan and is expected to decline slowly over time. In contrast, corn demand is expected to grow in Egypt, Iran, and more generally in South America. Currently, China, a key factor in world markets, does not source corn from the United States as its domestic stocks are still at high levels and China does not accept genetically modified (such as Roundup Ready) corn, which makes up the vast majority of U.S. production. When the 10-year projections were developed, China was importing U.S. sorghum to meet feed needs, and U.S. sorghum is non-GMO (see box on sorghum). Toward the end of the decade, the growth in China's livestock industry may draw down stocks to the extent that corn imports may be needed to make up for regional supply deficiencies.

Domestic Corn Yields Continue To Grow

Corn yields are expected to continue to grow at roughly 0.9 percent per year, averaging over 191 bushels per acre by 2027 (fig. 5). Each year, given limited demand growth and continued yield gains, less land is required to produce the same level of output. These trends also free up land previously (or currently) planted to corn for other crops. Without constraining corn production, the land sown to corn is expected to decline over the next decade (fig. 6). Despite a decline in planted area, corn plantings are still expected to remain between 87 and 90 million acres through 2027. Coupled with yield gains, slow domestic growth, and limited export opportunities, corn stocks will not be reduced easily.

Figure 5

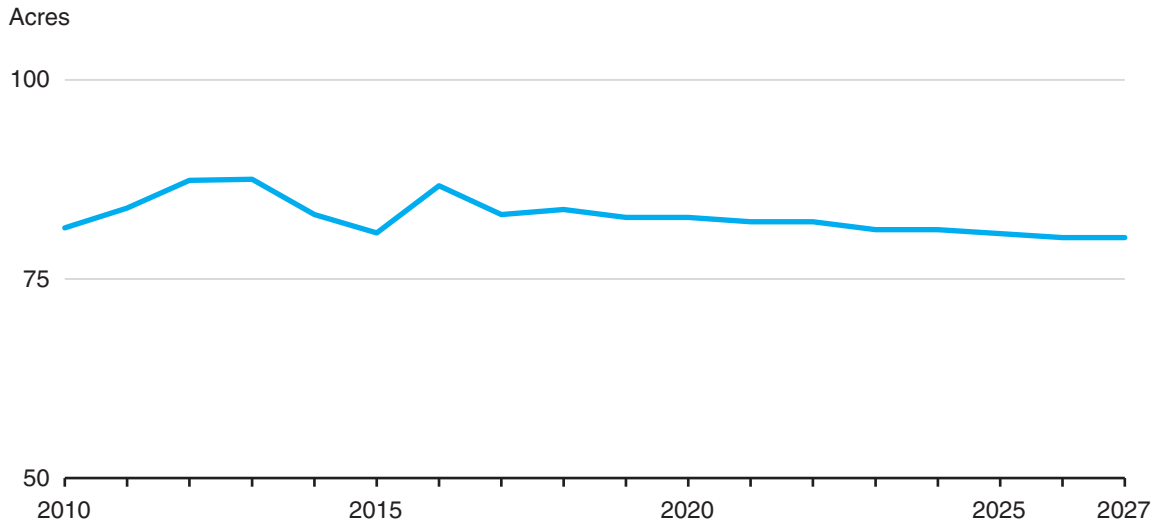
U.S. corn yields continue to grow



Source: USDA, National Agricultural Statistics Service, Quick Stats and USDA, *World Agricultural Outlook Board*.

Figure 6

U.S. corn harvested area is expected to decrease over time



Source: USDA, National Agricultural Statistics Service, Quick Stats and USDA, *World Agricultural Outlook Board*.

The Soybean Market

Once a niche crop, soybeans have become one of the largest crops grown in the United States, and in crop year 2019/20 soybean acreage is expected to take the top spot. There are three markets associated with soybeans–the market for the soybeans themselves and the markets for the products of the crushing process; soybean meal, used in animal feed; and soybean oil. High levels of supplies, growing global demand, greater supply competition, and increased competition from palm oil help to characterize the various soybean and product markets.

Soybean Supplies Grow

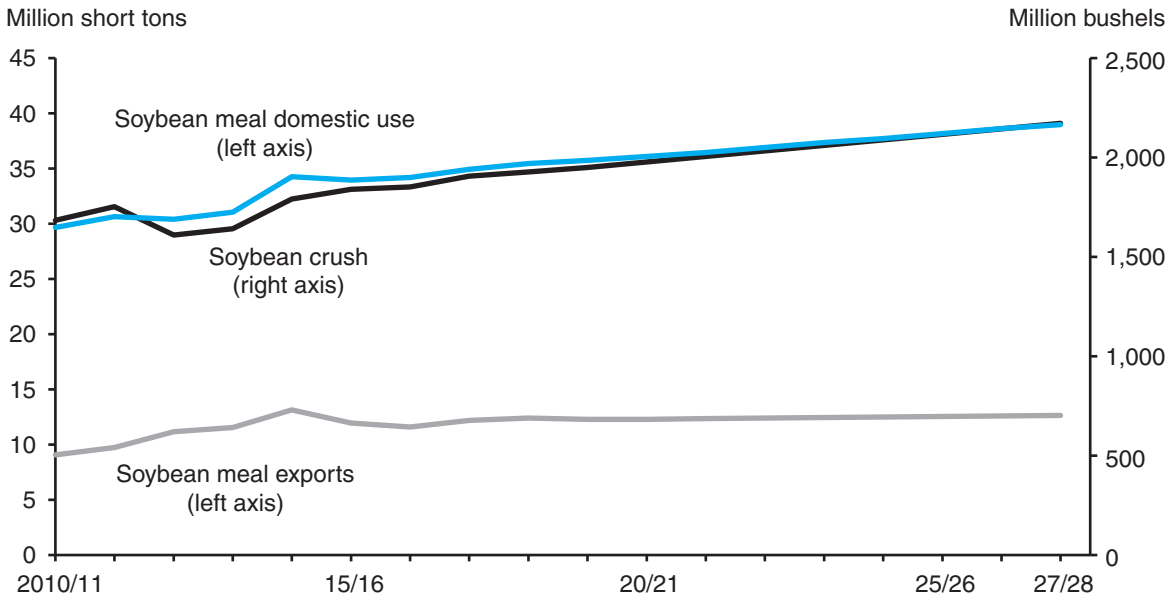
Exceptionally favorable weather over the last few years has produced soybean yields above the trend. Assuming average weather conditions in 2018/19, the U.S. average soybean yield may contract moderately. The combination of expected record acreage and good weather is projected to yield a harvest second only to the 2017/18 high. Coupling this production with larger than usual beginning stocks (the highest in 11 years) could result in the largest ever total supply of soybeans. Provided that the acreage and yield projections are realized, 2018/19 soybean prices would remain under pressure even with the most optimistic outlook for demand.

Domestic Soybean Use To Increase Steadily, Growth in Product Demand Slowly

Domestic demand makes up roughly 48 percent of total soybean use over the projection period and is expected to grow slowly, with the abundant supplies supporting an increase in the soybean crush (fig. 7). Domestic producers would derive support from moderate gains in the domestic demand and exports of soybean meal, the principal byproduct of crushing. Domestic use of soybean meal accounts for 75-80 percent of its total demand. The U.S. pork and poultry industries (the major domestic markets for soybean meal) may have limited potential for expansion next year, limiting the growth in domestic demand for soybean meal.

Figure 7

Modest gains in soybean meal use edge up domestic crush



Source: USDA, *World Agricultural Supply and Demand Estimates*, 2010/11 - 2017/18; USDA, *USDA Agricultural Projections to 2027* (2018).

Soybean oil is less influential to the decision to crush than soybean meal due to the oil's low share of the output. However, a higher soybean oil price next year could again edge up oil's contribution to the total processing value of soybeans. Consumption of soybean oil in the domestic market is expected to remain relatively flat. The edible use of soybean oil may increase modestly in 2018/19 as supply gains for alternative U.S. vegetable oils could be minimal. Domestic supplies of sunflowerseed and cottonseed may tighten as acreage of those crops is expected to decline.

Over the last decade, use of soybean oil for U.S. biodiesel production has expanded sharply under the Renewable Fuels Act. In 2017, soybean oil accounted for 52 percent of the total feedstock used to produce biodiesel, with the remainder coming from other vegetable oils, animal fats, and recycled grease. In the absence of tax incentives, volume obligations drive the demand, and under the law EPA has authority to set these obligations.

For 2019, EPA has proposed a minimum consumption for biodiesel and renewable diesel at 2.1 billion gallons, unchanged from 2018. The rate of use for 2018/19 is projected to be steady at just over 7 billion pounds, which satisfies less than half of the obligation set by EPA. Despite EPA's minimum consumption standards, incentives to blend biodiesel have waned as a Federal excise tax credit for doing so expired in December 2016. While soybean oil alone does not satisfy the minimum standards, countervailing duties placed on biodiesel imports from Argentina and Indonesia in 2017 could mean sharply lower imports throughout 2018. In 2016, U.S. biodiesel imports swelled to just under 700 million gallons (26 percent of the total supply) but fell to fewer than 400 million gallons last year.

Market support for increased biofuel production could arise from an expected slow increase in the price of crude oil. Through a narrowing of its price premium with diesel fuel, more biodiesel blending would be encouraged. Other feedstocks may similarly benefit as well.

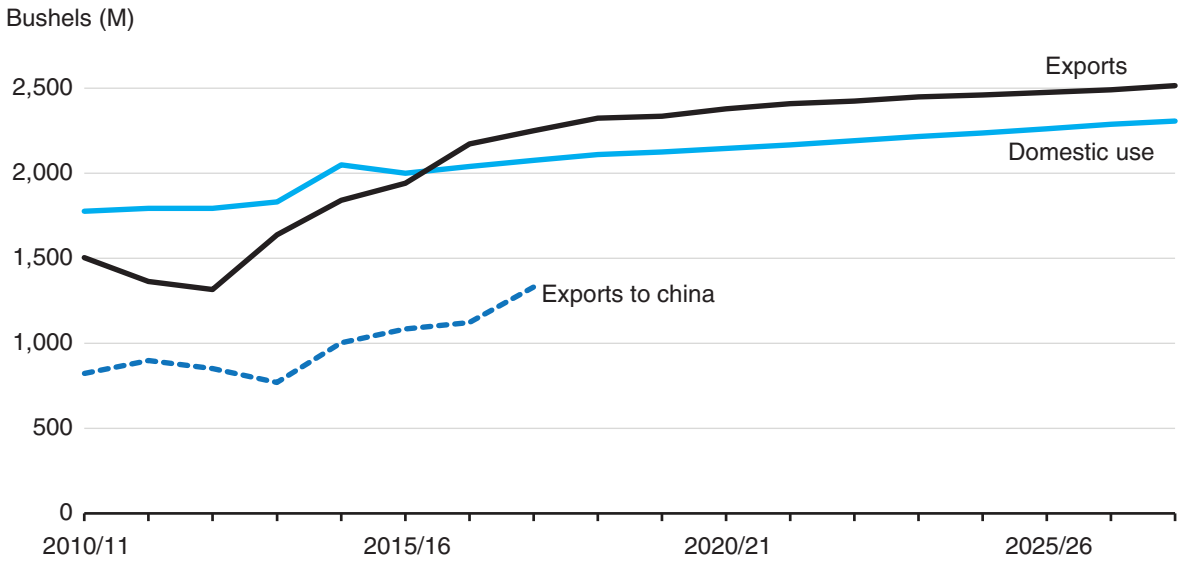
Season-ending soybean oil stocks for 2018/19 are projected to stay comparatively tight. Increased crush and a likely higher oil extraction rate suggest a modest increase in 2018/19. Even so, ample global supplies of vegetable oil may temper the rise in U.S. soybean oil prices in 2018/19.

U.S. Soybean Market Increasingly Reliant on Foreign Demand Growth

While the domestic use of soybeans is expected to increase over time, exports will dominate the growth in total demand (fig. 8). Historically, U.S. soybean demand has had a predominantly domestic orientation, despite formerly being the world's largest exporter of the crop. Over the last two decades, however, the U.S. market landscape has been permanently reshaped by the extraordinary gains in China's soybean demand; for the last 2 years, more U.S. soybeans have been shipped into the export market than used domestically. With a record supply, competitive prices, and continued strong foreign demand, U.S. soybean exports in 2018/19 may climb to an all-time high.

Figure 8

Exports overtake domestic use as main source of soybean demand



Source: USDA, *World Agricultural Supply and Demand Estimates*; USDA, *USDA Agricultural Projections to 2027* (2018); USDA, FAS, Global Agricultural Trade System Online.

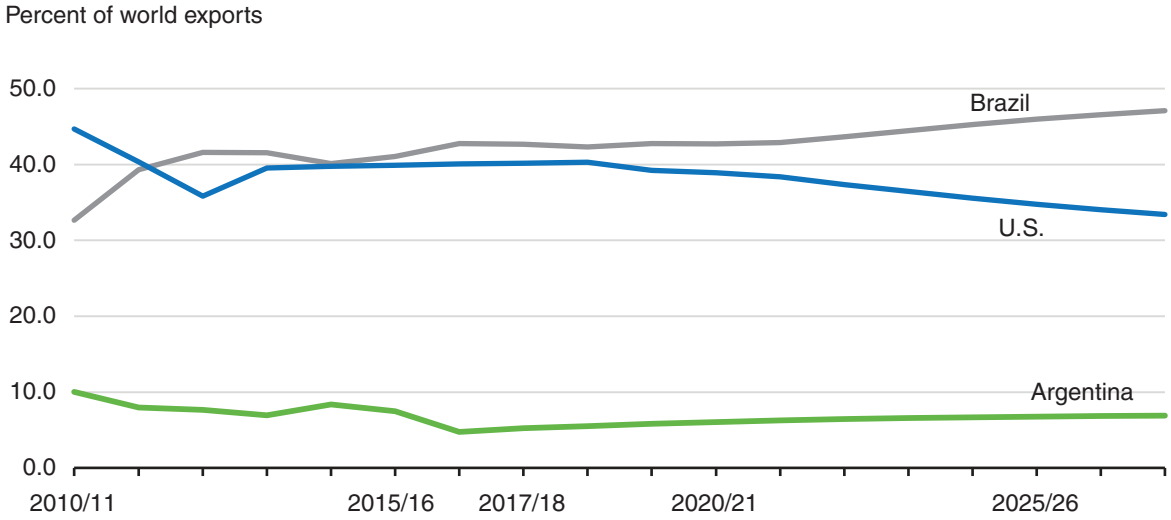
Global soybean stocks in 2017/18 are expected to grow to an all-time high following consecutive worldwide record harvests. By the end of 2018/19, global soybean inventories will tighten modestly if, as anticipated, demand growth slightly exceeds production gains. Foreign demand for soybeans continues to be led by China, which currently accounts for 65 percent of global imports. Low projected prices will also encourage noteworthy increases in soybean demand by other importing countries, including the European Union, Turkey, Russia, Vietnam, Indonesia, and South Korea. Even with the prospective gains in demand, U.S. soybean stocks in 2018/19 will decline only marginally.

The current U.S. share of the global export market is far from assured for next year, as foreign competition will remain formidable (fig. 9). In South America, where exportable supplies are also at record highs, stiff export competition will persist. Each year, soybean supplies in Brazil are estab-

lishing new heights, with a steady expansion of area and yield improvement. Recent expansion of port capacity in the country is lowering the freight cost and delivery time of export shipments.

Figure 9

Decline in U.S. share of global soybean exports slowed by supply gains



Source: USDA, *USDA Agricultural Projections to 2027* (2018).

In addition, soybean exports from Argentina—the third-largest exporting country—are shaping up to be more competitive. Beginning in January 2018, the Argentine Government has incrementally reduced export taxes on soybeans by 0.5 percent per month. By the end of 2019, a reduction in the soybean export tax from 30 percent to 18 percent will encourage more old-crop farm sales and higher new-crop area. Finally, the competitiveness of U.S. soybean exports could be diminished by any strengthening of the U.S. dollar relative to these foreign currencies. All trade projections are posited on normal weather conditions in each country.

Opportunities to expand global trade in soybean products are more limited. Many countries have surplus capacity to crush soybeans as they have adopted tariff structures that are more favorable to soybeans than soybean products. For instance, China has a 3-percent general duty rate on imports of yellow soybeans, but tariffs are much higher for soybean meal (5 percent) and soybean oil (9 percent). China is the world's largest consumer of soybean meal but imports almost none. In 2018/19, modest growth in world soybean meal trade is projected, supported by higher demand in the EU and Southeast Asian countries.

Argentina counters higher import tariffs on soybean products by levying a higher export tax on soybeans than on its soybean meal and soybean oil exports. Excluding China, Argentine meal exports are highly competitive nearly everywhere, particularly in markets where demand for soybean oil is less keen. Soybean meal exports by Brazil may expand in 2018/19 as well. In contrast, exports by India may remain unchanged due to strong consumption growth for soybean meal by the country's own poultry industry.

U.S. soybean meal prices are projected only modestly higher next season to $325 per short ton, compared to the midpoint of the 2017/18 forecast range of $315. That should let U.S. soybean meal

exports in 2018/19 maintain their competitiveness. Shipments of U.S. meal abroad are projected to edge 200,000 short tons higher in 2018/19 to 12.4 million, primarily to import markets in Latin America and the Philippines.

Growing Surplus of Palm Oil May Limit Global Export Demand for Soybean Oil

It is likely that the major obstacle for growth in soybean oil trade next year will be a resurgent palm oil sector. Production of palm oil (the world's top-traded oil) in Southeast Asia could continue to expand due to a rising-yield trend. In 2016, palm oil output in Indonesia and Malaysia fell sharply as an extended drought curtailed yields. Since then, production has recovered with a resumption of rainfall. Tree productivity has also improved. As they age and grow taller, oil palm trees become less productive and more difficult to harvest. Several years ago, a replanting program (subsidized by the Malaysian Government) led to the replacement of many old (but still producing) trees with improved varieties. When old trees are replanted, it takes up to 3 years for their replacements to start producing fruit bunches. That nonproductive period for immature trees has now largely lapsed, so yields are benefiting from maturation of the recently planted trees.

The price discount of palm oil relative to soybean oil is now widening. Ample global supplies of vegetable oil substitutes could constrain demand for soybean oil by the top importers, India and China. Low-income consumers in both these markets are most attracted to the least expensive edible oils. While vegetable oil consumption in the European Union for edible uses is stable, demand could be curbed by a pullback in its use for biofuels. Within 3 years, the EU will entirely ban the use of palm oil in biodiesel, regardless of its certification of sustainability. This would subtract about 3.5 million tons from EU palm oil demand, leaving even more supplies to compete worldwide with soybean oil and other vegetable oils.

U.S. exports of soybean oil tend to be most competitive in Latin America, where a regional transportation advantage is most pronounced. Argentine soybean oil exports may benefit from a dimmer outlook for its biodiesel exports. Conversely, soybean oil shipments by Brazil—the world's second-largest oil exporter—could be rationed by a hike in its domestic biodiesel blending rate. Beginning in March 2018, Brazil's mandatory blending rate for biodiesel will be raised from 8 percent to 10 percent.

The Wheat Market

Wheat, which used to be the predominant crop grown in the United States, encompasses five different classes that are grown in different areas of the country and have differentiated markets (see box "Wheat Classes and Uses"). Wheat's dominance has since dropped with the growth of corn and soybeans, and producers have continued to decrease plantings. In recent years, wheat harvests have hit record lows as producers have faced low-quality crops, along with increased competition in the international marketplace, which is expected to continue as a major factor in the wheat market in coming years. Rising domestic use has helped to strengthen prices and is expected to continue to expand, helping to drive growth in plantings in the coming years.

Wheat Classes and Uses

The five major classes of U.S. wheat are hard red winter, hard red spring, soft red winter, white, and durum. Each class has a somewhat different end use, and production tends to be region-specific.

Hard red winter (HRW) wheat accounts for about 40 percent of total production and is grown primarily in the Great Plains (Texas northward through Montana). HRW is principally used to make bread flour.

Hard red spring (HRS) wheat accounts for about 20 percent of production and is grown primarily in the Northern Plains (North Dakota, Montana, Minnesota, and South Dakota). HRS wheat is valued for high protein levels, which make it suitable for specialty breads and blending with lower protein wheat.

Soft red winter (SRW) wheat, accounting for 15-20 percent of total production, is grown primarily in States along the Mississippi River and in the Eastern States. Flour produced from milling SRW is used in the United States for cakes, cookies, and crackers.

White wheat, accounting for 10-15 percent of total production, is grown in Washington, Oregon, Idaho, Michigan, and New York, and its flour is used for noodle products, crackers, cereals, and white-crusted breads.

Durum wheat, accounting for 3-5 percent of total production, is grown primarily in North Dakota and Montana and is used in the production of pasta.

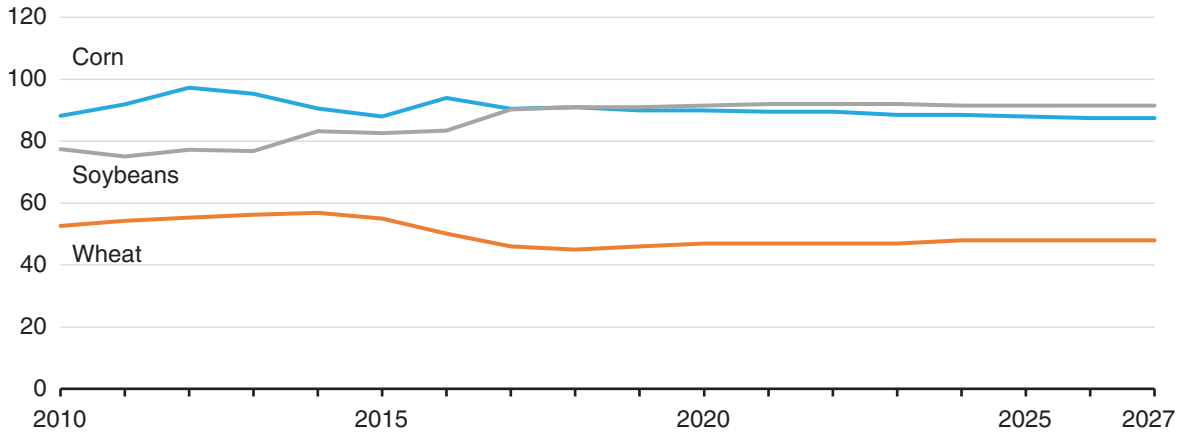
Source: USDA, Economic Research Service Wheat Background.

With a mature wheat market in place, food use of wheat is expected to grow more slowly than population growth. High corn stocks suggest lower demand for wheat for feed use, and growing international competition is expected to provide fewer opportunities for exports. Coupled with relatively high ending stocks at the time of the projections, area planted to wheat is expected to drop to a low of 45 million acres in 2018/19 before rebounding slowly to 48 million acres by crop year 2024/25.

Since then, however, new information has come to light, providing an example of how circumstances can change and readers could adjust baseline projections. Despite winter wheat sowings that are projected to be the lowest in 109 years, area seeded to all-wheat in the 2018/19 marketing year is forecast to rise nearly 500,000 acres from the 46 million acres planted in 2017/18. The current projection for 2018/19, which incorporates data from the January 12, 2018, USDA NASS Winter Wheat and Canola Seedings report, represents a 1.5 million acre increase in planted area compared to the November *WASDE*, the starting point for the *USDA Agricultural Projections to 2027* report. Rising prices and returns in the spring wheat belt helped encourage farmers to expand spring wheat planted area in the Northern Plains. If realized, aggregate expanded planted area projected in the new marketing year will reverse a long-term trend of gradually declining wheat planted area. Wheat sowings have decreased over time as farmers turned to more profitable soybean and corn cultivation (fig. 10). Through 2027/28, wheat planted area is not expected to recover to pre-2015 levels. However, level-to-very-modest growth in sowings projected to improve wheat prices, as well as a modestly improving wheat-to-corn price ratio, provide modest incentives to increase wheat area.

Figure 10

U.S. corn, soybean, and wheat planted area: 2010-2027



Source: USDA, National Agricultural Statistics Service, Quickstats Database and USDA, *USDA Agricultural Projections to 2027* (2018).

Winter Wheat Sowings Down in Key States

In recent years, weak relative returns, weighted down by substantial stocks of lower-protein and lower-value wheat, have reduced farmer interest in planting winter wheat. In the fall of 2017, as the 2018 crop entered the planting window, producers faced additional agronomic factors that included delayed seeding due to a late corn harvest, disease challenges, and below-average soil moisture levels. These factors served to reduce winter wheat plantings in the leading Hard Red Winter (HRW) wheat States, including Kansas, Texas, Oklahoma, and Colorado. In USDA's January 12, 2018, *Winter Wheat and Canola Seedings r*eport, area planted to winter wheat is estimated at 32.6 million acres, down about 1 percent from 2017. HRW planted area is projected to total just over 23 million acres, a decline of 2 percent from 2017, while Soft Red Winter (SRW) planted area is forecast up 4 percent year-to-year, to nearly 6 million acres.

Spring Wheat Planted Area Set To Rise on Improved Prices and Returns

Collectively, spring wheat sowings are expected to increase by 7.5 percent in 2018/19, following a year in which a number of farmers in the Northern Plains switched from growing spring wheat to sowing soybeans (*Wheat Outlook*, November 2017). Spring wheat prices have steadily strengthened through the 2017/18 marketing year, reflecting premiums for high-protein milling wheat and for Hard Red Spring wheat, in particular (USDA, *Agricultural Prices*).

Dry conditions in the Northern Plains and Canadian Prairies trimmed spring wheat yields and production, while the Hard Red Winter wheat harvest was plagued by below-average protein levels. Constrained supplies of high-protein wheat in 2017, which was needed to blend with the abundant supplies of lower-quality winter wheat, put further upward pressure on spring wheat prices. While rising prices create incentives to plant more spring wheat, additional spring wheat

planted area is expected to be supported by weaker soybean prices and returns in the region, owing to expanded oilseed stocks and farmer reluctance to plant back-to-back soybean crops. Incentives to plant pulse crops in the spring wheat belt also decreased with the addition of a 50-percent tariff to enter the Indian import market, a key market for U.S. dry peas and lentils (USDA, FAS *India GAIN Report*, 2017).

While the projections suggest a decline in wheat planted area in crop year 2018, more recent regional crop enterprise budgets from North Dakota State University extension (NDSU *Farm Management Budgets*, 2018) reflect expectations for costs and returns to commodity production —supporting prospects for improved returns to spring wheat production in 2018, as compared to the previous marketing year and in comparison to substitute crops such as soybeans, pulses, and corn. As always, farmers in the Northern Plains will be carefully watching the later winter and early spring weather and noting changes in soil moisture. Warmer, drier weather toward the end of winter generally favors cultivation of early-planted spring wheat, as do below-average soil moisture levels.

Durum acres are projected slightly down in 2018/19 as both "Desert Durum" farmers in Arizona and California and those in the Northern Plains are expected to respond to successive years of disappointing returns and challenging cultivation conditions by trimming plantings. Strong prices for cotton have also encouraged switching away from durum production, especially in Arizona and California, where according to the more recent January *Winter Wheat and Canola Seedings* report durum sowings are down 41 percent from 2017. Similarly, in the March 2018 *Prospective Plantings* report, Arizona and California cotton plantings are 102 and 103 percent of 2017 figures, respectively. Most relevant to intentions in northern States, early in 2018, futures price spreads between hard red spring and durum supported a year-to-year reduction in durum plantings in favor of increased other spring wheat acres. Through the 2017/18 marketing year, U.S. durum prices have been weighed down by large stocks of Canadian product, which has been imported in increasing volumes to supplement the relatively small 2017/18 U.S. durum harvest. Prospects for a durum price recovery in the new marketing year have been dampened by 2018 expectations of a sizable Canadian durum crop (StatCan Outlook, 2018), further reducing Northern Plains farmers' interest in durum cultivation.

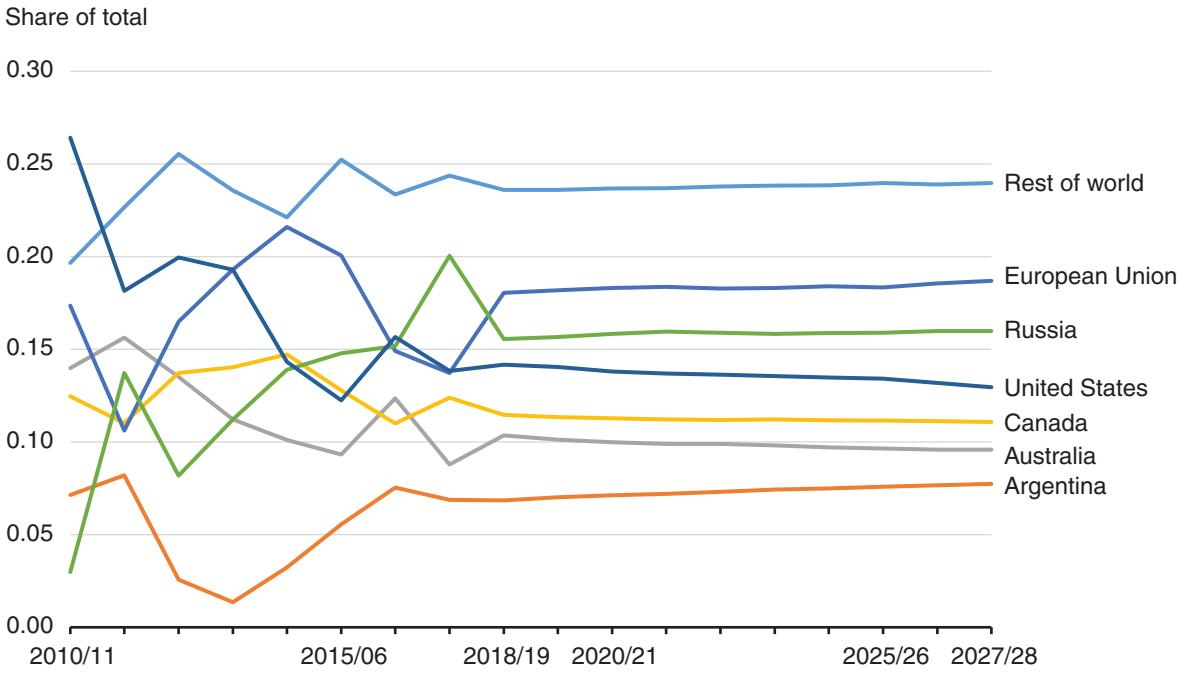
U.S. Share of Global Wheat Exports Expected To Continue To Decline

As U.S. wheat prices and the value of the dollar have generally strengthened, U.S. wheat's competitiveness in international markets has been reduced, as evidenced by multiple downward revisions to USDA's 2017/18 export forecasts. Argentina and Russia continue to be formidable forces in global wheat trade and limit U.S. export marketing opportunities. The U.S. share of total global exports has fallen to under 14 percent, down from nearly 20 percent just 5 years ago for the 2012/13 marketing year (fig. 11).

The rapid rise in Russia's prominence in global wheat markets has been aided by a period of notably excellent weather, supporting abundant production far in excess of domestic consumption needs, which has contributed to low prices. Low prices have in turn benefited from favorable exchange rates that have further reduced the relative price of Russian wheat. The proximity of Russia, and other Black Sea area wheat producers such as Ukraine, has helped the region become a key supplier to the rapidly growing Middle East and North African markets. During the recent period of surplus production, the Russian Government has worked to support expanded exports, including providing subsidies to facilitate the transportation of grains from the wheat-producing regions of the country.

Figure 11

U.S. share of global wheat trade is expected to continue to drop



Sources: USDA Foreign Agricultural Serivce, Production, Supply, and Distribution database and ERS Calculations based on USDA, *USDA Agricultural Projections to 2027* (2018).

Generally lower U.S. supplies and continued strong international competition will challenge a recovery in U.S. wheat export prospects in the next marketing year and beyond. In particular, the European Union is expected to have a larger crop, while Argentina is anticipated to continue to expand wheat area. Both Australia and Canada are expected to have ample exportable supplies from larger crops as they rebound from reduced 2017/18 yields. Though the Russian crop is expected to be down from the 2017/18 record, total supplies will still be abundant due to massive carryin stocks. Global 2018/19 wheat trade is anticipated to reach a record high, while global consumption is projected to continue to grow, particularly in the net importing countries of Africa and Asia. While the United States is expected to retain its core markets, expansion into these growing regions will be limited in light of abundant competitor supplies.

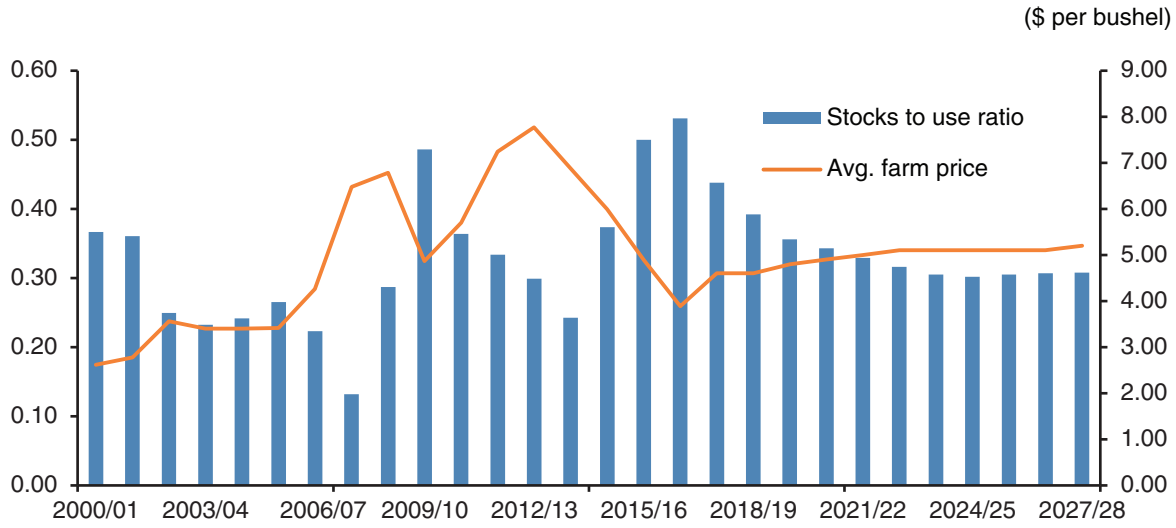
Ending Wheat Stocks, Kept in Check by Rising Domestic Use, Help Strengthen Prices

For 2018/19, a year-to-year increase in production is a function of modestly expanded sowings multiplied by an 83.4-percent harvested-to-planted ratio. While up from the 2017/18 ratio, the 2018/19 ratio is slightly below trend and lower than the projection in the *USDA Agricultural Projections to 2027* report, reflecting prospects of increased abandonment in the drought-affected winter wheat belt. At the time of the writing of this report, an estimated 45 percent of the 2018/19 winter wheat crop is located in an area experiencing drought. At present, trend yields underpin the 2018/19 production forecast of nearly 1.9 billion bushels and support a near 6-percent increase in production. In combination with lower carryin projected for 2018/19 as compared to 2017/18, total wheat supplies are expected to be down 3 percent. Reduced supplies more than offset the effects

of lower projected use on ending stocks, which are expected to be the lowest ending stocks in 4 years, below both the 5-year and 10-year average. The implied 2018/19 stocks-to-use ratio is the lowest since 2012/13; at less than 40 percent, it is indicative of increasing tightness in the balance sheet, supporting maintenance of the Outyear price at or near the current 2017/18 projections and continued incentives for higher planted wheat area in the out-years (fig. 12).

Figure 12

U.S. wheat stocks-to-use ratio vs. season-average farm price



Source: USDA, Economic Research Service calculations based on data from USDA, *USDA Agricultural Projections to 2027* (2018).

The Cotton Market

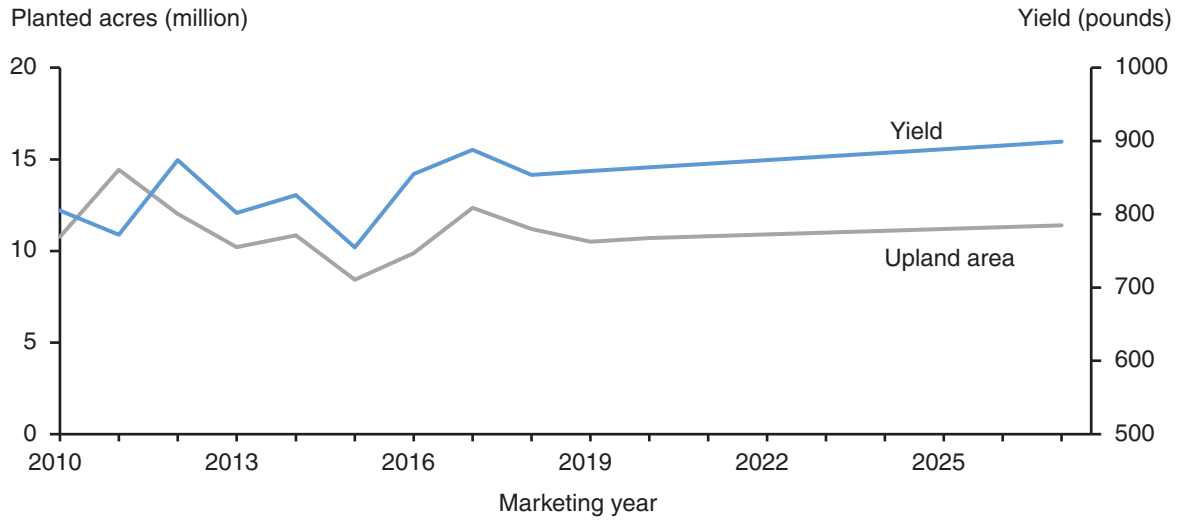
U.S. cotton area is projected to rise slightly throughout the baseline period after a fallback from 2017/18's 6-year high. During the past decade, U.S. upland cotton plantings varied considerably—ranging between 8.4 million and 14.4 million acres—depending on factors that include the price outlook for cotton and alternative crops, commodity program and crop insurance prospects, crop rotation benefits, irrigation supplies, and weather at planting time. The degree to which these factors affect planting decisions, however, differs across the Cotton Belt, where the potential for crop diversity varies by region. While each of the above factors likely will continue to influence cotton area during the next decade, relative prices for cotton and competing crops will be key to farmers' planting decisions. However, the growth in global consumer demand for cotton textile and apparel products remains the primary force behind an expanding global cotton outlook.

U.S. Export Prospects Lead Cotton Production Higher

Over the long term, U.S. cotton production expands to keep pace with a growing export demand, as U.S. mill use is forecast to remain relatively flat and stocks to stabilize below 25 percent of total use. U.S. cotton production gains are achieved mainly through steady yield growth associated with technological advances, such as improved seed varieties and production practices (fig. 13). The U.S. cotton yield reached a record in 2017/18 as crop conditions indicated a strong finish to the growing season. For 2018/19, the U.S. yield is expected to retreat before returning to a growth trend near that of the previous decade.

Figure 13

U.S. upland cotton planted acres and yield



Source: USDA, *USDA Agricultural Projections to 2027* (2018).

Over the next decade, the U.S. cotton market picture is centered around the continuation of the United States as the world's leading exporter of raw cotton. During the past 10 years, U.S. cotton accounted for approximately one-third of global cotton trade. Since the United States exports, on average, nearly 80 percent of its production, the U.S. outlook depends almost entirely on the interactions of global cotton supply and demand.

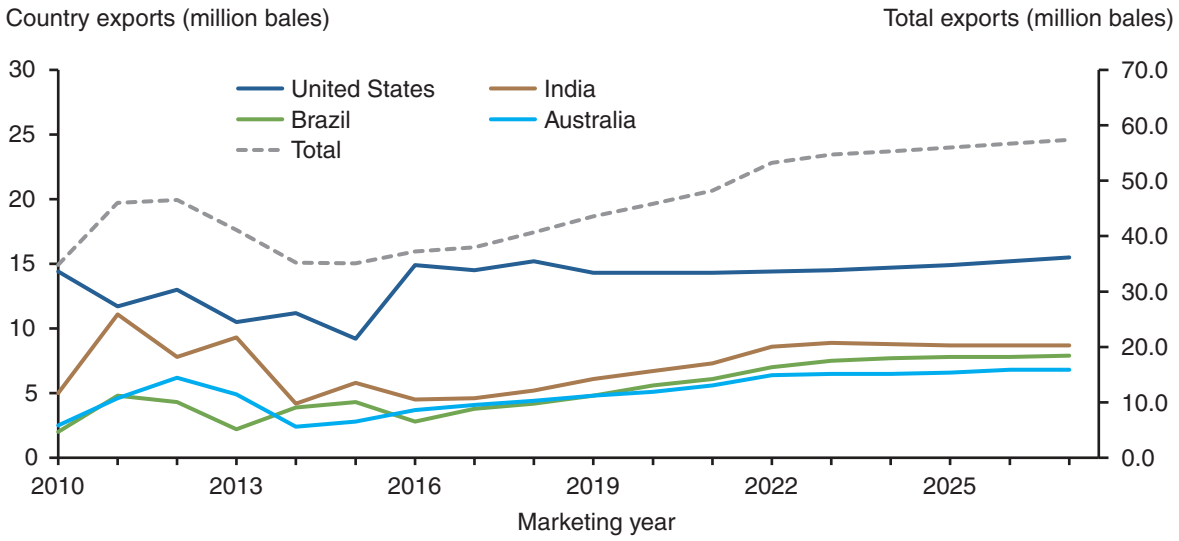
Global Mill Use Expansion Continues

The world outlook for cotton over the next decade is predicated on modest growth in global cotton mill use—spinning raw cotton into yarn for textile and apparel products. Demand for raw cotton and products made from cotton will be a primary driver in the fiber's production prospects for the United States and other countries in 2018/19 and beyond—and with cotton mill use projected to expand in both producing and nonproducing countries, trade prospects for a number of countries are forecast to reach record levels over the next 10 years.

Global cotton mill use in 2017/18 is forecast to reach a 10-year high as consumption continues to expand from its recent low in 2011/12, the year following record-high world cotton prices that considerably suppressed cotton mill use. With global cotton mill use generally following world economic growth, annual global GDP projections above the long-term growth rate observed since the early 1990s is a positive sign for world cotton mill use during the next 10 years (fig. 15). Throughout the baseline period to 2027/28, global cotton mill use is projected to increase modestly with competitive prices and an expansion of consumer demand for cotton products. While supporting the higher demand of a growing world population, competition with synthetic fibers—particularly polyester—is expected to limit the growth potential in global cotton mill use during this period.

Figure 15

Four countries dominate cotton exports



Note: 1 bale = 480 pounds.
Source: USDA, Interagency Commodity Estimates Committee.

China Remains Key to Cotton Mill Outlook

In 2018/19, world cotton mill use is forecast to increase about 2 percent, less than half the growth rate estimated for 2017/18—a year supported by a strong rebound in demand for cotton products and by cotton prices that became more competitive with those for synthetic fibers. However, the global mill use gain projected for 2018/19 is forecast near the 20-year average, as income growth in developing countries helps sustain world demand for cotton clothing. In 2018/19, mills in China are projected to remain the largest users of raw cotton, accounting for one-third of the global cotton mill use. China experienced a recovery in cotton mill use in recent years as domestic stocks became more readily available to local mills with the release of stocks from China's national reserve, which is estimated to have reached its peak in 2013/14 before policies were implemented to reduce its size.

Cotton mill use in China is also projected to benefit further from the Government's direct support for spinning and investment in spinning capacity in the western province of Xinjiang; this coincides with the expansion of cotton production in the region, as cotton area shifts away from the traditional small plots of Eastern China. Xinjiang's share of cotton production reached an estimated 80 percent of the nation's production in 2016/17. That share is expected to rise further during the baseline period, as Xinjiang's yields are likely to trend higher and offset lower production elsewhere in China.

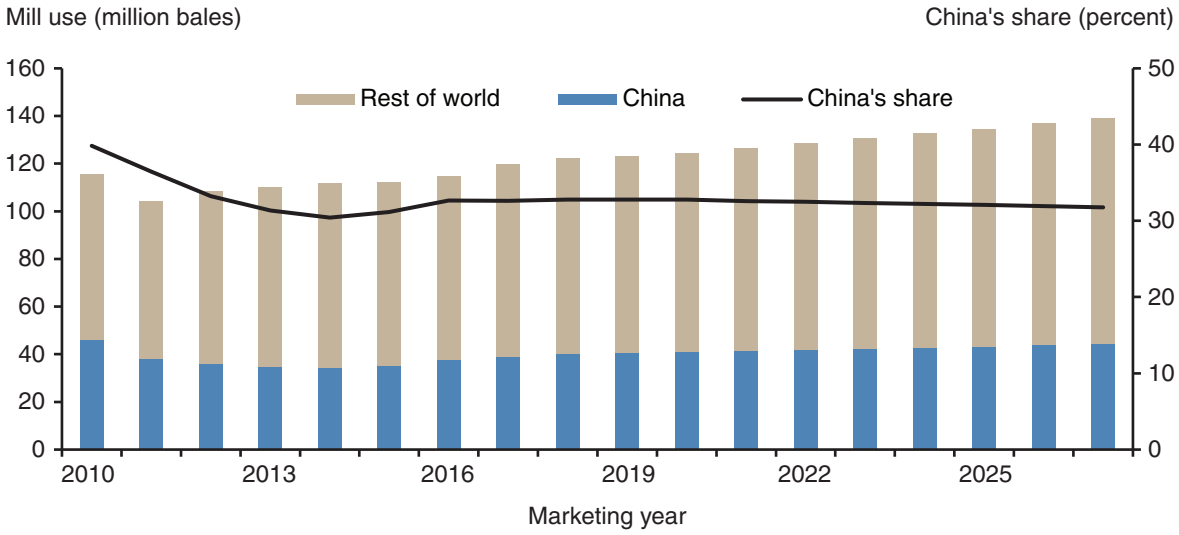
Although China is the second-largest cotton producing country—behind only India—the gap between its production and mill use is expected to increase for 2018/19 and beyond as production remains relatively flat. With the continuation of Government policies that have reduced national reserve stocks to a more manageable level, China is projected to require considerable annual raw cotton imports during the baseline period to reach its modest mill-use growth expectations. While the country may offset some raw cotton import requirements with imports of cotton yarn if prices are favorable, doing so would further boost mill use prospects in countries like Vietnam, India, and Pakistan—the countries that provided the bulk of cotton yarn to China in recent years.

World Trade Growth in Cotton Anticipated

In addition to rising import needs anticipated for China, Vietnam and Bangladesh are also expected to import higher amounts of cotton in 2018/19. Clothing production is labor-intensive, and countries with low-cost labor, such as Vietnam and Bangladesh—where cotton production is inconsequential—must import the raw fiber to satisfy their mill use, which is projected to continue expanding throughout the baseline period. With rising global import demand for cotton expected during the next 10 years, a number of cotton producing/exporting countries will likely benefit (fig. 14). In addition to the United States—the world's leading exporter—larger cotton exports are forecast for India, Brazil, Australia, and the countries of West Africa, where higher production prospects are likely to result from increased adoption of technological innovations that improve yields. Consequently, these production advancements are expected to create added export competition for U.S. cotton on the global market.

Figure 14

Global cotton mill use is expected to grow while China's share is expected to slowly decline



Note: 1 bale = 480 pounds.
Source: USDA, *USDA Agricultural Projections to 2027* (2018).

For the United States, cotton exports continue strong in 2018/19, as large stocks remain despite a short-term reduced production forecast. A record U.S. cotton yield in 2017/18—coupled with the highest harvested area in a decade—provide ample exportable supplies at the beginning of 2018/19, a feat not achieved since 2009/10. The larger carryin supply allows for steady U.S. cotton exports in the early months of the 2018/19 marketing year, before the new crop harvest is available for shipment from other producing countries. Nevertheless, with foreign cotton supplies outside of China expected to rise in 2018/19, prospects for the U.S. share of global trade decline slightly from the previous 2 years, when the share was near 40 percent. Beyond next season, the global export market is forecast to remain competitive, with the U.S. share of world cotton trade expected to continue lower before stabilizing around 27 percent—compared with the 20-year average of approximately 33 percent.

The Rice Market

The 2018/19-2027/28 USDA rice baseline forecasts for the United States indicate little, if any, area expansion beyond the 17-percent increase to 2.9 million acres expected for 2018/19, the first year of the projection period. Some of the 2018/19 projected area increase is due to recovery from adverse weather—severe flooding in the Delta during planting in 2017/18—that was partly responsible for the year's sharply reduced U.S. plantings. U.S. rice-planted area is projected to drop substantially in 2019/20 and 2020/21 due to declining prices, and U.S. rice area is not expected to exceed 2018/19 plantings until 2024/25, when it levels off at just over 2.9 million acres for the remainder of the decade. This level of planting is fractionally higher than the 2008/09-2017/18 average, which includes the 30-year-low plantings in 2017/18 but remains below the U.S. average for 1998/99-2007/08.

Several interrelated economic factors, both domestic and global, account for the lack of any significant rice area expansion in the United States after 2018/19, with global factors especially important since the United States exports about half its rice crop each year and is too small a producer to impact global prices. Foreign policies and decreasing Asian demand thus play key roles in driving the rice market.

U.S. Rice Area Constrained by High Costs and Only Modest Price Increases

U.S. farm prices for rice do not rise sufficiently over the baseline to increase area more than fractionally above the 2018/19 level of 2.9 million acres by 2027/28. In fact, for the first 2 years of the baseline, U.S. rough-rice prices are projected to decline, largely due to a substantial U.S. supply buildup. Then, from 2020/21-2027/28, nominal U.S. rough rice prices average annual increases of about 1.1 percent, slightly slower than the average annual increase projected over the 10-year period for per acre rice variable production costs. By 2027/28, U.S. rice prices are projected to be just 6.5 percent above 2018/19 prices and nearly unchanged from 2017/18. A major factor behind the weak U.S. price growth is projection of only modest increases in global rice trading prices, largely due to adequate exportable supplies worldwide, self-sufficiency policies in much of Asia and Sub-Saharan Africa, and slower consumption growth in Asia.

Per acre net returns for rice drop sharply the first 2 years of the baseline due to declining rice prices, then increase an average of 2.4 percent a year for the remainder of the baseline, exceeding 2017/18 net returns in 2027/28 by just 1 percent (table 3). This is particularly important because the per acre cost of production for rice is substantially higher than for competing crops in the South, primarily soybeans and to a lesser extent corn, making these crops more attractive planting options for many growers given the small projected increase in rice prices. In addition, because of its much higher production cost, rice has more downside risk for financial loss than soybeans—and even corn—if prices drop unexpectedly after planting.

In fact, per acre variable costs of rice production increase at a slightly faster rate than nominal rough rice prices over the 10-year period, increasing more than 1.2 percent a year on average. However, a projected steady increase in rice yields allows per acre net returns for rice to increase each year from 2020/21 to 2027/28, with per acre net returns in 2027/28 up 12.4 percent from 2018/19.

Table 3
Projected variable costs and differences in returns for crops that compete with rice

Commodity	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
						Dollars per acre					
Soybeans	287	279	284	287	293	296	303	314	317	323	326
Corn	232	236	247	248	262	266	276	288	291	306	320
Cotton[1]	135	142	150	156	164	170	177	184	192	199	206
Rice	404	363	337	349	356	370	374	379	392	401	408
Rice - soybeans	117	84	53	62	63	74	71	65	75	78	82
Rice - Corn	172	127	90	101	94	104	98	91	101	95	88
Rice - cotton	269	221	187	193	192	200	197	195	200	202	202

Source: USDA, *USDA Agricultural Projections to 2027* (2018).

[1]Upland cotton.

In contrast, although U.S. soybean prices increase at a slower rate than U.S. rice prices over the baseline, a slower rise in variable per acre production costs and rising yields boost soybean net returns 17 percent over the 10-year projection period. Soybeans are the major alternative crop for rice growers in the Delta, the largest U.S. rice growing region. The outlook for net returns for U.S. corn is even more favorable; corn prices are projected to increase 9 percent over the baseline period, just 1 percentage point slower than the increase in corn variable production costs. Combined with rising corn yields, per acre net returns for corn increase 36 percent over the 10-year period, and some growers in the Delta region can switch between corn and rice acreage. Although net returns per acre for rice exceed net returns for both soybeans and corn each year of the baseline, the difference narrows, especially for corn.

Self-Sufficiency Policies, Declining Use in Asia, Slow Consumption Growth and Limit Global Trade

As noted, the United States is not a large enough player in the global markets to affect global rice trading prices, and events and policies around the world can help shape the global rice market. Currently, rice self-sufficiency policies in Asia and declining per capita use in many former top Asian rice importing countries, as well as rapidly increasing production in much of Sub-Saharan Africa, limit the growth in global rice trade—and hence global trading prices—that impact U.S. farm prices and planting decisions. In fact, global rice trade is projected to increase just 1.5 percent a year over the projection period, well below the average annual growth of 4.9 percent from 2008/09-2017/18, when China accounted for much of the increase after 2011/12. In both Asia and Sub-Saharan Africa, import growth was much stronger from 2008/09-2017/18 than the import growth projected for 2018/19 to 2027/28. After expanding 77 percent from 2008/09-2017/18, Asian rice imports are projected to decline more than 3 percent over the baseline. China, Indonesia, and Bangladesh account for most of the expected decline in Asian rice imports over the period. While rice imports by Sub-Saharan Africa expanded nearly 89 percent during 2008/09-2017/18, imports are projected to increase just 29 percent from 2018/19 to 2027/28.

The primary reason for projected slower import growth over the baseline in Asia is declining per capita rice consumption—primarily food use—in many former top importing countries, coupled

with near-steady rice production, typically a result of Government producer support. As incomes are rising across Asia, consumers are shifting to more western diets, eating more meats, vegetables, fruits, and wheat-based foods. This is especially important for former number one rice importer Indonesia, which is expected to be only a minor rice importer over the next decade, with production nearly flat but per capita use dropping 0.7 percent a year. Imports—once from 1 to 2 or more million tons a year—never exceed 0.5 million tons over the baseline. Bangladesh, also once a major rice importer, is expected to have no import growth over the baseline, with imports consistently below 0.9 million tons and per capita use dropping even faster than in Indonesia. Despite nearly flat production, rice imports decline each year for both of these countries over the baseline. China, the largest rice importing country over the entire baseline, is projected to import slightly less rice each year due to rising stocks, fractional total consumption growth, and small increases in production due to slightly higher yields.

Rice imports by Japan, South Korea, and Taiwan are all projected flat over the baseline and are solely driven by World Trade Organization commitments. For each of these three East Asian countries, a requirement for joining the WTO was to partially open their rice markets to imported rice. For the next 10 years, these annual imports are projected to be unchanged from current requirements. In contrast, the Philippines are projected to increase imports more than 7 percent over the baseline, despite their historic goal of rice self-sufficiency, as consumption growth still outpaces production. Malaysia, a much smaller rice-consuming country than Indonesia or the Philippines, is expected to increase imports over the baseline as expanding production is unlikely.

In West Africa—the largest rice producing and consuming region on the African continent—average annual production growth of 3.2 percent outstrips projected consumption growth of 3.0 percent a year, although imports still increase 2.5 percent a year over the baseline and the region remains a major buyer. Population growth is the primary driver behind the expected growth in use. However, unlike Asia, per capita use is projected to continue to rise in West Africa, allowing imports to increase despite projections for consecutive bumper crops. Sub-Saharan Africa is one of the few regions globally where higher incomes are associated with increased per capita rice use. Production growth in other countries in Sub-Saharan Africa is slower than in West Africa, and imports are projected to increase at a faster pace than in West Africa, with per capita use rising slightly.

These factors make continued robust imports by China critical to keeping rice trade expanding to record levels each year of the baseline. However, while China remains the number one rice importer each year of the projection period, its imports are expected to slowly decline due to slow growth in consumption, huge stocks, and just slight yield-driven production increases. China's rapid import expansion from 2012/13 to 2016/17 was a major reason for record global rice trade in 2016/17 and 2017/18. But with rising stocks, small but steady production increases, and only minimal expansion in use, China's imports are projected to slowly decline over the baseline, though to remain well above pre-2012 levels. Without China as a top importer of rice over the baseline, annual global rice trade would be roughly 10 percent less, with a substantial bearish price impact for the world and U.S. rice markets.

While self-sufficiency policies and declining per capita use in key markets dampen the demand for rice, global exportable rice supplies are projected to be sufficient to meet expanding import needs even with only modest annual global price increases. Shipments from four of the current top five exporters and from an aggregate of rising midlevel exporters increase over the baseline, keeping a lid on price increases. The top three rice exporters—India, Thailand, and Vietnam—increase

exports each year over the baseline and account for more than 60 percent of global exports and 47 percent of the projected export increase over the 10-year period. These three Asian countries have been the largest exporters since 2011/12. India is projected to remain the largest rice exporting country, increasing exports almost 1 million tons to 12.8 million tons by 2027/28. Thailand follows closely, increasing exports 8.5 percent over the baseline to 11.2 million tons by 2027/28. Vietnam's rice exports are projected to increase 19 percent over the baseline to 7.8 million tons by 2027/28, with declining per capita use a factor. U.S. rice exports increase almost 9 percent over the baseline, reaching 3.7 million tons in 2027/28, still below the 2002/03 record of 3.8 million tons. Slow growth in U.S. domestic use, coupled with steady yield increases, allows U.S. rice exports to increase despite only slight area expansion. In contrast, Pakistan's exports decline about 5 percent over the baseline, largely due to production limitations, especially reliance on an outdated infrastructure. These top five rice exporting countries currently account for about 80 percent of global rice exports. However, their share of exports is expected to drop below 75 percent by 2026/27 as Burma, China, and Cambodia expand exports at a faster pace.

Most midlevel rice exporters boost shipments over the baseline as well. Exports from Burma and Cambodia are projected to increase 33-35 percent over the next decade, while China's exports are projected to increase 71 percent. All three of these midsized exporters are projected to increase exports at a faster pace than any of the top five exporters. Burma, Cambodia, and China had all been major rice exporters at one time—Burma was the world's largest prior to WWII—but all three largely or totally withdrew from the global rice market for a period. Cambodia experienced violent political upheaval in the 1970s during and following the Vietnam War that drastically reduced its food production and severely damaged its rice producing capabilities for a substantial time; in fact, Cambodia was unable to export rice again until 2003/04, an absence of more than three decades. Shortly after the military took over Burma in 1962 in a coup, it instituted policies that soon reduced Burma from being the top exporter to being a midlevel or, in some years, a small exporter. Burma's policies did not support surplus production despite ample natural resources.

In response to the accumulation of record stocks of rice by the turn of the 21st Century, China adopted policies to slow production growth and hence annual surpluses, reducing China's status from major exporter to midlevel exporter by 2003/04, and the country's imports more than doubled. Starting in 2004, China's imports included regular milled white rice in addition to the few hundred thousand tons of jasmine previously imported each year. Due to its tighter supplies, China did not export more than a million tons of rice from 2006 to 2016, when exports tripled to almost 1.2 million tons.

The recent return of Burma, Cambodia, and China as midlevel exporters—with Burma currently close to being classified as a top-tier exporter—now adds more than 5 million tons of rice to annual global exportable supplies, a major limit on any price strength. Brazil's exports are projected to more than double over the baseline, and exports from the rest of South America—combining those from Argentina, Paraguay, Guyana, Suriname, and Uruguay—to expand 7-16 percent, further limiting any price strength. Except for Brazil, these South American exporters produce rice primarily for export and have the ability to expand rice area.

The Sugar Market

Sugar, a crop subject to a high degree of Government intervention, is in strong competition with High Fructose Corn Syrup (HFCS) as a sweetener in food and beverages. The U.S. sugar market is

projected to require a steady increase in imports in order to meet continued growth in use. In recent years, the market has been primarily driven by trade flows and trade agreements with Mexico, resulting in policies that set up constraints on imports from Mexican sugar mills. Antidumping and countervailing duty (AD/CVD) investigations initiated by a group of U.S. sugar processors in 2014 against imports from Mexico established terms of trade for U.S. imports that limit the volume and price of imports from Mexico. Despite the recent focus on trade with Mexico, future drivers indicate that foreign sugar supplies will have to come from elsewhere in order to meet growing use in the United States. Corn prices, limited room for growth in planted area, policy changes—particularly with respect to Mexico—and consumer preferences are among the key factors helping to drive the sugar market.

The Demand for Sugar

Domestic food and beverage deliveries are projected to grow based on population growth and continued substitution away from corn sweeteners (especially high-fructose corn syrup) toward more use of refined sugar. Sugar deliveries for food and beverage use are projected to increase at an average annual rate of 1.7 percent as per capita total caloric sweetener consumption is projected to decline, but sugar continues to account for a growing share.

Since 2008, per capita sugar consumption has increased due to three main drivers.

- Higher corn prices, due to growth in global demand and increasing demand in the United States from ethanol production, increased the costs associated with HFCS relative to refined sugar as a sweetener ingredient for food manufacturers.
- The sweetener market provisions of NAFTA were implemented beginning in 2008, which resulted in larger available supplies of raw and refined sugar from Mexico.
- There has been an increased focus from food manufacturers on front-of-package labeling and on perceived customer preferences away from HFCS to refined sugar.

While there are challenges in isolating the impact of each one, these main drivers are projected to continue in the future, further pushing the growth in food and beverage deliveries. However, rising oil prices are expected to constrain growth in sugarbeet production over time, while increases in sugarcane plantings would likely be predicated on potential improvements in sugarcane varieties and/or increases in returns relative to crops that compete for the same land.

This growth in use keeps demand strong, and along with growing imports, keeps prices stable in the baseline projections; probabilities are very low that prices would fall to a level that would induce forfeitures by sugar processors under the U.S. sugar program and result in public stocks of sugar. Both raw and refined sugar prices are projected to be higher than in recent years, although not as high as levels in 2009/10 to 2011/12, when both North American and global sugar markets experienced large price volatility. The high prices then were primarily due to weather and policy-related tight supplies in the Brazilian and Indian markets that pushed up global sugar prices, along with relatively tight supplies in the U.S. market due to lower domestic production in both the beet and cane sectors and still-limited production and imports from Mexico. The conditions that led to high prices and volatility during this time are not projected to occur again in the 10-year outlook.

The projected growth in use in both the United States and Mexico and corresponding tight ending stocks throughout the projection period suggest relatively higher prices for sugar and grower prices. These price levels are supported by the relatively tight supply situation, with the projected ending

stocks-to-use ratio totaling 13.5 percent due to the terms of the AD/CVD suspension agreements designed to keep the market balanced at that level.

Domestic Sugar Production Expected To Grow More Slowly Than Demand

Higher prices are incentives for increases in domestic sugar production. However, increases in production are projected at a slower rate than deliveries. The projections show expansion for both the beet and cane sectors of the market, with strong prices and continued productivity improvements in growing and processing sugar-producing crops expected. Total sugar production is projected to increase at an average annual rate of 0.9 percent.

Beet sugar production is projected to remain the largest source of domestic sugar. The sector is projected to increase production, primarily by increasing yields of sugar per acre harvested—with continued advancement in technologies and processes used in the field and factories. Plantings of sugarbeets are projected to decline beginning in 2020/21, however, as production costs are projected to increase in response to rising oil prices. The result is that beet sugar production growth in the projection is constrained, as growers rely more on yield increases, fewer acres, and greater returns.

Sugarbeets are often rotated with other crops such as corn, soybeans, lentils, and wheat. As a result, these acres are likely to remain in crop production, and a reduction in sugarbeet acres would likely mean fewer rotations rather than letting the land convert to pasture land or lie fallow. Similarly, alternative crops that are facing increasing production costs would likely benefit from more rotations in sugarbeet-growing areas due to the high productivity potential of that land.

Cane sugar production is projected to increase at a rate of 1.8 percent per year, primarily due to larger harvested area. Returns for cane sugar are projected to be strong during the period, slightly above the projected price for refined beet sugar—although not to the degree seen during 2015/16 and 2016/17 as the two sectors' supplies and inventories have returned to a more balanced level. While sugarcane yields are not projected to increase substantially, improved industrial yields and higher recovery rates will also contribute to increased production.

While also facing higher projected growing costs, sugarcane growers are not as responsive to the increases as growers in the sugarbeet sector. This is mainly due to the planting cycle for sugarcane in the United States, where sugarcane is typically harvested for three growing cycles before being replanted. As a result, a planting decision in a single year has production implications for at least the next 2 years, which results in lagged effects in cane sugar production from previous years.

The projection results are for increased harvested area over the projection period, but the projections remain below historical highs. Any increased area would most likely be in the two largest sugarcane-producing states of Florida and Louisiana. Louisiana's sugarcane area is constrained by weather and climate, as it is situated in a relatively high latitude for sugarcane production. As a result, increased area is likely predicated upon development and improvement of sugarcane varieties that can grow quickly and tolerate the relatively cool harvest-season conditions. Sugarcane production in Florida currently occurs in South Florida, primarily to the South and East of Lake Okeechobee. Increases in harvested area would likely have to occur to the North and West of the lake and compete with alternative land uses, which include citrus, beef cattle, and vegetable production.

The U.S-Mexico Sugar-Trade Relationship

Mexico, the largest foreign supplier of sugar for the United States, is projected to increase its U.S shipments. According to the terms of the AD/CVD suspension agreements signed in December 2014 and amended in June 2017, the volume of sugar imports from Mexico is bound to a limit determined by "U.S. Needs"—which the agreement defines through a formula using total use and supplies from non-Mexico sources as projected by the USDA in the *WASDE*.[2] Over the long-term outlook, however, Mexico exports are constrained by the growing demand within Mexico as well. Mexico's population growth, along with a steady increase in per capita sweetener consumption over the projection period to levels seen in the mid-2000s, translates to higher domestic deliveries. Consumption of high-fructose corn syrup is also projected to increase, but only modestly and not higher than the per capita peak of 2011/12, shortly after implementation of NAFTA's sweetener provisions. The Mexico sweetener market is expected to remain an important segment of the U.S. HFCS use, but total HFCS production is expected to continue to contract throughout the projection.

Mexico sugar production is projected to increase at an annual rate of 1.2 percent over the projection period. Strong prices in both the United States and domestic markets spur expanded harvested area, and combined with higher sugarcane yields, drive the production growth.

Mexico exports are projected to increase 2.3-percent annually over the projection period, with nearly all exports shipments destined for the United States market. Trade with the United States is governed by the current terms of the antidumping and countervailing duty suspension agreements between the U.S. Department of Commerce and the Government of Mexico signed in December 2014 and amended in June 2017—including the Export Limit, which determines Mexico's market access based on U.S. use and supplies from domestic production and other foreign sources. These terms impose constraints on volumes and prices of sugar that is shipped from Mexico to the United States.

However, with growing sugar use projected for both the United States and Mexico, the Export Limit is not the limiting factor for volumes. Rather, Mexico's projected production increases do not keep pace with the combined growth in deliveries for both the United States and Mexico. The projections assume that Mexico will satisfy domestic markets by maintaining ending stocks equal to no lower than 18 percent of domestic deliveries for human consumption. This allows inventories to carry the domestic market in the beginning of the fiscal year before the domestic harvest season gets fully underway, traditionally around December. As a result, Mexico exports are less than the projected Export Limit due to limited available supplies for export.

The constrained shipments from Mexico mean that the United States will have to rely on other avenues for imports to meet growing U.S. deliveries and maintain adequate ending stocks. Since the combined growth in use for Mexico and the United States means that projected imports from Mexico do not keep pace with the growing "U.S. Needs" expected, the United States would have to utilize mechanisms in other TRQs to keep the U.S. market adequately supplied, in accordance with the language of the Farm Bill. Imports under quota programs—which include WTO import commitments, free-trade agreements, and the specialty sugar import program—are projected to increase at

[2] The formula defines U.S. Needs as the difference between 1.135*Total Use – Beginning Stocks -Domestic Production- Imports from TRQs, FTAs, and high-tier tariffs. The parameters are set in the July, September, December, and March WASDE reports for each respective fiscal year. The suspension agreements also include limits on: the amount of refined sugar are allowed to enter; the times of the year that Mexico sugar can enter the United States; and the price levels with which Mexico sugar can enter the U.S. market.

an annual rate of 5.1 percent in order to keep pace with increasing use. The largest suppliers under these programs include the Dominican Republic, Brazil, the Philippines, and Australia, as well as the volumes from the CAFTA-DR agreement and the FTA with Colombia. The global market for sugar is fairly fragmented, with many domestic policies and tariffs that diversify sugar trade flows. While the United States has limited market access for global exporters due to TRQs and high tariffs, the premium prices that the U.S. market has compared to global markets means that exporters usually get a better return for shipping to the United States than other markets. In recent history, the U.S. market was not a significant driver of global sugar markets. This may change if the relative demand from the United States is large enough, the supply and use balance for the world is tight enough, or there is a combination of the two. Nonetheless, U.S. imports through expanded TRQ program imports are projected to be fulfilled to maintain adequate supplies in the United States.

Final Thoughts

Understanding the forces driving the major crop markets and how the markets are interrelated is important when projecting the long-term outlook of U.S. agriculture. While the projections are a key part of designing U.S. Government budgets and generating expectations for business models and obtaining a sense of the overall health of the farm economy, any such estimates naturally contain a large degree of uncertainty. Events occur—both man-made and natural—that can change any of the previously projected estimates and alter the path on which markets are expected to continue.

This report complements the *USDA Agricultural Projections to 2027* report that was developed in late 2017 and released in February, 2018 by providing a general roadmap of the process by which those long-term projections are generated. In particular, this report helps to take some of the guesswork for the reader as to how the USDA projections are constructed for the 2017/2018 marketing year and forward. By outlining the reasoning behind the main drivers of the major crop markets, including corn, soybeans, wheat, cotton, rice, and sugar, the reader gains a better understanding of the projections generated by USDA.

Armed with this understanding, the reader can adapt the projections to circumstances that were unforeseen at the time the projections were made. For example, China was expected to demand large quantities of U.S. sorghum at the time USDA made the projections. When China launched an antidumping and antisubsidy probe into U.S. sorghum imports in the beginning of 2018, it dried up U.S. opportunities to sell sorghum and, as a result, sorghum production will most likely be reduced from the USDA estimates produced at the end of 2017. Moreover, by examining the interrelationships among the markets, this report can also help the reader better understand where those previously expected acres of sorghum might end up – likely as either wheat or soybean acres. Sorghum is simply one example; ideally, the report can help the reader understand in greater detail how many of the major commodity markets work in relationship to each other.

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