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A Deeper Look Into the USDA Crop Baseline Projections to 2028, With a Focus on Trade

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Abstract

This report complements the *USDA Agricultural Projections to 2028* report released in March 2019 by providing an overview 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 report also focuses on demand for U.S. commodities in the international markets. 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, rice, cotton, sugar, exports.

Acknowledgments

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Introduction

Each year, the U.S. Department of Agriculture (USDA) releases a set of 10-year projections of both the domestic and international supply and use and trade tables for major crops and livestock. While USDA prepares and releases a large amount of data and information, only a rudimentary explanation of the reasoning behind the projections is provided. 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.

This report explains the most recent baseline projections developed for the commodity markets for corn, soybeans, wheat, cotton, rice, and sugar—and touches on some of the minor feed grains major crop markets—reported in *USDA Agricultural Projections to 2028* ,which were produced in 2018, using the October 2018 *WASDE* report as the starting point. All of the 2019 baseline projections are predicated on the assumptions made in October 2018 regarding U.S. and foreign country income growth, the relative strength of the U.S. dollar versus other currencies, normal weather conditions, and continuation of trade and domestic agricultural policies in force at that time. Should the dollar weaken, U.S. exporters will be more competitive internationally. Similarly, if domestic or international income growth is higher or lower than expected in October 2018, demand for crops will be affected.

Numerous other events may also affect the October 2018 projections. For example, the culling of swine herds in China due to multiple outbreaks of African Swine Fever thus far in 2019 is expected to reduce the projected demand for oilseeds (GAIN, 2019a) for livestock feed. Conversely, the detection of the Fall Armyworm in multiple Chinese provinces may lower output and quality of grains, oilseeds, sugarcane, and cotton (GAIN, 2019b). These developments may impact China's 2019/20 import demand and, potentially, world market prices. In addition, the wet spring in the United States may result in lower than expected area of corn, soybeans, and other crops, which affects the price outlook. We also review factors driving U.S. supply and demand, with a special emphasis on international market conditions that are affecting international trade.

The report can be considered a companion piece to the report *USDA Agricultural Projections to 2028* developed in late 2018 and released in March 2019, which explains the main circumstances that, in the fall of 2018, were assumed to drive these markets for the next 10 years. The projections are conditional on assumptions about U.S. and foreign country macroeconomic conditions, including income growth and exchange rates; continuation of agricultural and trade policies in place in October 2018, which for the United States includes the provisions of the 2014 U.S. Farm Bill and the ongoing China-U.S. trade dispute; rising real oil prices at 2.3 percent per year; a strong U.S. dollar; and normal weather throughout the projection period.

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

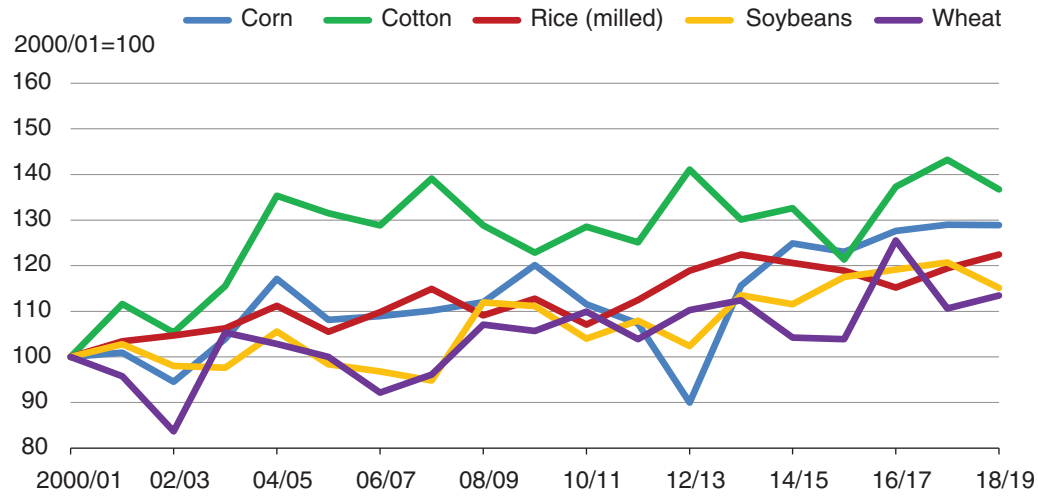
Background

Producers in the United States generated record corn, soybean, and wheat yields in the 2016/17 crop year, with cotton yields reaching a record level in 2017/18 (fig. 1). While yield growth moderated or declined in 2018/19, production of major crops rose as farmers increased area in response to declining petroleum and other energy-related prices. The resulting supply gains, when coupled with weak global economic growth and lower biofuel mandates, placed heavy downward pressure on prices that had remained relatively high in the preceding years (Nigatu, et al., 2019).

While record yields in one part of the world might offset lower production elsewhere, this was not generally the case from 2016/17 through 2018/19 (fig. 2) as corn yields reached record highs in the rest of the world. High worldwide crop production generated supplies in excess of local demand for a variety of crops across the globe. For example, South American corn and soybean production and Ukrainian and Russian wheat production were record-setting, placing further downward pressure on prices and making it more difficult for U.S. producers to export their goods.

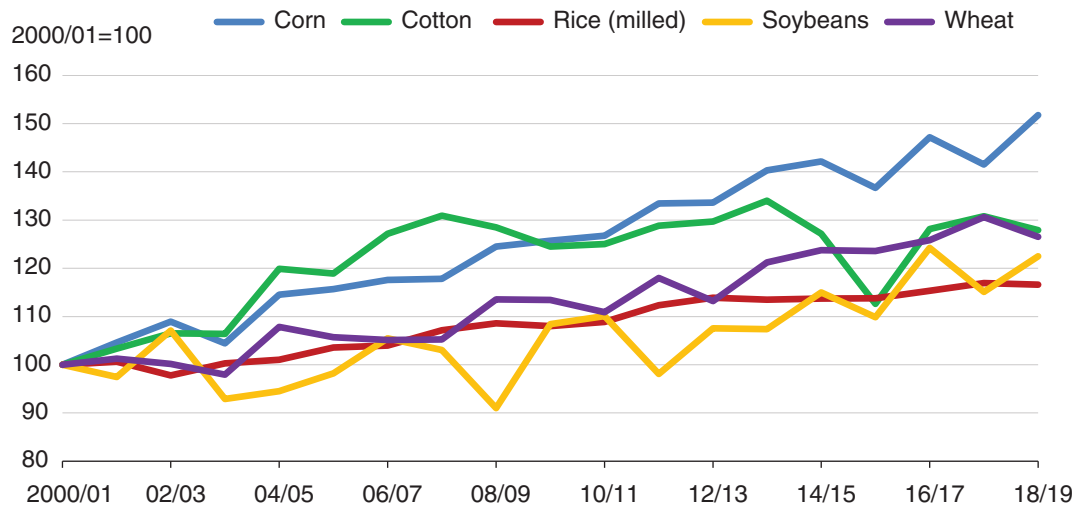
The United States has been a major supplier of many commodities in global markets for decades. Rapidly increasing domestic yields—the product of a continued focus on agricultural research and development (Heisey and Fuglie, 2018), particularly for major crops like corn, soybeans, and wheat—help to generate large supplies, which in turn contribute to the competitiveness of U.S. products in world markets by reducing production costs. Meanwhile, with demand for many food products in the United States relatively invariant to income growth (Okrent and Alston, 2012), domestic population growth is the primary driver of demand. Depending on the commodity, this means that U.S. producers are relying more and more on global outlets to market the crops they produce. As a consequence, international markets play a larger role in how U.S. producers fare.

Figure 1
Indices of selected crop yields in the United States



Source: Index computed using data from USDA, PS&D Online (2019).

Figure 2
Indices of selected crop yields in the rest of the world



Source: Index computed using data from USDA, PS&D Online (2019).

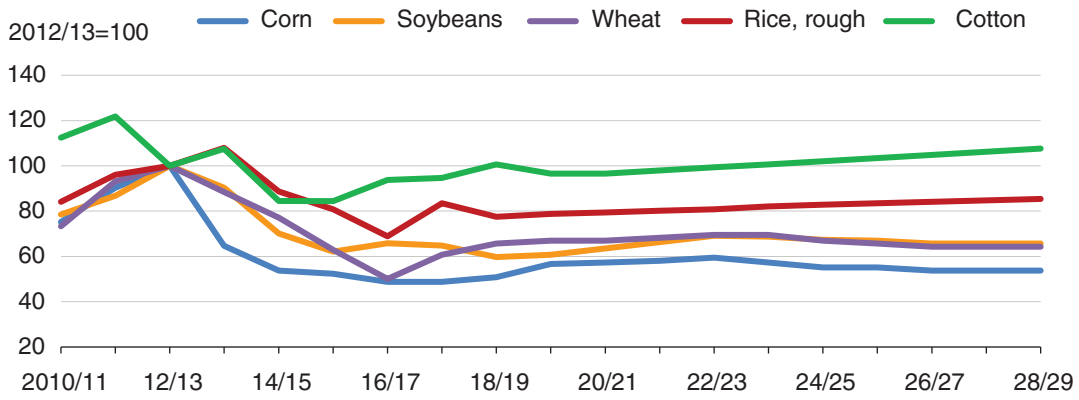
In the 2018/19 marketing year, U.S. producers exported roughly 15 percent of the corn, 37 percent of the soybeans, and 50 percent of the wheat they produced (WASDE, 2019). Similarly, more than three-quarters of U.S. cotton production and 41 percent of rice production were sold outside the United States (WASDE, 2019). However, foreign competition continues to strengthen, and even though export volumes are likely to remain steady or grow, the United States is expected to continue to lose global market share across a variety of commodities. Producers in different regions across the world can leverage their advantages, often in terms of lower land costs, such as in Brazil, or in lower transportation costs and closer proximity to importing markets, as with Black Sea grain exporters.

As a result of excess supplies in both domestic and international markets—coupled with weak international economic growth in developed countries offsetting growth in developing countries and a relatively strong U.S. dollar (Nigatu et al., 2019)—many crop prices in 2014/15 through 2016/17 fell to levels not seen since the 2006/07 crop year. Some markets showed a slight improvement in 2017/18 as feed demand continued to grow, but for a large number of farmers in the United States this price decline meant that the period of high prices they enjoyed just over 5 years ago had ended (fig. 3). Net farm income for U.S. farmers dropped almost in half, from nearly $124 billion in 2013 to just over $69 billion in 2018.

Long-term price prospects are mixed in relation to weaker international demand. World income growth was projected to average 2.8 percent per year, up 0.3 percent annually from the 2009-18 average growth rate but 0.5 percent less than in 1999-2008 (USDA, 2019a). In the United States, farm prices of cotton and rice are expected to consistently rise over the projection period. Soybean and wheat prices are expected to increase initially through 2022/23 and 2023/24, respectively. Thereafter, soybean prices slowly decline to the 2016/17 level, while wheat prices fall to the 2017/18 level and remain there through the projection period. Corn prices follow a similar pattern but are expected to fall back to 2014/15 levels by the end of the projection period.

Figure 3

Prices received or expected to be received by farmers for selected crops, 2000/01-2028/29 marketing years



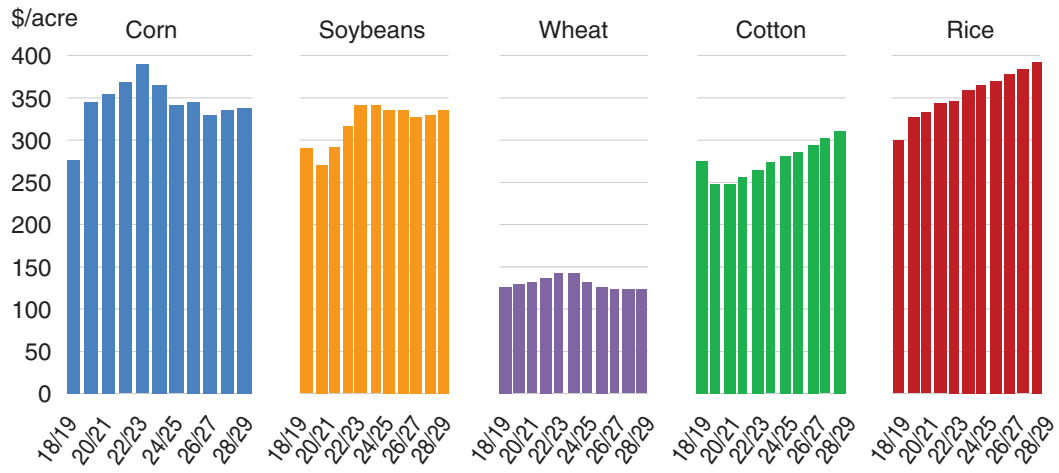
Note: Prices are for each crop's respective marketing year.

Sources: USDA, National Agricultural Statistic Service, Quick Stats (2019); USDA, USDA Agricultural Projections to 2028 (2019).

The drop in soybean and corn prices results in declining expected returns in the mid-2020s, with 1 percent annual growth in the last 2 years of the projection period (fig. 4). An expected dip in cotton prices between 2018/19 and 2021/22 leads to declining returns, followed by 2.3-3.6 percent annual gains in net returns throughout the rest of the projection period. Returns to rice producers increase steadily through 2028/29, with annual gains ranging from 1.4 to 2.4 percent. Net returns to wheat producers are projected to rise through 2023/24 and then decline for 3 years before increasing in 2027/28.

The projected net returns reflect changes in both domestic and international dynamics. One of the largest changes incorporated in the projections is the rise of trade tensions which had a significant impact in the 2018/19 crop year. Beginning in January 2018, the United States imposed a round of tariffs on Chinese solar panels and washing machines. In March, further tariffs were imposed on steel and aluminum, affecting not only China but also close trading partners Canada and Mexico. In April 2018, China retaliated by imposing tariffs on products imported from the U.S., including soybeans, pork, fruit, and nuts, as well as nonagricultural commodities. Further tariffs were imposed by both the United States and China in July, August, and September 2018, escalating the trade tensions between the two countries. With no formal end in sight in October 2018, it was assumed the trade tariffs would remain in place for the duration of the decade for the purposes of generating the USDA projections.

Figure 4
Projected net returns to crop production, 2019/19-2028/29



Source: USDA, USDA Agricultural Projections to 2028 (2019).

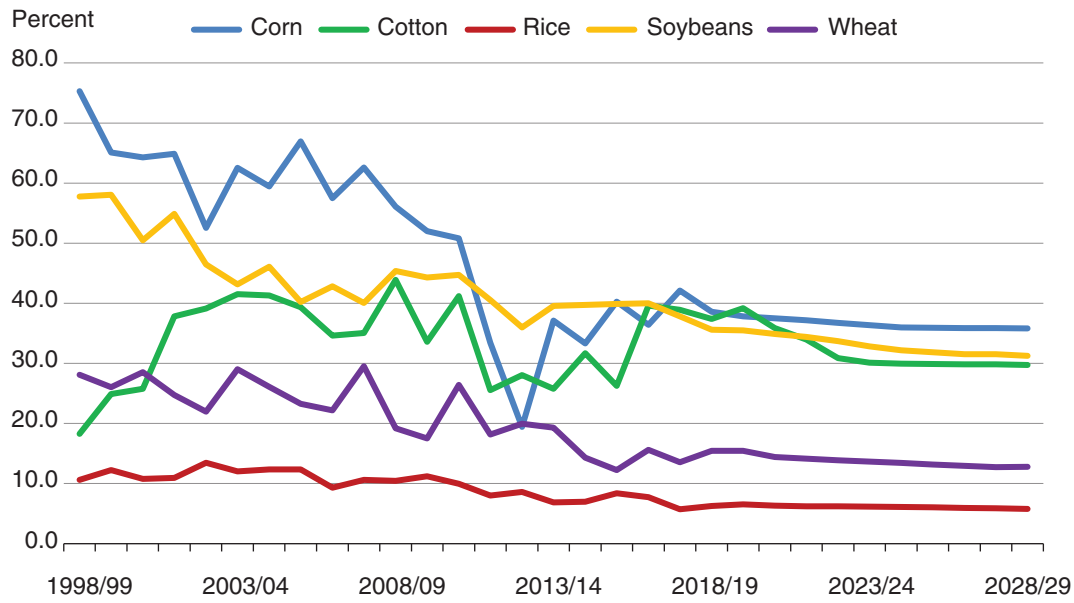
At the time of that assumption, the 25 percent tariff on soybeans—among all the tariffs imposed by China—was expected to have the greatest impact on the USDA crop projections. In effect, this appeared to have closed the China market for U.S. soybean producers, paving the way for Brazil to supply the Chinese demand. Prior to the retaliatory tariffs, the U.S. supplied the bulk of Chinese demand for soybeans, while Brazil supplied much of the rest of the world (Gale et al., 2019). As a result of the tariffs, U.S. producers scrambled to find new markets, providing much of the world beyond China with lower priced soybeans. With the baseline assumption of continued tariffs throughout the coming decade, this change in market structure would have significant implications for U.S. producers, described in more detail in later sections of the report.

Compounding the trade tensions is the continuing erosion of U.S. export market shares for corn, soybeans, and wheat relative to major competitors (fig. 5). Until 2011/12, the United States dominated the international corn market, supplying more than half of all exports. In October 2018, projected exports from the United States were expected to account for 39 percent of world exports in 2018/19, gradually falling to about 36 percent by 2028/29. Soybeans exported from the United States have faced stiff competition from Brazil since the late 1990s. This competition was expected to continue, reducing the share of U.S. soybeans in international trade to about 31 percent by the end of the projection period. U.S. wheat now fulfills 10-15 percent of worldwide demand, down from 20-30 percent prior to 2010. Cotton exports have recovered to pre-2010/11 levels but are expected to moderate, with the U.S. supplying 30 percent of total international import demand by the end of the projection period. The share of U.S. rice in total world exports was expected, in October 2018, to be steady at about 6 percent.

Projected U.S. exports are developed in conjunction with projections for major competitors and importing countries and regions. The factors driving both the domestic and international market outlooks are described in the following sections to provide context for the final U.S. 2019 baseline supply, demand, and trade projections.

Figure 5

Projected U.S. share of world exports for selected commodities



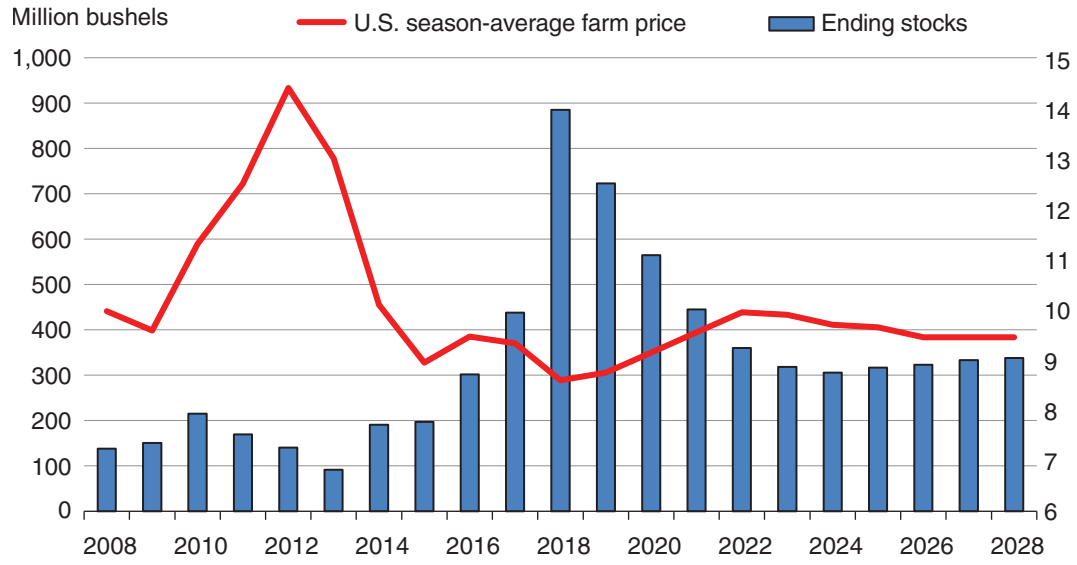
Source: USDA, USDA Agricultural Projections to 2028 (2019).

The Soybean and Products Markets

Slow Reduction Seen for Large Soybean Stocks

Exceptionally favorable weather over the last few years produced above-trend soybean yields. Assuming normal weather conditions in 2019/20, the U.S. average soybean yield was projected in October 2018 to move closer to trend from the 2018/19 record. Following a 25-percent hike in China's import tariff on U.S. soybeans in July 2018, U.S. sales to the world's top import market had come to a near standstill as China turned almost exclusively to Brazil as a supplier. U.S. prices dropped sharply as a consequence. The ensuing combination of a record 2018/19 harvest and reduced exports is swelling U.S. season-ending soybean stocks to an unprecedented level (fig. 6). The Market Facilitation Program (MFP) is assisting eligible soybean farmers hurt by trade disruptions through direct payments of $1.65 per bushel on a producer's 2018 soybean production (USDA, Farm Service Agency, 2018).

Figure 6
Projected soybean prices are subdued by an accumulation of stocks



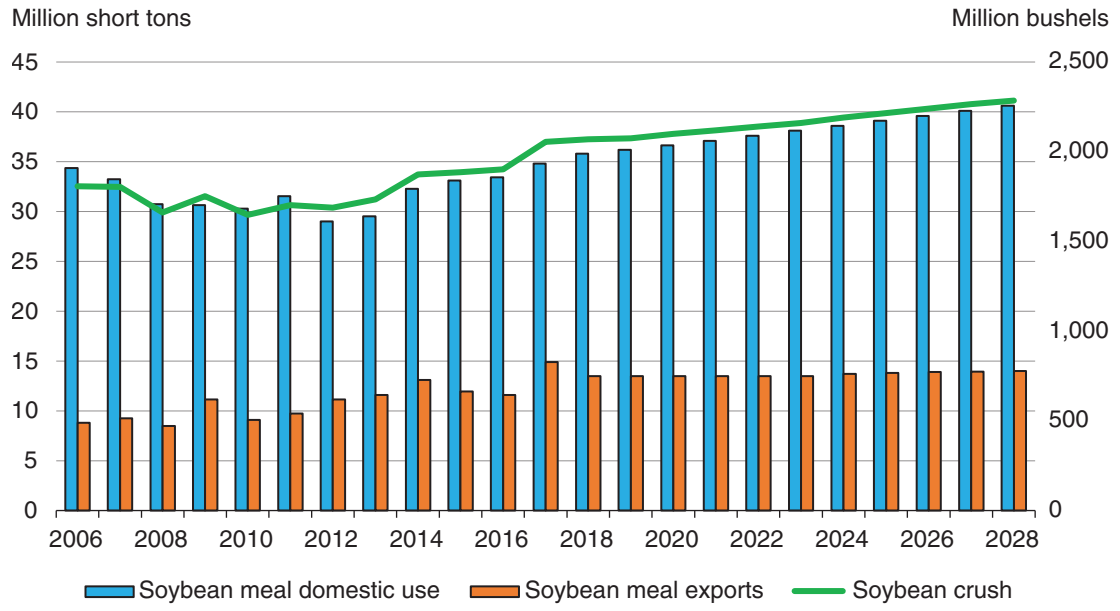
Sources: USDA, Economic Research Service, Oil Crops Yearbook (2019); USDA, USDA Agricutlural Projections to 2028 (2019).

U.S. farmers were expected to reduce the sown acreage of soybeans in 2019/20 to 82.5 million acres from 89.2 million in 2018/19. Soybean area likely will decline throughout the Northern Plains, while spring wheat, corn, and other crop area is expected to rise. Also, in the South, soybeans may lose competiveness with cotton and fewer soybeans may be double-cropped with winter wheat. Even though lower acreage in 2019/20 may reduce U.S. soybean production by as much as 600 million bushels, massive beginning stocks are likely to trim total supplies only modestly. Provided that the lower acreage and yield projections are realized, 2019/20 soybean prices could remain under pressure even under the most optimistic outlook for demand. But with the baseline assumption of continuation of the higher Chinese tariffs, soybean acreage was expected to recover slowly over the next 10 years and only gradually reduce the stock surplus. Coupled with a steady rise in the values of soybean meal and soybean oil, prices for soybeans are expected to eventually strengthen.

Domestic Soybean Use To Increase Steadily, with Slow Growth in Product Demand

Over the 10-year projection period, domestic demand makes up roughly 48 percent of total soybean use. Abundant supplies will support an increase in the soybean crush (fig. 7), although slow growth is anticipated. Domestic soybean producers likely will derive support from moderate gains in the domestic demand and export of soybean meal—the principal byproduct of soybean crushing. Domestic use of soybean meal accounts for 75-80 percent of its total demand. A sharp recovery in corn prices next season was expected due to an estimated 12 percent decline in the stocks-to-use ratio, limiting the potential for expansion in the U.S. pork and poultry industries. These industries will remain the major domestic users of protein feed, constraining demand gains for soybean meal.

Figure 7
Modest gains in U.S. soybean meal use edge up domestic crush



Sources: USDA, Economic Research Service, Oil Crops Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

The robust demand for U.S. soybean meal exports in 2018/19 will be tempered next year by a recovery of production by Argentina—the world's top exporter of soybean products. Argentina will remain a formidable presence in soybean product trade due to its considerable comparative advantage in foreign trade. These advantages stem from the country's high farm productivity, the large capacity of its well-situated crushing industry, and a small domestic usage, all of which lead to a substantial exportable surplus. Nevertheless, that recovery may be moderated somewhat by recently instituted policy changes. In September 2018, Argentina eliminated a long-established tax rate differential between soybean products and soybeans that will permanently narrow processor margins. The Argentine share of global soybean meal exports is projected to remain steady around 45.5 percent. In contrast, a receding market share for U.S. soybean meal exports will continue through 2028/29 as slow production gains were expected to be mostly absorbed within the domestic market.

Soybean oil is less influential in the decision to crush rather than to produce soybean meal due to oil's low share of the output. Oil typically contributes only about one-third of the total value from soybean crushing. Nevertheless, an expected 2-percent price increase for soybean oil next year would boost its contribution to the total processing value of soybeans. That price strength for soybean oil stems primarily from the domestic market, where consumption growth was expected to increase modestly in 2019/20. The edible, feed, and other industrial uses of soybean oil may edge up as minimal supply gains are seen for alternative U.S. vegetable oils.

Over the last decade, U.S. soybean oil consumption has expanded more rapidly as its use for biodiesel production surged with passage of the Renewable Fuels Act and a Federal excise tax blending credit. Biodiesel now accounts for up to 35 percent of the total use of soybean oil. Annual volume obligations drive the demand for oil used for biodiesel production and, under the law, EPA has authority to set these obligations. For 2020, EPA proposed a minimum consumption for biodiesel and renewable diesel at 2.43 billion gallons—up from 2.1 billion for 2019 (EPA, 2019). This volume requirement is assumed to remain at the proposed-rule level though 2028/29 (USDA, 2019). USDA projects the rate of soybean oil use for 2019/20 at 8.1 billion pounds—satisfying almost half of the biodiesel obligation set by EPA. In addition, some biodiesel production is expected to meet a portion of the nonspecific advanced biofuel requirement. By 2023/24, use of soybean oil for biodiesel is projected to increase to 8.3 billion pounds and then stabilize at that level.

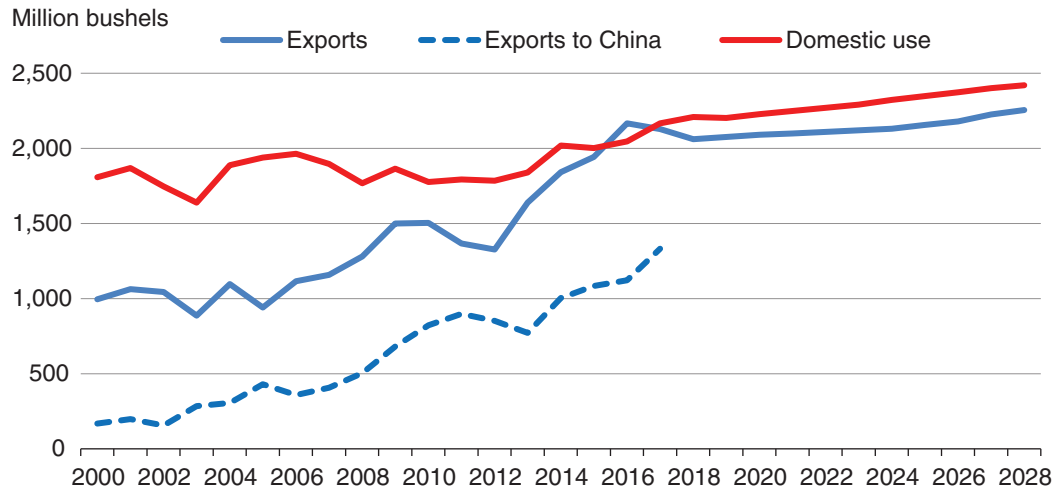
Despite EPA's minimum renewable volume obligations for biodiesel, consumption incentives have fluctuated since the blending credit expired at the end of December 2016. Some market support for increased biofuel production could arise from the baseline's assumed gradual increase in the price of crude oil. This would encourage more biodiesel blending by narrowing its price premium with diesel fuel. In 2018, only 52 percent of the total feedstock used to produce biodiesel came from soybean oil, so other biodiesel feedstocks may benefit from rising production, as well. The remaining feedstock is from other vegetable oils, animal fats, and recycled grease. In addition, minimum blending requirements for biodiesel are not fulfilled solely by domestic production as imports can also contribute. On October 31, 2017, countervailing duties were placed on unliquidated entries of biodiesel and new biodiesel imports from Argentina and Indonesia following a ruling that they were unfairly subsidized (Federal Register, 2017). As a consequence, U.S. biodiesel imports from these countries fell sharply throughout 2018, while domestic production picked up. In 2016, U.S. biodiesel imports swelled to just under 700 million gallons (26 percent of the total supply), but by 2018 they had fallen to fewer than 150 million gallons. These countervailing duties will remain in place for a minimum of 5 years (but are assumed to continue throughout the projection period). Over the next decade, they are projected to further support domestic demand of soybean oil.

For soybean oil, season-ending stocks for 2019/20 were projected to remain comparatively tight. Increased crush and a trend-level oil extraction rate suggested a modest 0.3 percent increase for production in 2019/20 and just over 1 percent growth thereafter. Although season-ending inventories were expected to climb 7 percent by 2028/29, the stocks-to-use ratio would stay roughly the same for the 10-year projection period. The projected rise in U.S. soybean oil prices through 2028/29 will be tempered by ample global supplies of vegetable oil, particularly palm oil.

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

While the domestic use of soybeans is expected to increase over time, exports will overshadow the contribution to the growth in total demand (fig. 8). Historically, U.S. soybean demand had a predominantly domestic orientation, despite the U.S. formerly being the world's largest exporter of the crop. Over the last two decades, however, the market landscape faced by U.S. producers was permanently reshaped by the extraordinary gains in China's soybean demand. By 2016/17, as much as 61 percent of all U.S. soybean exports were sold to China. Indeed, for the last 3 years, nearly as many U.S. soybeans were shipped into the export market as were used domestically.

Figure 8
Exports have nearly overtaken domestic use as the main source of U.S. soybean demand



Sources:USDA, Economic Research Service, Oil Crops Yearbook (2019); Census Bureau, USA Trade Online (2019); USDA, USDA Agricultural Projections to 2028 (2019).

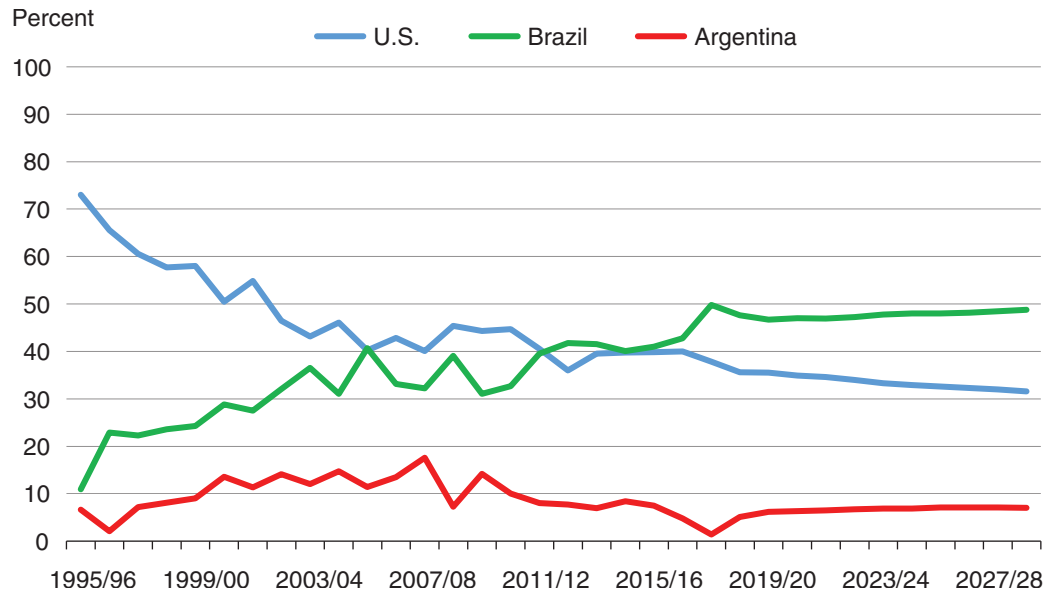
However, the recent tariff increase by China represents a new impediment to U.S. export growth. Until those barriers to exports to China are lifted or reduced, U.S. soybean trade will be more focused on the rest of the world. With a near-record supply, competitive prices, and continued strong foreign demand, U.S. soybean exports in 2019/20 were expected to rebound slightly. For some importing countries, U.S. shipments already have many natural advantages in terms of shipping costs, delivery times, and credit availability. But it will not be easy to compensate for the dominant position that China holds in the global market. Even then, staying competitive in other markets will be a challenge. Relative to foreign currencies, the U.S. dollar was expected to appreciate to its strongest level in many years. That makes U.S. soybeans more expensive in import markets, generating positive support to production incentives among South American soybean producers as their crops are worth more in their own currencies. Also, severe crop losses in Argentina in 2017/18 were exceptional and, assuming normal weather, not expected to be repeated. Losses for this major competitor generated a windfall for U.S. exports, even including a rare tranche of shipments to Argentina.

In October 2018, global soybean stocks in 2018/19 were expected to grow to an all-time high following a worldwide record harvest. By the end of 2019/20, global soybean inventories were expected to tighten only modestly if, as anticipated, demand growth slightly exceeds production gains. Foreign demand for soybeans continues to be led by China. The country currently accounts

for more than 60 percent of global imports, and USDA projects that its share by 2028/29 will expand to 64 percent. Since China imposed higher tariffs on U.S. soybeans last year, its narrower diversity of supply sources has spurred more conservative use of the commodity. The higher costs of soybean meal are encouraging China's feed compounders to substitute as many other proteins as possible and to moderate the overall protein level of feed rations. Since tariffs on U.S. imports were assumed to remain in place over the next 10 years, China's demand for soybeans was expected to be much slower than it has been previously. Elsewhere, low projected soybean prices will also encourage noteworthy increases in soybean demand, including the European Union, Turkey, Russia, Vietnam, Indonesia, and South Korea. But through 2028/29, the importing countries other than China are projected to account for only 23 percent of the gains in global soybean imports. Even with the prospective gains in foreign demand, U.S. soybean stocks were expected to decline only marginally in 2019/20 and could take up to 4 years to return to a long-term equilibrium level.

Maintaining the U.S. share of the global export market next year is far from assured, as foreign competition will remain formidable (fig. 9). The U.S. share of global soybean trade was expected to stay level given the assumption of normal weather conditions in each country. South American exportable supplies are also at record highs, and stiff export competition will persist. Each year, soybean supplies in Brazil are establishing new heights with a steady expansion of area and improving yields. For the past 7 years, Brazil has been the world's top soybean-exporting country. Recent expansion of port capacity in Brazil is also lowering the freight cost and delivery time of export shipments. The extension of paving on a major north-bound highway originating in the Center West growing region is also nearing completion, which will soon expedite deliveries abroad from the country's northern ports. Railway extensions are planned to further reduce the country's dependence on shipping soybeans by truck (Salin, 2019).

Figure 9
Decline in U.S. share of global soybean exports may slow with domestic production gains



Source: USDA, Economic Research Service, Oilseeds Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Likewise, soybean exports from Argentina—the third-largest exporting country—are shaping up to be more competitive again. In 2018, an economic crisis in Argentina caused a sharp depreciation of the peso relative to the U.S. dollar. Also, as of September 2018, the Argentine Government suddenly reduced its export tax rates to 18 percent for soybeans (previously 25.5 percent) and for soybean meal and soybean oil (previously 23 percent). However, the Government needed to boost federal revenue to obtain lending from the International Monetary Fund (GAIN, 2018a). The Macri Administration responded with reintroduction of a general surtax (also known as a retention) on grain and oilseed crops that it had abolished in 2015. All primary product exports (which include soybeans and soybean products) would be assessed a retention fixed at 4 pesos per dollar of revenue. This is equivalent to raising the effective export tax by 10.5 percent, as commodities exported at an exchange rate of 38 pesos per dollar would only yield 34 pesos to the seller after the tax is assessed. A depreciating currency (more pesos per dollar) lowers the effective tax rate. At a minimum, the retentions are staying in place through December 2020, although the USDA baseline projections assume that they continue through 2028/29.

Soy Meal Export Prospects Are Also Limited

Opportunities to expand global trade in soybean products are more limited than for soybeans alone. Many countries have adopted tariff structures that are more favorable to soybeans than soybean products, which has incentivized excess capacity to crush soybeans. For example, China is the world's largest consumer of soybean meal, producing nearly all of it domestically and importing virtually none. As a result, for 2019/20 and beyond, only modest growth in world soybean meal trade is projected, supported by higher demand in the EU and Southeast Asian countries. These latter regions have a higher demand for soybean meal imports due to more pronounced needs for protein over soybean oil. The gains in global soybean meal demand in 2019/20 will accrue to Argentine suppliers, with little benefit for U.S. exporters.

Excluding China, Argentine meal exports are highly competitive nearly everywhere else, particularly in markets where there is less keen demand for soybean oil. Brazilian soybean meal exports were expected, in October 2018, to expand in 2019/20 as well. In contrast, for India—the world's fourth leading exporter of soybean meal—trade will remain unchanged due to strong production growth in the country's poultry industry.

U.S. soybean meal prices are projected higher over the projection period, but the increases will be slight enough to let U.S. soybean meal exports maintain their competitiveness. Shipments of U.S. meal abroad were projected to stay nearly level in 2019/20. They primarily go to import markets in Latin America (accounting for about half of U.S shipments) and Philippines (15-20 percent). Despite the volume gains for soybean meal, the U.S. share of global exports was projected to decline from 18 percent in 2019/20 to 16 percent by 2028/29.

Growing Palm Oil Surplus May Limit Export Demand for Soybean Oil

Limited supplies of soybean oil and higher prices will moderate a gain in U.S. exports. The United States tends to be a residual supplier of soybean oil exports and is most competitive in Latin America, where it has a pronounced regional transportation advantage. A significant amount of U.S. soybean oil is also shipped under government aid programs, where comparative prices between

suppliers matter less to the recipient country. Argentina is the dominant player in global soybean oil exports, and its status will strengthen with a dimmer outlook for its biodiesel exports. Conversely, soybean oil shipments by Brazil—the world's second-largest oil exporter—will be rationed by a hike in its domestic biodiesel blending rate. Beginning in March 2018, Brazil's mandatory blending rate for biodiesel was increased from 8 to 10 percent.

However, the major obstacle for growth in global soybean oil trade is 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 trend in yield. In 2016, palm oil output in Indonesia and Malaysia fell sharply as an extended drought curtailed yields. Since then, production has recovered with a subsequent resumption of rainfall. Tree productivity is also higher now. 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. As they age and grow taller, oil palm trees become less productive and more difficult to harvest. When old trees are replanted, it then 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 more recently planted trees.

Ample global supplies of vegetable oil substitutes could constrain demand for soybean oil by the top importers, India and China. Together, both countries were projected in October 2018 to make up 56 percent of the gains in global soybean oil imports by 2028/29. The price discount of palm oil relative to soybean oil is currently widening. Low-income consumers in both these markets are most attracted to the least expensive edible oils. Although India has raised import tariffs on all vegetable oils, both Malaysia and Indonesia have countered with reductions of the export taxes on palm oil, which is assumed to continue throughout the projection period. The European Union is another major import market for vegetable oils. While EU vegetable oil consumption for edible uses is stable, demand will be curbed by a pullback in support for biofuels. The EU has capped the use of food-based oil for blending in biofuels at 7 percent for 2021-2030 under a high-risk Indirect Land Use Change (ILUC) provision (GAIN, 2019c). The ILUC provision applies to palm oil, with sustainability requirements such as being produced on unused or abandoned land or cultivation by small holders. This could subtract about 3.5 million tons from EU palm oil demand, leaving even more supplies to compete worldwide with soybean oil and the other vegetable oils. Heightened competition for the remaining markets could further squeeze the demand for U.S. soybean oil exports.

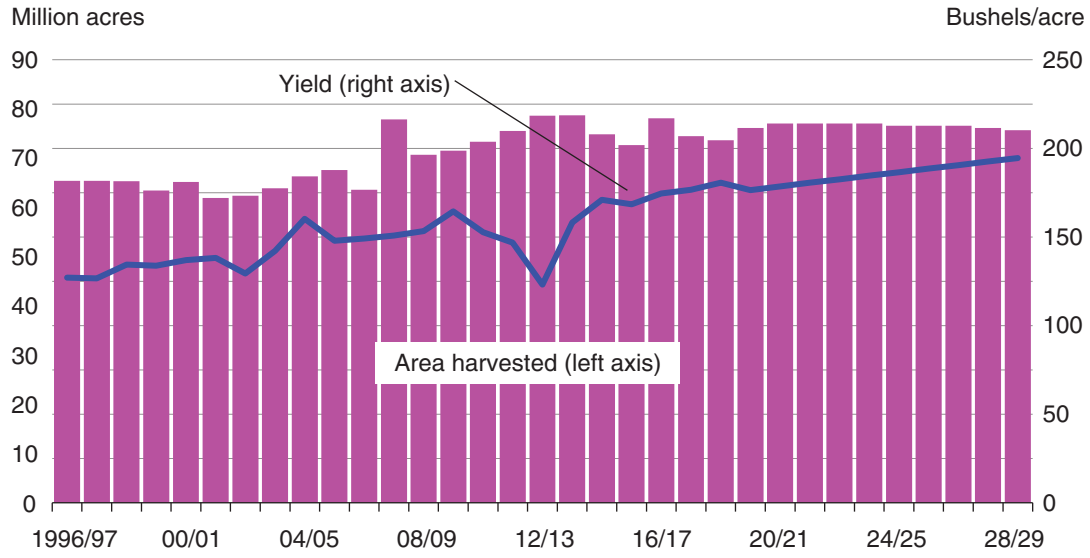
The Corn Market

Corn accounts for more acres planted than any other crop produced in the United States. It has a wide variety of uses ranging from livestock feed to ethanol and sweetener production and is a major export product. The 10-year USDA baseline projections provide a long-range view of the domestic and international corn markets and are the basis for the more detailed analysis provided below.

Projections are impacted by Demand for Competing Crops and Export Competition

Generally, corn is the highest acreage crop in the United States, although 2018/19 was an exception, with soybeans leading by 6.5 million acres. In October 2018, corn returns were expected to average $30 per acre higher than soybeans for the first 8 years of the baseline. As a consequence, corn harvested acreage exceeds soybeans by an average of 2.3 million acres, with soybeans regaining the top spot in the last 2 years of the projection period (fig. 10).

Figure 10
U.S. corn harvested area and yield, historical and projected



Sources: USDA, National Agricultural Statistics Service, Quick Stats (2019); USDA, USDA Agricutlural Projections to 2028 (2019).

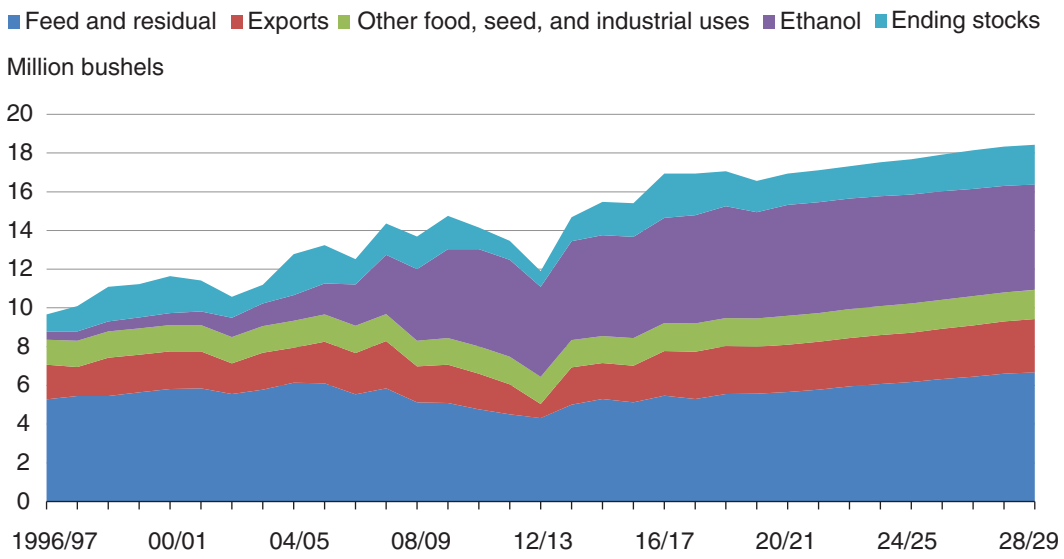
Supply Edges Up During Baseline Period

The increase in projected corn acres is coupled with robust corn yields, which were projected at 176.5 bushels per acre in 2019 and to rise by an annual average of 1.0 percent over the baseline period. By the end of the projection period, yields were expected to reach 194.5 bushels per acre. Production during the baseline period trends upward as higher yields offset lower acreage for a gain of 9.5 percent over the baseline period to 16.4 billion bushels. Likewise, beginning stocks were expected to increase 11.6 percent from 2019/20 levels while imports, consisting primarily of organic and seed corn, were projected at a steady 50 million bushels per year. The result is an increase in corn supplies from 16.8 billion bushels to 18.4 billion in 2028/29, an average increase of 1.0 percent per year.

Demand for Corn Increases Steadily Throughout the Baseline Period

At the beginning of the baseline period, about 38 percent of corn use went to ethanol production and about 37 percent was consumed as livestock feed and for residual uses, while 16 percent was exported. In October 2018, total corn use was expected to increase 0.8 percent each year to end at 16.4 billion bushels in 2028/29, compared with 15.2 billion projected for 2018/19 in October 2018 (fig. 11). The largest growth is in feed and residual use, rising 20 percent from 2018/19 to reach 6.7 billion bushels in 2028/29. Feed and residual use tends to increase as the balance sheet gets larger due to increased statistical error, and it is also supported by 3.8 percent annual growth in per capita meat consumption during the baseline period, led by pork, beef, and poultry.

Figure 11
U.S. corn utilization, historical and projected



Sources: USDA, Economic Research Service, Feed Grains Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Food, Seed, and Industrial Use Slowed by Stagnant Fuel Demand

Food, seed, and industrial use (FSI) was expected to decline 0.4 percent annually over the course of the projection period, mostly due to a decrease in its largest component, fuel ethanol. Ethanol peaks during the early forecast years, then declines during the last 8 years of the projection period. Ethanol use is a function of gasoline consumption, which declines mostly due to increased vehicle fuel efficiency, augmented by lower miles driven during some years along with a larger fleet of electric vehicles, according to projections from the Energy Information Administration (Annual Energy Outlook, 2018). The ethanol component of gasoline is assumed to remain relatively steady at about 10 percent as alternative blends such as E-15 and E-85 are expected to contribute little to overall ethanol use.

Prospects for other FSI categories in October 2018 were mixed. Over the long-term, domestic production of high fructose corn syrup (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 decrease slowly. Soft drink consumption in the United States is projected to continue a downward trend and veer away from HFCS to sugar. Starch, used in building materials and paper products, is expected to remain steady over the projection period. Glucose and dextrose, however, is expected to increase gradually as industrial uses, such as enzyme production, continue to expand. However, the increase in glucose and dextrose is moderated compared with last year's baseline. U.S. corn exports were projected to rise 13.4 percent between 2019/20 and 2028/29.

U.S. ending stocks of corn were projected to decline by 210 million bushels in 2019/20, but then to increase gradually over the course of the baseline, ending a few million bushels higher at 2,045 million by 2028/29. The drop in the stocks-to-use ratio from 12.0 to 10.6 in 2019/18 is a 1- year phenomenon, but the ratio remains under 11.0 through 2022/23, supporting an increase in the season average price from the October 2018 expected price of $3.50 per bushel to $4.10 per bushel. Thereafter, the stocks-to-use ratio rises gradually to 12.5 in 2028/29. However, with global supplies continuing high throughout the remainder of the baseline period due to typical weather, corn prices fall off to $3.70 per bushel in 2026/27 and thereafter.

United States Is Losing Market Share in Global Corn Trade

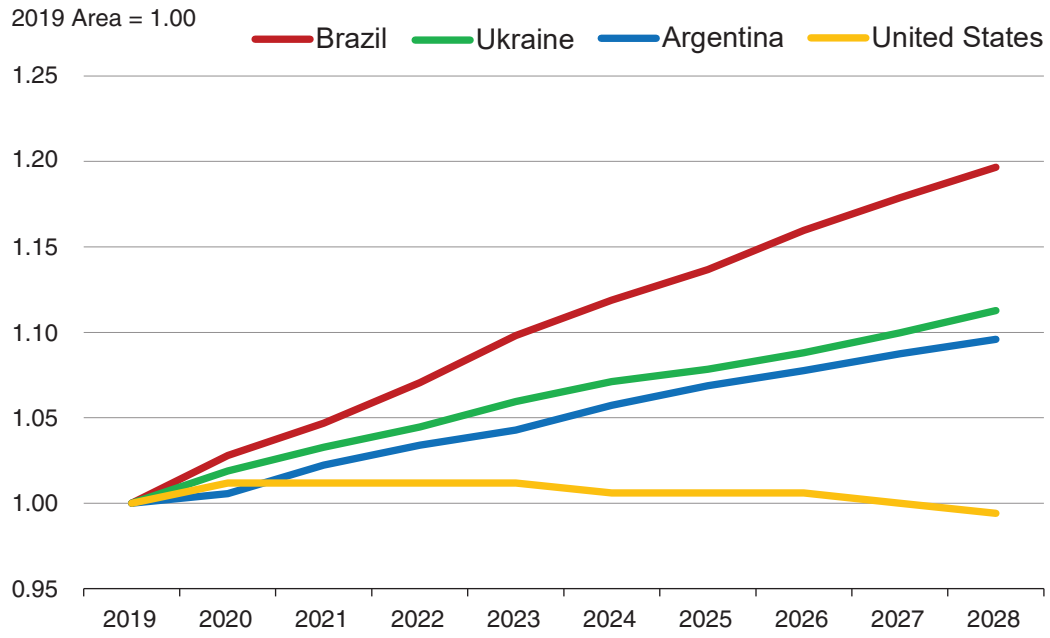
The United States maintained its status as the world's grain superpower for most of the post-World War II period by being the dominant corn (and wheat) producer and exporter. Before the beginning of this century, the United States accounted for around 70 percent of world corn exports (and about a third of globally traded wheat), and was an undeniable pricemaker for both commodities. The emergence of new low-cost producers and exporters in the global corn and wheat markets have reduced the U.S. share of grain exports and transformed global grain trade. Competition from Brazil, Argentina, and Ukraine are driving down the U.S. corn export share. Higher surplus-generating grain production in these countries has reduced the U.S. share in global output.

Robust Corn Production Growth in the Major Competitors

Global corn exports are dominated by four countries that produce about half of the world's corn (the United States alone produces about 38 percent of global corn), and their combined exports are projected to reach almost 90 percent of global corn trade. Although the United States continues to be by far the world's top corn producer and exporter, its shares in both world output and exports are expected to decline over the next decade. During the same period, the combined corn output and exports of the three main U.S corn competitors—Brazil, Argentina, and Ukraine—are expected to grow, so that by the end of the projection period they will produce 17 percent of world output and export more than half of all corn traded worldwide.

The United States is the only large corn producer whose area is not projected to increase over the next decade (fig. 12). The combined corn area in Brazil, Argentina, and Ukraine is projected to approach the size of U.S. area by the end of the period.

Figure 12
Index of major producers' projected corn area growth



Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database (2019); USDA, USDA Agricultural Projections to 2028 (2019).

The most dynamic and fastest growing corn producing region in the world is South America, mainly Brazil and Argentina. Corn is the region's dominant grain, and both countries are expected to boost corn area further. Paraguay, a smaller producer exporting corn to the feed-deficit south of Brazil, is also expected to increase its corn area.

Among the three major U.S. competitors, Brazil is expected to expand corn area and output the fastest. Since 2010, Brazil has been steadily increasing corn area for its low-cost, second-crop (safrinha) in the Central-West of the country, while simultaneously reducing its first-crop corn area. The producers (especially large farms) are investing in improving productivity and limiting weather-related risk. The first-crop corn area in Brazil, which is less than one-fourth of total planted area, keeps declining. However, this decrease only partially offsets the expansion of second-crop corn, as there are few limitations on area expansion given the large pool of land available for double cropping with soybeans in the Center-West. Brazil is expected to continue to expand area of its low-cost second-crop corn and by the end of projection period to reach about 60 percent of U.S. corn area.

In Argentina, the 2015 reforms eliminating taxes and quotas for corn exports boosted farmers' incentives to expand area. The reforms increased tax revenue and also reversed trade protection policies that had burdened farmers for the past 15 years, enhancing producer incentives to expand corn (and wheat) planting. Since 2015, Argentina has increased corn area by more than 50 percent and is expected to continue the expansion over the next decade, although at a much lower pace. Argentina is one of the world's lowest cost producers of grain (as well as of oilseeds and beef).

Although corn yields have been steadily growing in both Brazil and Argentina, the two countries are prone to adverse weather conditions and markedly variable yields. Based on trend, corn yields for both countries are expected to grow by about 10 percent over the projection period.

Ukraine is the third largest U.S. competitor in corn exports, although in the past it produced and exported trivial amounts of corn. After the early 1990s, former state and collective farms inherited from the Soviet period were forced to reorganize. They had to become self-financing, but at the same time obtained new decision-making freedom previously denied them. This motivated farmers to shift area to more profitable crops, mainly corn and sunflowerseed, at the expense of rye, barley, oats, and pasture. Although the total crop area in Ukraine fell from the late Soviet period to the early 2000s, most of the decline came in crops other than grain and oilseeds.

Since 2005, Ukraine's corn and oilseed area has more than doubled. The country became more integrated into the world agricultural economy, with trade and technology transfer all expanding following investments by Bunge, Cargill, the International Finance Corporation, and several other companies and development banks (InVenture.com, 2016). These developments have helped to drive the expansion of corn area and raised yields. Although area expansion has been a factor behind the increase in Ukraine's corn production and exports, the main driver of the significant growth in Ukrainian corn output since 2012 has been rising yields. Producers are taking advantage of new technologies (improved hybrid seeds, fertilizer, and machinery) and of Ukraine's one-quarter share of the world's very fertile chernozem or "black earth" soil (Bunge.com, 2016).[1] A contributing development has been the rise of large vertically-integrated agro-holdings, which typically combine primary agriculture, processing, and distribution. Many argue that the agroholdings have brought investment, superior technology, and better management practices into the agro-food sector.

Although Ukraine's corn area has plateaued, the yield trend is expected to be strong, growing more than 11 percent over the next decade. The country has large yield potential, being still 20 to 30 percent below the larger corn-producing European countries that also grow non-GMO corn. The country is also a very low-cost producer of corn due to undervalued land (in the absence of land markets) and labor (Ukrainian GDP per capita and standards of living are low relative to the rest of the developed world). Similar changes occurred in Russia, which used to import sizeable amounts of corn in Soviet times but has become a corn exporter with the expansion of area and yields.

South Africa is a minor corn exporter of about 2.0 million tons annually, with stable corn area and production of mainly white corn. Other major global corn producers include China, the European Union (EU), and India. India is self-sufficient in corn, while the EU is one of the largest corn importers and Chinese corn imports, although subject to quantity restrictions and other border measures, are an important element in world corn trade.

Growing Global Demand for Corn Increasingly Captured by U.S. Competitors

World demand for corn has been growing at a steady robust pace, mainly in line with per capita GDP growth, which is correlated with higher incomes and meat consumption. Expanding meat production is the main driver of higher corn imports in most corn-importing countries. While the overall expansions in global corn feed use and corn imports are expected to grow by about 20 percent over the next decade, the dynamics vary across corn-importing countries.

[1]Chernozems (from the Russian words for "black earth") are humus-rich grassland soils used extensively for growing cereals or for raising livestock. They are found in the middle latitudes of both hemispheres, in zones commonly termed prairie in North America, pampa in Argentina, and steppe in Asia or in eastern Europe. Chernozems account for 1.8 percent of the total continental land area on Earth (Britannica.com, 2019).

By the end of the projection period, Mexico is expected to become the top world corn importer, driven by more than 30-percent growth in its feed use. The United States is the major supplier of Mexican corn, and almost all the increase in projected U.S. corn exports is to come from the augmented shipments to Mexico. See the special box on corn developments in Mexico.

Mexico's Corn Sector

Corn is the largest crop in terms of production and consumption in both the United States and Mexico. In Mexico, corn accounts for a large share of the population's caloric intake and is used to make tortillas and other corn-based foods. For this reason, a larger share of use in Mexico is for food than in the United States. White corn is generally preferred for food use. Mexican corn production in the form of grain reached 27.4 million metric tons (MMT) in 2017/18. Of this quantity, about 87 percent was white corn, and the remainder was yellow. In the same year, U.S. corn exports to Mexico totaled 15.7 MMT, of which 7 percent was white corn. Corn farms in Mexico are diverse, ranging from large-scale, irrigated, commercial operations to households growing local varieties on subsistence rain-fed plots. In the United States, corn farms are larger. According to the 2017 Census of Agriculture, 82 percent of U.S. corn production took place on farms larger than 250 acres (about 101 hectares) (USDA, NASS, 2019).

Imports accounted for one-third of Mexico's total 2017/18 corn supply, and 97 percent of these imports came from the United States, with most of the remainder coming from Brazil. Corn is shipped from the United States by rail, primarily through Laredo, Texas, and also shipped by sea from various Gulf ports (Zahniser, et al., 2019). About 60 percent of U.S. corn shipments to Mexico are overland. Like many other developing countries, animal protein consumption is increasing; greater consumption of pork, and especially poultry meat, is expected. Imported corn plays a large role in the expanding and increasingly concentrated livestock industry. Total imports of corn by Mexico are projected to increase 40 percent between 2018/19 and 2028/29, reaching 23 MMT.

The European Union (EU) is projected to become the second-largest importer of corn over the 10-year projection period. However, its livestock herds and industrial use of corn are expected to grow more slowly than the world average. Its imports, although high, are expected to remain flat, while a modest increase in corn consumption is to be covered by production growth. Recently, the EU has been getting its corn primarily from Ukraine's pool of non-GMO corn, and this lucrative corn import market is a boost to Ukrainian exports.

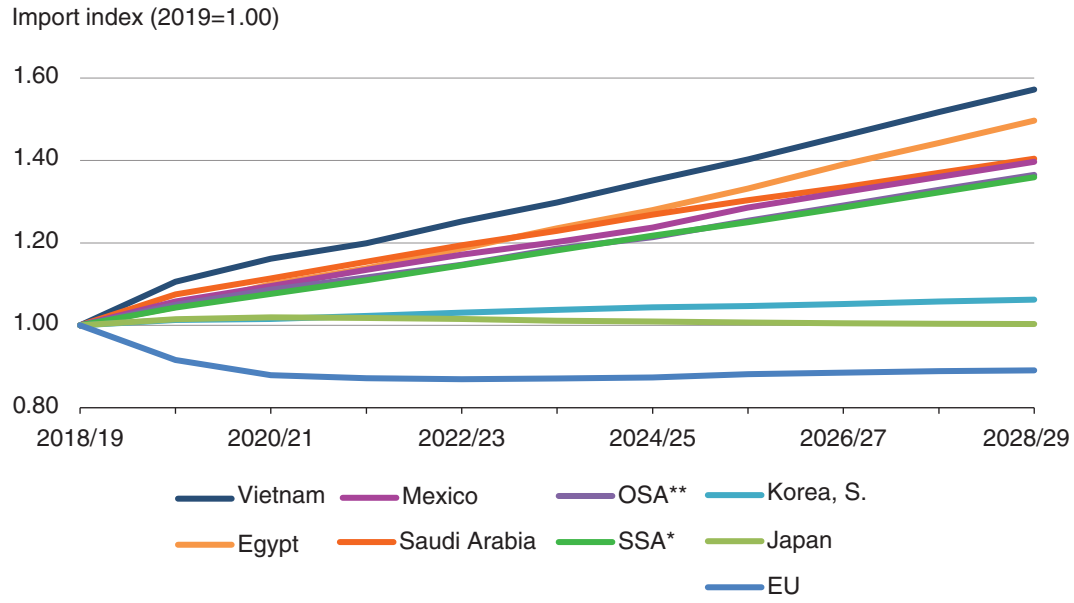
Among Southeast Asian countries, an anticipated increase in pork consumption supported by growing incomes drives swine numbers in Vietnam higher, with a projected growth in corn feed use of 45 percent and a corresponding increase in imports. Import demand in other countries of this region is not expected to grow nearly as rapidly; although their corn imports are expected to grow, the increase will be more modest. The expanding Vietnamese corn market is increasingly relying on Brazil and Argentina for its corn supplies.

The countries of North Africa and the Middle East are expected to continue to expand their use of corn, mainly for feed, although in Egypt a nontrivial amount of corn is used for food (fig. 13). Rising demand in the regions for an inexpensive source of protein is driving both increased domestic poultry production and imports. The strong growth of poultry production in Egypt, Iran, and Saudi Arabia, the largest corn importers in these regions, is a response to this rising

demand and generates increased imports of corn for feed use. Egypt is one of the world's top and fastest growing corn importers, with expected import growth of 43 percent over the next decade. Although the United States at one time provided the bulk of Egypt's corn imports, it is currently a small supplier. A similar story has occurred with Algeria, which around 2005 gradually began to switch from U.S. to Argentinian corn. The United States has a very small share of Saudi Arabia's corn imports, another fast growing corn market with expected import growth of 31 percent over the projection period. The United States does not export to Iran, whose imports are expected to increase by 24 percent over next decade. All of these countries source most of their corn from Brazil, Argentina, and Ukraine, though Iran also imports from Russia.

South and Central American corn-importing countries, such as Colombia, Chile, and Guatemala, are expected to increase corn feed use (for beef, pork, and poultry) and imports by almost 30 percent over the next decade. Argentina and Brazil have preferential trade terms with other MERCOSUR countries, including Colombia and Chile, so they are preferred trading partners.

Figure 13
Index of corn import projections, major importing countries/regions



Note: *Sub-Saharan Africa. ** South America minus Argentina, Brazil, and Peru.

Source: USDA, USDA Agricultural Projections to 2028 (2019).

China, also formerly a prime foreign market for U.S. corn, has a price structure for feed grains—particularly in the feed-deficit south—which creates a strong incentive for feed mills to use imported feeds despite existing huge corn stocks. China is expected to boost its corn imports close to the tariff rate quota (TRQ) of 7 million tons, sourcing it mainly from Ukraine.

Healthy growth in corn use is expected in Sub-Saharan Africa, where corn is used for both food and feed, with corn imports expected to increase by about 25 percent over the next decade. South Africa, Brazil, and Argentina are the major exporters to the Sub-Saharan countries.

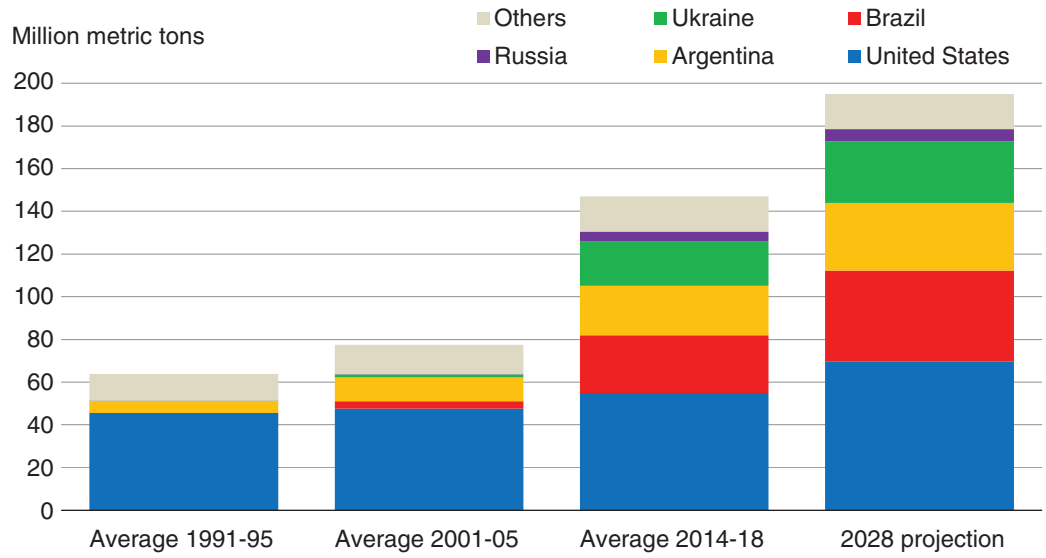
In addition to the dynamic Mexican market, several large corn-importing countries are still getting most of their corn from the United States. The most prominent among them are Japan, South Korea, and Taiwan, whose markets are large and stable. However, import-demand growth is slow, and in the

case of Japan, it is expected to slightly decline as the population ages and declines. Moreover, even in these previously solid U.S. markets, where the U.S. market share used to be close to 100 percent, Brazil, Ukraine, Russia, and South Africa are chipping away at the U.S. share. Over the next decade, the United States is expected to continue exporting marginally increasing amounts of corn to countries like Mexico, as well as to the stable and slow-growing markets of South Korea, Japan, Taiwan, Peru, among certain others. Variation in U.S. corn exports to these markets will depend on the weather conditions, policies, and currency fluctuations of the United States and its competitors.

A Reshaping of Corn Export Market Shares

Corn producers in South America (Brazil and Argentina), Ukraine, and less so in Russia have been increasingly capturing the steady growth in global corn trade, and this trend is expected to continue. This shift in global corn production and exports in favor of these low-cost and favorably located corn producers has already altered global trade. The United Sates, once the foremost power in corn exports with a market share historically between 60 and 80 percent, has recently seen its share fall below 40 percent and is expected to continue losing its competitive edge to lower cost producers (fig. 14). The combined corn production of Brazil, Argentina, Ukraine, and Russia is expected to approach 230 million tons by the end of the projection period. These export-oriented countries are collectively projected to provide 56 percent of world corn exports, while the U.S., which will remain the largest individual supplier, will see its share fall to 36 percent.

Figure 14
Global corn trade: reshaping of export market shares



Source: USDA, Foreign Agricultural Service, PSDOnline (2019); USDA, USDA Agricultural Projections to 2028 (2019).

The Wheat Market

In October 2018, wheat growers were projected to earn a season-average farm price of $5.20 per bushel for their 2019/20 wheat crop, up 10 cents from the October 2018 estimate of the 2018/19 price. The slight price increase was expected to enhance grower returns and to encourage plantings in the out-year. Further, under the assumption of ongoing tariffs on U.S. soybeans, the outlook for soybeans was decidedly less optimistic than for 2019/20 wheat. Since continuation of the trade stalemate is an underlying assumption, prospects for higher returns to other crops in 2019/20 and beyond are brighter. In light of this, wheat area planted was projected to rise in 2019/20 to 51 million acres. However, in the years that follow, both prices and net returns for wheat are expected to soften and to reduce support for wheat plantings in favor of more profitable crops.

Wheat cultivation, particularly in the winter-wheat-growing belt that covers the Midwest, was expected in October 2018 to rise in 2019/20 by nearly 7 percent to 51 million acres. If realized, this would be the largest year-to-year positive gain in acres since 2008. Based on gains in planted area and expectations for trend yields and average abandonment, all wheat production in 2019/20 was expected to increase to 2,060 million bushels, up from 1,884 million in 2018/19. Gains in production are largely offset by reduced carryin from the previous marketing year and a slight cut to imports for 2019/20. Total supplies are forecast to rise only slightly, despite a sizable increase in wheat production.

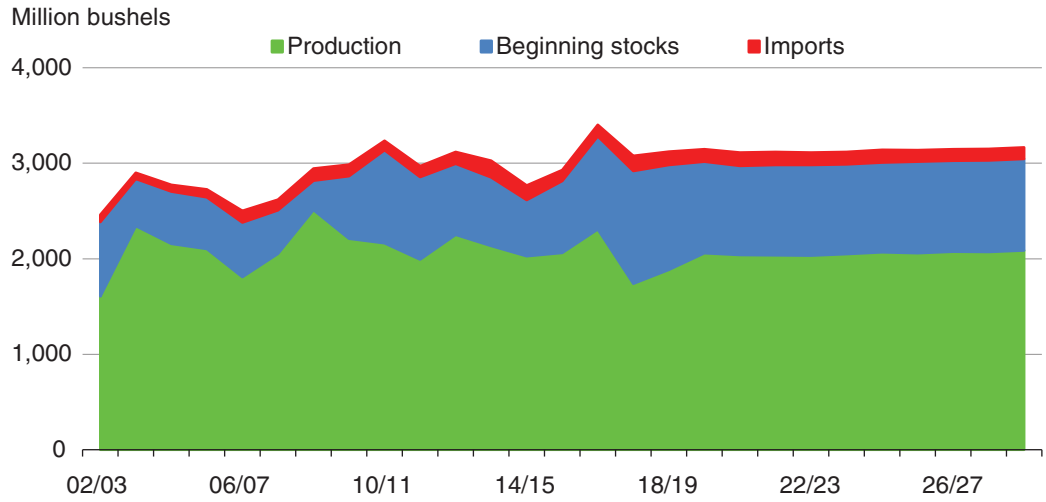
Inherent in the 2019 long-term projections, the all-wheat planted area projection reflects the assumption of normal weather and planting progress. Subsequent to the release of the projections, a large swath of winter-wheat growing area was beset by poor weather conditions that delayed the old crop (mainly corn and soybean) harvest. Harvest delays and saturated soils, in turn, pushed back the planting of the 2019 winter wheat crop.

By late November 2018, USDA, NASS reported that 95 percent of the winter wheat crop had been planted, slightly less than the 5-year average of 99 percent. With the planting window essentially closed, it is expected that winter wheat sowings—especially in Kansas—will be below initial expectations. As the 2019 winter wheat crop headed into dormancy, winter wheat emergence was also reported to be behind schedule, with just 86 percent of the crop emerged compared to the 5-year average of 92 percent (USDA, NASS, 2019). If significant declines in planted area occurred along with delayed emergence, winter wheat production would have been expected to be lower than originally projected in October 2018.

U.S. Supplies Expected To Be Constant Over the Projection Period

For 2019/20, wheat supplies were projected to increase less than 1 percent (fig. 15). Growth in production was expected to offset lower carryin from the 2018/19 crop relative to a year prior, as well as to offset expectations of reduced imports of wheat, primarily from Canada. U.S. wheat imports are comprised primarily of spring and durum wheat from Canada. Underlying the wheat area projections is a sizable increase in spring-wheat planted area in the U.S., which is expected to reduce demand for imported spring wheat from Canada.

Figure 15
U.S. wheat supply to remain virtually level through 2028/29



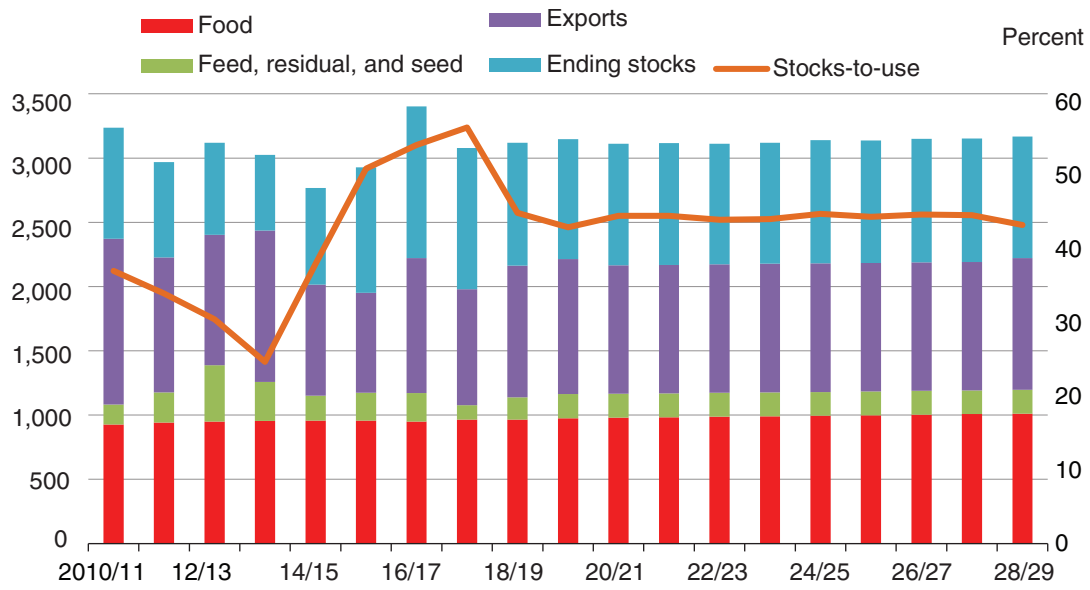
Source: USDA, Economic Research Service, Wheat Yearbook (2019); USDA, USDA Agricultural Projections to 2028/29 (2019).

Over the projection period, aggregate U.S. wheat production is expected to grow very slightly, largely based on modest gains in yields. Yield gains reflect long-term trends and assumptions of normal weather patterns and pest loads. Gains in yields offset a general trend toward reduced planted and harvested acreage. Wheat acres are expected to fall as returns decline after 2023/24 (see fig. 4), with area planted to other grains expected to expand in wheat production strongholds. A gradual tapering off of spring and durum wheat imports is expected across the time horizon as domestic production of these classes is generally expected to be ample for most domestic milling demands.

While utilization in 2019/20 was projected to rise in October 2018, ending stocks were projected to fall slightly, resulting in a 10-cent-per-bushel increase in the farm price. Thereafter, however, ending stocks fall within a narrow range between 946 and 960 million bushels, averaging 950 million bushels, a bit below the 5-year average of about 1 billion bushels. Through 2028/29, U.S. all-wheat supplies are, on net, expected to be less than 1 percent higher than in 2019/20, a minimal change and evidence of a mature crop market with limited growth potential,

Throughout the balance of the projection period, very limited growth in utilization is expected (fig. 16). Level-to-slightly-lower planted area results in level-to-lower seed use. Expanding corn supplies create formidable competition in the domestic feed market, putting downward pressure on wheat feed and residual use, resulting in a constant 120 million bushels through the remainder of the projection period. Expectations for continued, though modest, growth in food use is expected to be supported by population growth. Over the projection period, wheat food-use was projected to rise from 975 million to 1,011 million bushels. While food use was expected to rise in aggregate, per capita food use was projected to continue the multiyear trend of erosion and to decline slightly in each year of the baseline period.

Figure 16
Wheat utilization and stocks-to-use ratio



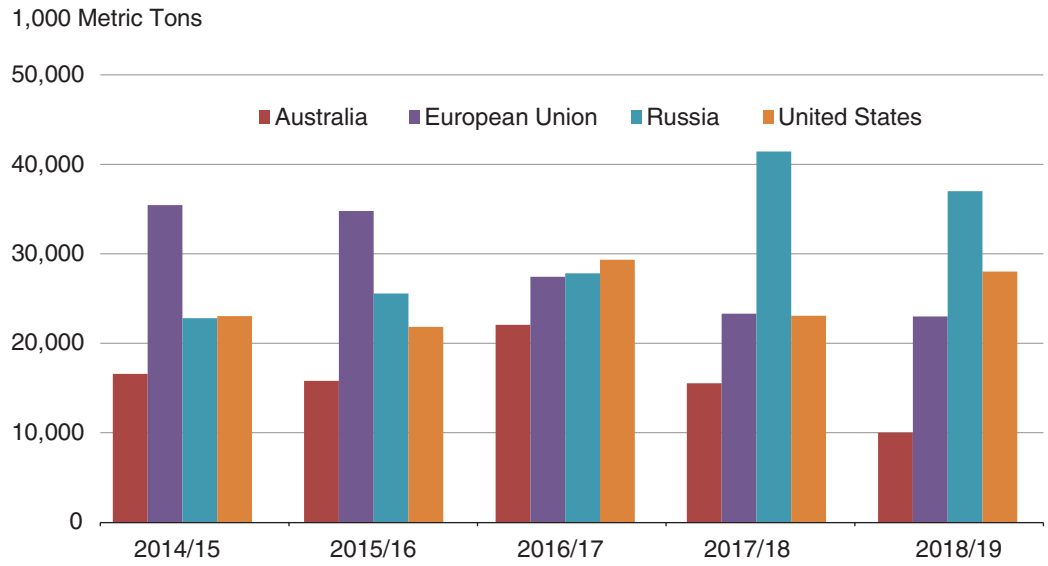
Source: USDA, Economic Research Service, Wheat Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Persistent Global Competition Yields Little Export Growth

In October 2018, U.S. wheat exports for 2019/20 were expected to be up slightly, to 1,050 million bushels from 1,025 million projected for the 2018/19 marketing year. Expanded production and growing global demand underpin the projection for modest U.S. export growth. However, competitors in the wheat export market are poised to create headwinds that inhibit significant recovery in U.S. sales. As a consequence, exports are projected at near 1,000 million bushels annually for the rest of the projection period. The United States faces stiff competition in the wheat market (fig. 17), despite being the largest wheat exporter in 2016/17. The European Union (EU) was the leading exporter in 2014/15-2015/16, but Russia took the lead among the major exporters beginning in 2017/18.

Exports through 2028/29 are essentially level as the U.S. continues to serve established partners and to act as a residual supplier to the balance of the wheat importing countries. Limited growth in utilization more than offsets tepid growth in supplies through 2028/19, resulting in a steadily tighter all-wheat balance sheet. The stocks-to-use ratio is forecast to rise to 43.7 percent in 2020/21 before gradually declining to 42.5 percent in 2028/29. While a tighter balance sheet and lower stocks-to-use ratio are typically indicative of price support, abundant supplies of other grains and limited price support from corn weigh on wheat price recovery prospects. In addition, the underlying assumption of a strengthening of the U.S. dollar dampened projected U.S. wheat export sales.

Figure 17
Wheat exports from selected suppliers, 2014/15-2018/19



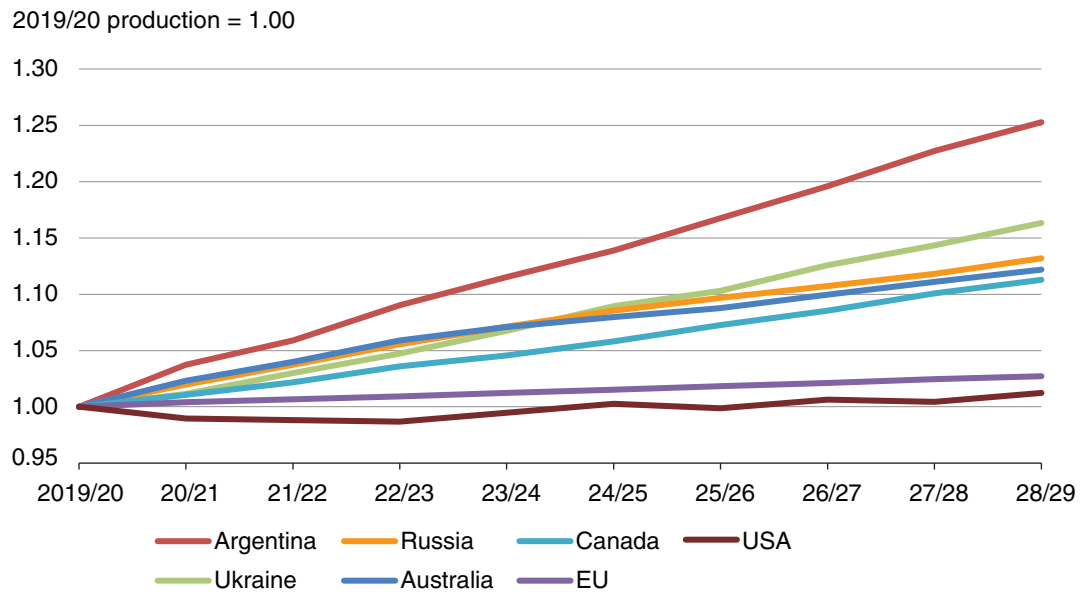
Note: Data are on a Trade Year basis. 2018/19 data are preliminary.

Source: USDA Foreign Agricultural Serivce, Production, Supply, and Distribution database (2019).

Competition Leads to Declining Share of Wheat Export Markets

Wheat production in Ukraine and Russia is expected to continue to benefit from more wide- spread adoption of enhanced production technology and agronomic practices, as well as expanded use of improved wheat seed that serves to push wheat yields up further (fig. 18). However, prospects for significant increases in wheat planted area in the Black Sea region are limited. Given the regional cost structure of Russian grain production, the growth in grain area and output would have to be in relatively high-cost regions. Unless world grain prices were to rise considerably, at least enough to cover the high production costs, such expansion is not expected to be economically feasible. Infrastructure developments in Russia are anticipated to further enable moving of expanding volumes of grains to export hubs. In addition, Russia's export incentives will likely continue to aid its projected 2 percent annual export growth. Ukraine is expected to expand its exports at a pace of 3 percent annually. Collectively, the Black Sea region is forecast to expand its dominance of global wheat exports markets and to continue to offset U.S. market share.

Figure 18
Wheat production indices



Source: USDA, USDA Agricultural Projections to 2028 (2019).

In 2019 and beyond, the growth in export sales from the EU and Argentina was expected to be robust, averaging about 3 percent per year (fig. 19). The EU, Ukraine, and Russia have a comparative advantage in Middle Eastern countries, where import demand growth is expected to expand at a rate of 1.4 percent per year. The fastest growing wheat import markets are in Africa, including North Africa, ECOWAS[2] member states, and other Sub-Saharan countries. The United States has been losing market share to competitors in all of these regions. The most striking examples of declining market share are for the formerly lucrative Egypt and Nigeria markets. In 2012, the U.S. supplied 73 percent of all wheat imported into Nigeria, but that share fell to less than 20 percent in 2018. Over the same period, the U.S. share of Egyptian wheat imports fell from 11 percent to a fraction of a percent (Wheat Outlook, 2018).

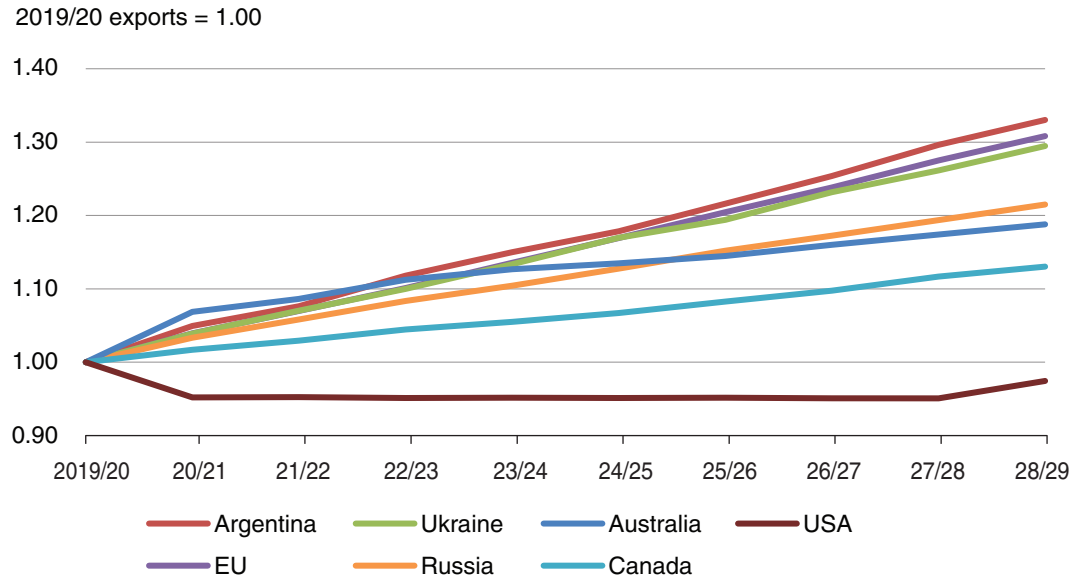
Australia, Canada, and the United States have comparative advantages in supplying Southeast and East Asian markets. For Australia, a key U.S. competitor in Asian white-wheat markets, relatively favorable trading terms with Japan resulting from participation in the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) create a competitive advantage in regional trade. Canada's CPTPP membership may also bolster its exports to Japan and other Partnership member countries. Similarly, the new EU-Japan free trade agreement, which went into force on February 1, 2019, may further erode the U.S. export market share.

The final factor affecting U.S. wheat export prospects is that from a demand perspective, wheat importing countries are anticipated to increasingly be able to assimilate lower protein and off-white-color Black Sea wheat into their mill grinds, resulting in growing demand for attractively priced Russian and Ukrainian wheat. Increasing imports of Russian wheat to Mexico and former U.S. stronghold markets in Africa are evidence of the adaptability of wheat importing countries and reinforce the notion of the U.S. as a long-term residual supplier of wheat in global markets.

[2]Economic Community of West African States.

Figure 19

Wheat export indices



Source: USDA, USDA Agricultural Projections to 2028 (2019).

The Rice Markets

The 2018/19 U.S. 10-year baseline for rice projects a slight decline in planted area, modest growth in domestic use, a small expansion in exports, continued large carryouts, and a slow increase in farm prices. Most of these projections are driven by international factors that, when combined, reduce inflation-adjusted global rice trading prices over the projection period, sharply limiting any increase in U.S. farm prices. The U.S. currently exports about half its annual rice production; the global rice market thus has an important impact on the size and viability of the U.S. rice sector. As a high-cost producer of top-quality rice, U.S. rice growers would not be able to profitably expand acreage given expected prices and rising input costs.

Slow but steady yield growth will allow both U.S. exports and domestic use to expand slightly over the next decade. No expansion is expected in the higher yielding hybrids whose planting in the South began early this century, a factor that had previously boosted yields in the region. Expectations in October 2018 for U.S. rice exports in 2028 were to be below the high levels achieved in 2015/16 and 2016/17, but higher than in 2017/18 and 2018/19. In both 2015/16 and 2016/17, U.S. exports to top long-grain rough-rice buyer Venezuela were record- or near-record high, with U.S. long-grain milled rice shipments to Sub-Saharan Africa—a market in which the U.S. is often not price competitive—quite strong in 2016/17 as well. However, in 2017/18, tight supplies reduced total U.S. exports, with sales to Venezuela and Sub-Saharan Africa down sharply. Although the U.S. regained sales in some Latin American markets in 2018/19, U.S. sales to Venezuela showed little improvement, and sales to Sub-Saharan Africa remained low. U.S. sales to Turkey—a medium- and short-grain market—collapsed in 2017/18 and have not recovered. The sharp decline in Turkish demand is partly due to the implementation in August 2018 of an additional tariff of 50 percent on U.S. goods, imposed in response to tariff increases on Turkish steel, which was assumed to continue throughout the baseline projection period (GAIN, 2018b). Furthermore, China has sharply increased rice sales to Turkey since early 2017, a result of China's much lower prices.

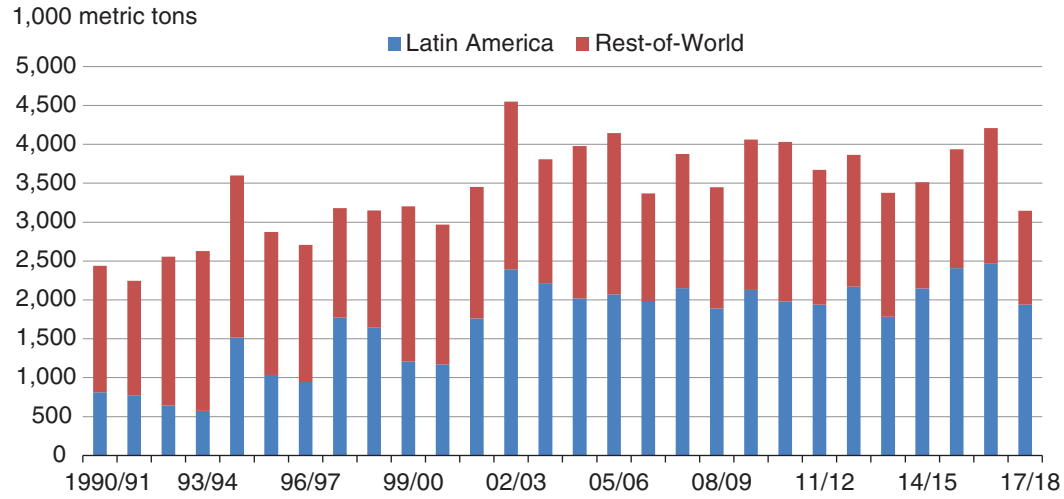
The U.S. global export market share is projected to decline over the next decade to less than 6 percent from about 6.5 percent in 2019/20, despite global trade increasing 15 percent. Although currently the fifth largest rice exporting country, the United States is expected to drop to number six by 2021 when it is overtaken by Burma. China is expected to return to status as a major exporter in the next 10 years. For more than 30 years, the United States has lost market share to the top Asian exporters.

Growth in domestic use is not projected to exceed the rate of population growth, with imports accounting for a growing share of the domestic market. Aromatics will continue to account for the bulk of U.S. rice imports. China's status as a long-term supplier of nonaromatic medium-grain rice to Puerto Rico (included as part of the U.S. market) is unknown. China has recently returned as a major supplier to Puerto Rico after a near-decade of absence, replacing rice shipped from the United States. Puerto Rico, which produces no rice, consumes 5-6 million cwt (rough basis) of medium- and short-grain rice annually, often shifting its buying between California, the U.S. South, Australia, and China. Prices, including shipping costs, and availability are critical factors in determining the source. U.S. suppliers face the disadvantage of requirements under the 1920 Jones Shipping Act to ship the rice on a U.S. flagged vessel, typically much costlier than shipping on vessels flagged under a developing country. For the United States as a whole, the level of immigration will be a key factor behind the rate of growth in domestic use, with any immigration slowdown reducing the increase in domestic use.

Eight Global Rice Market Factors will have Major Impacts on the U.S.

The first global factor limiting U.S. export expansion is continued growth in South American rice exports to major U.S. markets in Latin America, primarily Mexico, Central America, and northern South America (fig. 20). The U.S. was once the dominant supplier to these markets. Among South American exporters, Brazil, Guyana, and Paraguay are expected to increase exports the most over the next decade, with expansion in exports from Argentina and Uruguay projected to be much smaller. Brazil, the largest exporter in the region, was expected in October 2018 to ship 1.5 million tons by 2028, up 61 percent from 2019. In recent years, South American exporters have penetrated U.S. markets in Latin America due to their lower prices and variety-specific quality attributes—such as milling and cooking quality. These Latin American importers purchase nearly all long-grain, with the U.S. shipping mostly rough rice and the South American suppliers shipping mostly milled (but, recently, some rough rice as well). Mexico, Central America, and Venezuela purchase mostly rough rice from the United States—which sells at a much lower price on the global market than fully milled rice—and then mill the rice internally. Each of these markets has excess milling capacity as their domestic rice production was previously larger. Thus, by importing the rough rice and then milling it, they can run their mills more efficiently and lower average milling costs. With the exception of border trade, few South American exporters allowed rough rice to be shipped until recently, preferring to keep the value-added from milling internal.

Figure 20
Latin America now accounts for about 60 percent of U.S. rice exports



Note: Data are on a product-weight basis and exclude groats, meal, and flour.

Source: Foreign Agricultural Service, U.S. Dept. of Agriculture, Global Agricultural Trade System (2019).

In the past 8 years, the U.S. share of the Mexican import market has dropped from more than 99 percent to about 70 percent on a milled basis. First Uruguay, and more recently both Uruguay and Guyana, have taken some of the U.S. market in Mexico, with Guyana shipping rough rice. The U.S. share of the Costa Rican market has declined from more than 90 percent in 2012 to around 50 percent in 2018, with Argentina and Uruguay gaining market share. In 2018, Brazil captured the bulk of the substantial Venezuelan market, previously a major destination for U.S. rough rice.

Brazil's prices were much lower than U.S. prices, partly due to large supplies and slow consumption growth. In addition, since 2017, Mexico has been milling imported U.S. rough rice and exporting it to Venezuela, further eroding the U.S. market share in the region. While the U.S. has been uncompetitive for many decades in the much larger South Asian, Southeast Asian, and Sub-Saharan rice markets, strong growth in the expanding Latin American markets allowed U.S. exports to increase despite extremely strong competition from the large Asian exporters outside the Western Hemisphere. Currently, Latin American accounts for about 60 percent of all U.S. rice exports and more than 75 percent of long-grain exports, making the region critical to the long-term viability of the U.S. rice export sector, especially in the South where the long-grain is produced.

Despite losing market share in some areas of Latin America, in other areas the U.S. has been able to maintain its export share. To date, Haiti remains an almost exclusively U.S.-supplied market, purchasing mostly high-quality U.S. long grain milled rice. Haiti is the largest market for U.S. long-grain milled rice, accounting for more than 40 percent of annual shipments. This critical U.S. market is expected to continue to expand due to population growth, stagnant local production, high and rising per capita rice consumption, and a strong consumer preference for U.S. rice. U.S. rice exports to Colombia will continue to expand largely due to the U.S. Colombia Trade Promotion Agreement, with the U.S. shipping both milled and rough rice. The U.S. continues to export much smaller amounts of milled rice to the Dominican Republic, largely supported by the CAFTA-DR. Cuba is currently not a market for U.S. rice.

U.S. Long-grain Rice Priced out of the Fastest Growing Import Region

The second factor affecting U.S. export growth is that the 10-year projected expansion in global rice trade is largely driven by strong import demand by Sub-Saharan Africa, currently the world's largest and fastest expanding rice-import market. This region, with a population of more than a billion, is expected to account for 70 percent of the growth in global rice trade over the next decade. A rapidly expanding population and rising per capita consumption—especially in West Africa—drive the expected substantial increase in imports by Sub-Saharan Africa over the next decade. This is the only region in which per capita rice consumption is projected to significantly increase over the period, a result of strong income growth, increased urbanization, and greater nonhousehold employment by family members. In all other global regions, higher incomes lead to lower average per capita rice consumption. West Africa has the highest per capita rice consumption in Sub-Saharan Africa, and per capita consumption is expected to continue to increase over the next decade, partly due to stronger income growth. Population growth is projected to be slighter faster in West Africa, as well. Consequently, import growth is projected to be the highest in West Africa, increasing by more than 4 million tons by 2028. Sub-Saharan Africa overall was projected to account for 37 percent of global rice imports in 2028, up from 32 percent in 2019.

However, for the U.S., the strong growth in imports by Sub-Saharan Africa is of little direct benefit as the U.S. currently ships very little rice to the region. U.S. prices for top-quality, long-grain milled rice are much higher than prices for lower grades of rice from Thailand, India, Vietnam, and Pakistan—major suppliers to the region. Many markets in Sub-Saharan Africa prefer shipments with 25 percent or more of brokens, with some countries such as Senegal preferring 100 percent broken shipments. Broken kernels are a byproduct of milling rough rice, with better milling producing fewer brokens. Milling equipment and the quality of the rough rice are major determinants of the share of brokens produced. Typically, the higher the brokens' share of a shipment, the lower the price.

In addition, some markets in Sub-Saharan Africa—especially Senegal—prefer to use brokens in cooking local cuisine, as the rice is completely broken down, subsequently becoming a paste when cooked. The United States almost exclusively markets high-quality rice with few broken kernels, and thus is expected to remain uncompetitive in this important and growing global rice market.

The Top Three Global Rice Exporters Are Expected To Expand Exports

A third factor affecting U.S. export growth is that India, Thailand, and Vietnam are all expected to expand exports over the next decade, with the 10-year expansion rate far in excess of the 0.4 percent annual growth projected for the United States in October 2018. Vietnam's exports are projected to increase 20 percent over the next 10 years, Thailand's 14 percent, and India's 9 percent by 2028. This ensures that there will be plenty of rice available globally. India remains the number one exporter each year, followed by Thailand. Of the top three exporters, Vietnam is expected to gain market share, while India's share declines and Thailand's stays roughly the same. These three top exporters are projected to account for more than 61 percent of global exports by 2028. Pakistan, meanwhile, is projected to remain the fourth largest rice exporter, shipping 4.3-4.4 million tons each year.

Burma, China, and Cambodia Have Returned as Major Exporters

A fourth influence on U.S. export growth opportunities is that three former major exporters—Burma, China, and Cambodia—are projected to continue their recent export expansion and return to their previous status as major exporters. Burma's exports are projected to increase 33 percent over the next decade, China's 48 percent, and Cambodia's 27 percent by 2028/29.

Burma was once the world's largest rice exporter, but by the mid-1960s domestic policy decisions sharply reduced its rice exports for more than 4 decades. These policies kept rice prices low for consumers but caused production to stagnate due to the weak incentives. The Government's focus was primarily on food security with rice designated a strategic good (Nehru, 2015). Lack of foreign exchange and import controls limited inputs, and foreign investment needed to modernize an aging and inefficient milling sector was not allowed. Thus, with an increasing population, little surplus rice was available to export (Nehru, 2015). Beginning in 2012 with overall economic and market reforms, but especially in 2015 with the launching in May of the Myanmar Rice Sector Development Strategy. With the new strategy, the Government of Burma changed its policies and began focusing on increasing rice production for both domestic use and export by providing support to farmers, relaxing export controls, and improving quality (Ministry of Agriculture and Irrigation, Union of Myanmar, 2015). As noted, the previous goal of the rice sector was primarily domestic food security. Since 2015, economic growth, poverty reduction—especially for small shareholders—and export earnings have been added as goals (Ministry of Agriculture and Irrigation, Union of Myanmar, 2015). Burma is projected to surpass the U.S. as the fifth largest exporter in 2021/22 and to be shipping approximately 4 million tons by 2028/29.

China was typically a major global rice exporter from the mid-1960s until 2004 (except in years of short supplies), when tighter domestic supplies led to a cutback in exports and policies were designed to rebuild stocks. However, since 2016, China has increased exports each year and is projected to export an annual average of 2.3 million tons over the baseline, just slightly less than its 1997-2003 average. Cambodia was a consistent midlevel rice exporter from the colonial period through the mid-

1960s, when regional war, followed by severe political turbulence in the 1970s, took it out of the rice export market for more than 3 decades. Since 2003, Cambodia has returned as a regular exporter, nearly tripling shipments from 2007-2018, with exports averaging about 1.5 million tons over the baseline. These additional supplies, mostly in low-quality markets, are expected to encourage Thailand, Vietnam, and India to seek higher quality markets in the Middle East, Europe, and the Western Hemisphere, on balance lowering global prices and limiting U.S. sales in some markets.

Rice Imports Decline for Three Historically Large Importing Countries

A fifth factor affecting U.S. rice export projections involves the Philippines, Indonesia, and Bangladesh, countries that have for many decades boosted global import demand and helped maintain global trading prices. However, a combination of a steady decline in per capita consumption—mostly due to rising incomes that enable greater variety in consumers' food choices—and bumper crops are expected to reduce annual rice imports by each country over the next decade. Although projected to remain a major rice importer, the Philippines' imports are projected to drop almost 2 percent over the next decade. Imports account for about 15 percent of rice consumption in the Philippines, the highest share among these three importers and one of the highest in Asia (excluding city states). Indonesia, once the largest rice importer in the world, is projected to experience nearly a 6 percent decline in imports over the next decade, with imports below 1.1 million tons in 2028/29, equivalent to less than 3 percent of consumption. Finally, Bangladesh, often a major rice importer, is projected to see imports drop 17 percent over the next decade, with imports accounting for less than 3 percent of consumption. Declining demand for imports by these three large consumers are expected to limit increases in global trading prices.

China Is Projected To Slowly Reduce Imports Over the Baseline

A sixth influence on U.S. rice export projections involves China, which is projected to remain the largest rice importing country over the next decade but with rice imports projected to decline 9 percent to 4.4 million tons by 2028/29. Prior to 2011, China was a small rice importer, purchasing mostly aromatic varieties not grown domestically. However, since 2012, China has become the largest rice importing country, with imports rapidly expanding from 2011-2017, reaching almost 6 million tons or more than 11 percent of global imports in 2017/18. China's rice imports soared due mainly to quality concerns regarding domestically produced rice, much lower prices in the global market, and lower transportation costs for importing rice compared with shipping costs within China. The resulting huge stocks of grain led the Government of China to enact policies to reduce its stocks, leading to an expected 9 percent drop in imports to 4.4 million tons by 2028. The strong growth in China's rice imports supported global prices from 2012 to 2017; the slow decline is expected to have a smaller negative impact.

Favorable Developments in Exporting Countries and Strong Northeast Asia Demand

Although U.S. rice exports are hindered by the six developments described above in the 10-year outlook for the global rice market, two additional developments support continued strength and some growth in the U.S. exports. The first is the decline in exports from Egypt and Australia due to production constraints. The second is continued steady rice imports under WTO agreements

by Japan, South Korea, and Taiwan. This expected export growth is mainly for medium- and short-grain rice, with most of it grown in California. However, with stronger prices some southern States—most importantly Arkansas—can expand medium- and short-grain acreage for non-Asian export markets.

Australia and Egypt have historically been major exporters of medium- and short-grain rice, often dominating import markets in North Africa, the Middle East, and Oceania. Australia also ships rice to Northeast Asia. In 2018/19, the Government of Egypt stipulated strong enforcement of penalties for exceeding area limits for rice production to conserve water. This resulted in a sharp drop in production and a virtual withdrawal of Egypt from the global export market. Egypt's area is projected to remain well below pre-2018/19 levels over the next decade, nearly eliminating Egypt's export potential. To date, Russia and China have taken much of Egypt's export market. However, the United States is expected to increase sales to North Africa and the Middle East as a result of Egypt's withdrawal. The southern U.S. often ships medium- and short-grain rice to these two markets, which are more price sensitive than the larger Northeast Asian medium- and short-grain market.

Meanwhile, Australia's rice producing area has experienced severe drought for the past 2 years, cutting production and reducing exports. Although some area recovery is expected, Australia's rice area is not projected to return to predrought levels over the baseline. As a result, Australia's rice exports are projected to slowly decline over the baseline and remain well below 2010/11-2014/15 levels. Australia dominates rice trade in Oceania and ships rice to the Middle East and Northeast Asia. The United States is likely to gain some market share in these regions, with California accounting for most of the projected increase.

Finally, annual imports under WTO agreements of Japan, South Korea, and Taiwan are projected to remain unchanged over the coming decade, despite declining consumption in each country. The United States supplies almost half of Japan and Taiwan's imports and more than a third of South Korea's. This solid annual export market for medium- and short- grain rice provides substantial support to the California rice industry, accounting for well over half of California's rice exports. The United States is expected to maintain these markets over the next decade and may pick up some additional sales due to expected weaker production in competitor countries.

Overall, continued export expansion by the top three exporters—India, Thailand, and Vietnam—and the return of Burma, China, and Cambodia as major exporters indicates ample exportable supplies worldwide to prevent inflation-adjusted prices from rising. Furthermore, the midlevel South American exporters are expected to continue to expand shipments into traditional U.S. markets in Latin America. On the import side, strong growth in Sub-Saharan Africa will boost global trade levels to record highs but will have little direct impact on U.S. exports as the U.S. is not price competitive in this large and expanding rice import market. The strong growth in global imports by Sub-Saharan Africa is expected to more than offset declining purchases by Bangladesh, China, Indonesia, and the Philippines. On the upside, area constraints in Australia and Egypt will likely open up additional sales for U.S. medium- and short-grain rice. Although the United States is projected to remain a major exporter and its annual exports increase slightly, the U.S. market share is projected to decline. Without a stronger export market, U.S. plantings are expected to drift lower, although higher yields will effectively boost production over this timeframe.

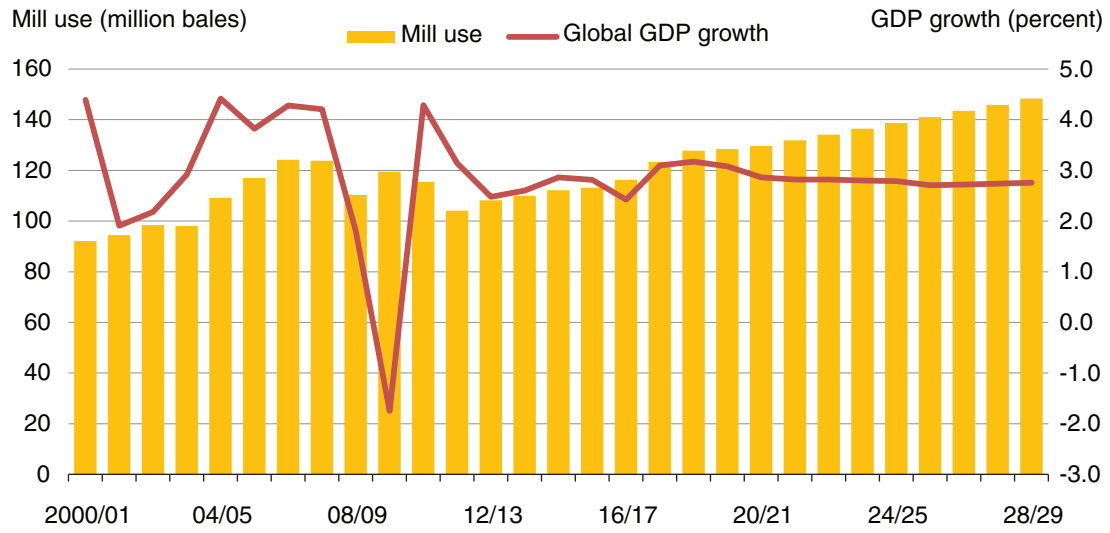
The Cotton Market

The global cotton outlook over the next decade is based on modest growth in world cotton mill use—spinning raw cotton into yarn for textile and apparel products. Demand for raw cotton and products made from cotton will be key for the fiber's production prospects in the United States and other countries in 2019/20 and beyond. In addition, with world cotton mill use projected to reach new heights, trade prospects for a number of countries are also forecast to reach record levels over the next 10 years.

Global Mill Use Expansion Continues

Global cotton mill use in 2018/19 was forecast in October 2018 to reach an 11-year high as consumption expands for the seventh consecutive season from its recent low in 2011/12, the year after record-high world cotton prices reduced cotton mill use substantially. As global cotton mill use generally follows world economic growth, annual global GDP projections above the average growth rates observed over the last decade is a positive indication for world cotton mill use during the next 10 years (fig. 21).

Figure 21
Global cotton mill use and GDP growth



Note: 1 bale = 480 pounds

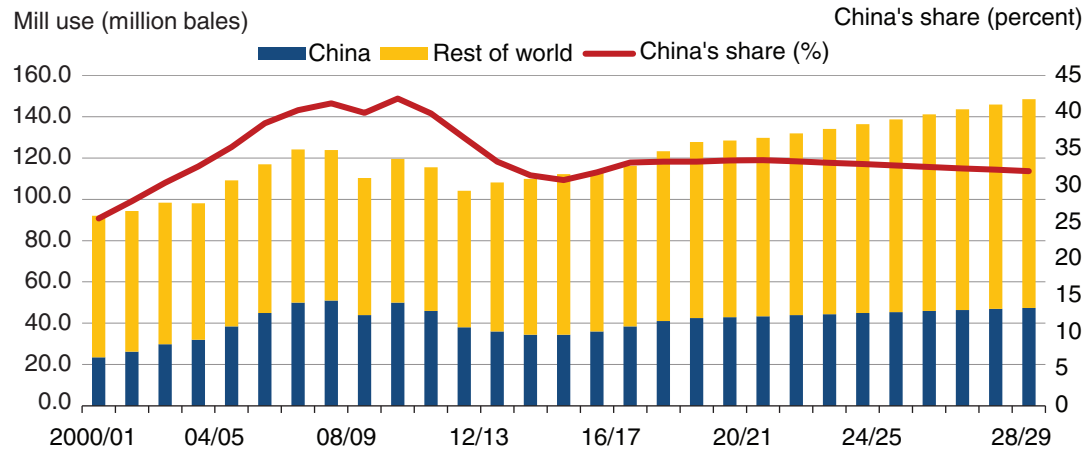
Source: USDA, Economic Research Service, Cotton Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Throughout the baseline period to 2028/29, record global cotton mill use is projected to increase modestly as competitive prices and an expansion of consumer demand for cotton products are forecast. Income growth in developing countries helps sustain world demand for cotton clothing. However, fiber competition—particularly with synthetics—is expected to limit the growth potential in global cotton mill use despite the higher demand of a growing world population during this period. Synthetic products are expected to play a larger role in clothing fabrics during the next 10 years, as consumer demand for athletic and other leisure clothing continues to expand.

Growth in Asia Drives Outlook

China continues to play a significant role in the global cotton market over the next decade, but the growing importance of other countries—like India, Bangladesh, and Vietnam—is also key to the outlook. China is projected to continue as the largest user of raw cotton, accounting for one-third of global mill use (fig. 22). China's cotton mill use is benefiting 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 to the increasingly mechanized western province. Xinjiang's estimated share of the nation's cotton production approached 85 percent in 2018/19, and the share is expected to rise further during the baseline period as yields there are likely to trend higher and offset lower production elsewhere in China.

Figure 22
Global cotton mill use and China's share



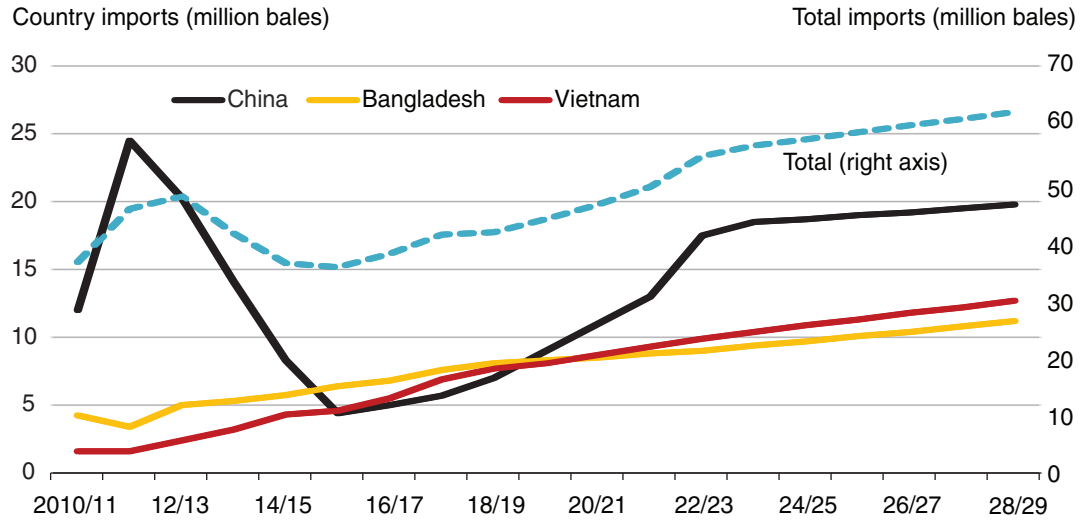
Note: 1 bale - 480 pounds.

Source: USDA, Economic Research Service, Cotton Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Although China remains one of the largest cotton producing countries, the gap between its mill use and production is forecast to increase for 2019/20 and beyond. As a result, China is projected to require considerable annual raw cotton imports during the baseline period to reach the modest growth expectations for its mill-use manufacturing, which supports China's large textile and apparel export market. While China may offset some of its raw cotton requirements with imports of cotton yarn if prices are favorable, the latter 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.

In addition to rising import needs anticipated for China, Vietnam and Bangladesh are also expected to import increasing amounts of raw cotton in 2019/20 and beyond (fig. 23). Clothing production is labor-intensive, and countries such as Vietnam and Bangladesh—with low-cost labor—must import the raw fiber for mill use manufacturing, which is projected to continue expanding there throughout the baseline period. While China's raw cotton imports are forecast to more than double during the next 10 years, imports by Vietnam and Bangladesh are expected to increase by 55 percent and 35 percent, respectively.

Figure 23
Leading cotton importers



Note: 1 bale = 480 pounds.

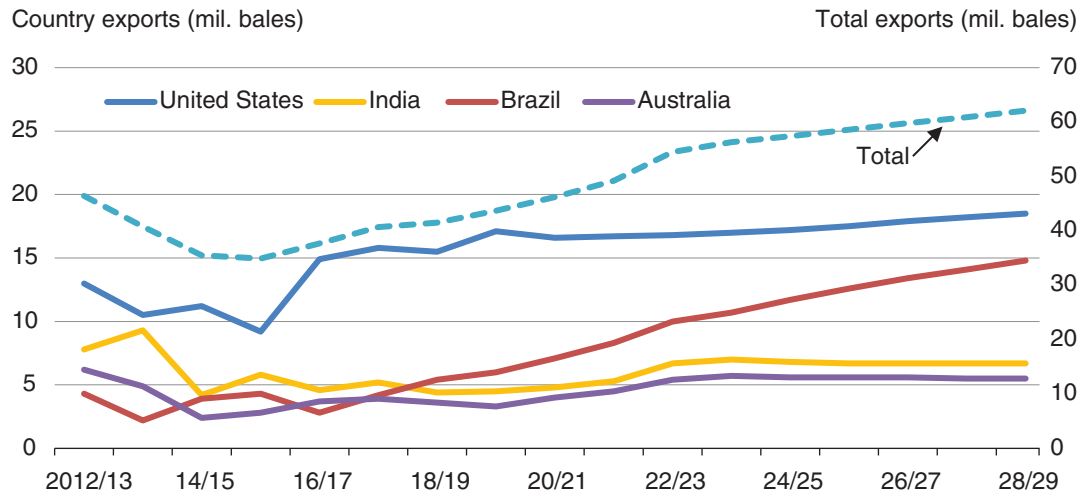
Source: USDA, Economic Research Service, Cotton Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

World Trade Projected Higher

With rising global import demand for cotton expected during the next 10 years, a number of cotton producing/exporting countries will likely benefit (fig. 24). In addition to the United States—the world's leading exporter—larger cotton exports are forecast for Brazil, India, Australia, and the countries of West Africa, where higher production is likely to result from increased adoption of technological innovations that improve yields. As a result, production prospects during the next decade are expected to provide added export competition for U.S. cotton in the global market. In particular, Brazil's cotton production growth expectations during the next 10 years provide a dramatic increase in exportable supplies, as cotton area expands in the high-yielding state of Mato Grosso with continued investment in production and transportation infrastructure, and to a lesser extent into the state of Bahia. Brazil's cotton exports are projected to more than double over the baseline period, attaining a significantly larger share of world export trade than forecast for 2019/20.

For the United States, cotton exports are projected to rise in 2019/20, as large supplies are anticipated with increased production prospects. However, with foreign cotton production outside of China expected to rise over the next decade, prospects for U.S. exports as a share of global trade are projected to decrease. With the global export market forecast to remain competitive through 2028/29, the U.S. share of world cotton trade is forecast to decline during the first half of the baseline period before stabilizing around 30 percent, compared with the previous 10-year average of approximately 33 percent.

Figure 24
Leading cotton exporters



Note: 1 bale = 480 pounds.

Source: USDA Economic Research Service, Cotton Yearbook (2019); USDA, USDA Agricultural Projections to 2028 (2019).

Export Prospects Guide U.S. Outlook

The U.S. cotton outlook for 2019/20 and over the next decade centers around the United States remaining the world's leading raw cotton exporter. With the United States exporting nearly 80 percent of its production, a growing U.S. export demand is key to higher production prospects since U.S. mill use is forecast to remain flat and stocks stabilize around 30 percent of total use.

U.S. cotton production gains are achieved mainly through yield growth associated with technological advances, such as improved seed varieties and production practices. However, U.S. cotton area is also projected to rise slightly during the baseline period, as relative prices and the associated net returns for cotton and competing crops that are crucial to farmers' planting decisions are expected to favor cotton. Additional factors that are likely to influence cotton area during the next decade include commodity programs, crop insurance prospects, crop rotation benefits, irrigation supplies, and weather at planting time. Although the U.S. outlook depends greatly on the interactions of global cotton supply and demand, growth in consumer demand for cotton textile and apparel products remains the underlying force behind an expanding global cotton market.

The Sugar Market

Domestic Demand Drives Production and Trade in U.S. Sugar Market

In contrast to many other U.S. agricultural commodity markets, the U.S. sugar market is heavily driven by domestic economic factors. The combination of Government policies and total use overwhelmingly marketed to the domestic food and beverage industry results in a market that is most directly impacted by domestic developments. Subtle changes in trends of domestic use that are expected to continue throughout the long-term outlook have the most significant impact on the U.S. sugar market outlook.

Growth in Production Slows Relative to Recent Years

Total sugar use in the United States is projected to increase from roughly 12.7 million short tons, raw value (STRV) in 2019/20 to over 14 million by 2028/29. The majority of use is domestic deliveries for food and beverage use, which is expected to grow an average of 1.1 percent annually. This growth rate is lower than in recent years, where average growth has been closer to 1.5 to 2.0 percent per year. There has been some volatility in deliveries over the past 10 years, however, with annual fluctuations ranging from a 3.3-percent increase in 2012/13 to 0.5-percent decline in 2011/12. Some of the year-to-year variability reflects specific, short-term market or policy developments, such as during the legislative deliberations in 2016 for Federal biotechnology labeling on foods. The uncertainty of how the Federal standard would be structured temporarily slowed deliveries at the end of 2015/16—particularly from beet processors that rely heavily on genetically modified varieties of sugarbeets—but then resulted in a much stronger pace during 2016/17 after the legislation was signed into law in the summer of 2016. The ultimate result was a consistent trend in deliveries, but variability in annual changes and normal seasonal patterns.

There has also been evidence of lower annual growth rates in recent years compared with the first few years after the sweetener market integration between the United States and Mexico in 2008, as part of the NAFTA agreement. This recent trend is likely due to consumer and food manufacturers' preferences and an increased awareness of sugar with regards to diets and food products, as well as a stabilization in the rates of substitution between refined sugar and corn sweeteners.

The current projections assume the lower growth rates continue for the duration of the period. Deliveries are still expected to grow, as a larger population and continued substitution of refined sugar at the expense of corn sweeteners continues. These fundamental factors are not expected to have as large an impact on sugar demand, however, as consumers' preferences and awareness of sweetener intake continues to evolve and the rates of substitution between refined sugar and alternative sweeteners stabilize.

The trends in the underlying demand for sugar set the stage for the supply side of the U.S. sugar market—both in terms of economic and policy factors. Trends in total sugar use define market conditions for domestic growers of sugarbeets and sugarcane, as well as processors and refiners of sugar. Additionally, policies, including the U.S. sugar program under the Farm Bill and the Suspension Agreements governing trade between the United States and Mexico, are directly impacted by trends in sugar deliveries. Specifically, expected deliveries for human consumption are used to establish the total size of the Marketing Allotments for each year and how those allotments

are distributed to the domestic sugarcane, sugarbeet, and import sectors. Expected total use is also an important component in the Suspension Agreements, as the agreement specifies USDA forecasts as the parameters that set Mexico's market access for sugar each year—with total use being the most heavily weighted component of the calculation.

Domestic sugar production was projected in October 2018 to grow from almost 9.5 million STRV in 2019/20, to over 9.75 million STRV in 2020/21, and finally to settle at just under 9.7 million STRV by 2028/29. While production was expected to grow at a long-run average rate of 0.2 percent, the fluctuating production levels reflect several factors that affect both the sugarbeet and sugarcane growing sectors during the projection period. Aside from demand, the biggest factor affecting both sectors is an expected steady increase in oil prices, which has been correlated with higher input costs for growers.

Beet Sugar Production Falls on Lower Acreage

Beet sugar production was projected to reach over 5.7 million STRV of production in 2020/21, before declining to 5.4 million STRV by 2028/29. Similarly, harvested area is projected to peak at nearly 1.18 million acres and then steadily decline to just over 1 million acres over the decade, as increased yields and relatively modest returns for sugarbeet production are expected to limit incentives to expand acreage. While acreage is projected to decline at a rate of about 1.2 percent per year, sugarbeet production is projected to decline by just 0.7 percent, as steadily increasing yields moderate the declines in area. Furthermore, improved factory recovery rates also help to mitigate the expected lower sugarbeet production. Beet sugar production levels are therefore expected to be higher than the record levels set in recent years and are expected to remain essentially flat over the coming 10 years.

Cane Sugar Production Rises on Higher Yields

Cane sugar production was projected to steadily increase throughout the projection period, from just over 4 million STRV in 2019/20 to nearly 4.3 million STRV in 2028/29. The increase represents a modest 0.7 percent increase per year. Sugarcane growers also face higher input costs, although the sugarcane sector is less responsive to higher input costs than sugarbeet growers due to the different cost structures and multiyear planting cycle associated with sugarcane. Sugarcane growers are projected to keep crop production relatively flat (exhibiting a 0.2 percent increase) during the projection period, as a slight decrease in harvested area is more than offset by higher yields. The additional sugar production is due to improved recovery rates by processors that boost cane sugar production growth, however.

Higher Input Costs Affect Acreage

Both sugarbeet and sugarcane growers are expected to respond to higher input costs and flattening domestic use by reducing acreage and relying on increased productivity. While market signals help direct producers' decisions, current Government policies also keep the sugar supply and price outlook stable. The program's administration is mandated to avoid public expenditures under U.S. Code Title 7, Chapter 34 (Cornell Law School, 2019), which typically occurs when U.S. sugar supplies are much greater than expected use. When this occurs, sugar prices can fall below the loan rates, which causes processors to forfeit the sugar used as collateral instead of paying off the loan. If expected use is much greater than supplies--typically signaled by high U.S. raw and refined

sugar prices--then the USDA is mandated to ensure that adequate supplies of sugar exist in the U.S. market, primarily by increasing import quotas. To avoid these extreme situations, the USDA utilizes several policy mechanisms to maintain balance in the market, such as adjusting marketing allotments held by domestic processors and importers, increasing import quotas, or diverting sugar supplies to nonhuman consumption market sectors in the United States—such as being used as a feedstock for ethanol production. As a result of these policy conditions, farmgate prices for sugarbeets are projected to remain stable and relatively predictable compared with other crops grown in sugarbeet regions. Farmgate prices for sugarcane are projected to increase slightly over the course of the decade. The distinction between the prices of the two crops can be attributed to costs of production and available cane refining capacity in the United States, particularly as imports from Mexico are constrained.

Imports Will Increase

While total use is projected to grow at a slower rate than in recent history, its projected growth still outpaces increases in domestic production. As a result, imports are projected to grow at an average rate of 3 percent per year—or from approximately 3.4 million STRV in 2019/20 to roughly 4.4 million STRV by the end of the projection period.

Imports from Mexico, our primary supplier for foreign sugar supplies over the past decade, are expected to grow at an annual rate of 0.9 percent per year. Imports from Mexico are governed by the Suspension Agreements signed between the Government of Mexico and U.S. Department of Commerce in December 2014 and amended in July 2017. These agreements limit the volume of shipments from Mexico to the United States based on a calculation of "U.S. Needs," determined by expected U.S. total use and supplies from domestic and other foreign sources. While these terms constrain shipments during the first few years of the projection period, trade between the U.S. and Mexico is primarily constrained by the availability of supplies of Mexican exports for much of the projection period. Like the United States, Mexico's projected growth in domestic use is higher than its growth in production. This results in Mexico's having fewer available supplies to ship to the United States for much of the upcoming decade.

The projected growth in imports therefore becomes heavily reliant upon additional imports under quota programs, such as WTO tariff-rate quota commitments and free trade agreements (FTAs). Trade under FTAs are a smaller component of the total imports under quota programs, but the schedules for many of the FTAs allow for marginal growth from each trading partner. FTAs with Western Hemisphere trading partners such as the member countries in the CAFTA-DR agreement, Colombia, Panama, and Peru, all include provisions and schedules for tariff-free access to the U.S. market. This allows for some of the growth in the import projections of less than 5,000 STRV per year.

The United States' future minimum raw sugar import commitment under WTO obligations remains unchanged at just over 1.2 million STRV. Based on current projections, however, in order to meet legislatively mandated objectives, the USDA will likely have to increase the availability of imports by adjusting the WTO raw sugar quota and the Specialty Sugar import quota—over both of which the USDA has discretion. Imports from these programs come from a broad portfolio of sugar-producing countries and would be expected to satisfy increased demand within the United States. Therefore, the projected growth in imports, particularly in the latter years of the projection, come primarily from these quota programs that are designed to maintain an adequate supply of sugar, in compliance with the Farm Bill.

Overall, substantial growth in imports is still needed to meet the growing demand for sugar, despite growth rates that are expected to be lower than in the previous 10 years. Changes to the outlook will likely be sensitive to the trajectory of sugar use. Given the Government policies that are in place, if actual sugar deliveries out- or under-perform the current projections, there may be a small impact on domestic production—and in particular the amount of land used for sugarcane and sugarbeet production. More important, however, how sugar use evolves over the next 10 years will likely have strong implications for the demand for imported sugar—whether in raw form to be refined in the United States or fully refined for end use—and how policy mechanisms within the U.S. sugar policy framework are utilized.

Final Thoughts

The United States has a long history of efficiently producing grains, oilseeds, cotton, and numerous other crops, which has given it a prominent role in international commodity markets. That role is now diminishing as the United States faces increased export competition from other suppliers. The United States will remain the largest corn exporter through 2028/29, in part due to continuing import demand by Mexico, while elsewhere, competitors are gaining market shares. Exports of high-quality long-grain rice by the United States will continue to grow slowly. Argentina, Australia, Brazil, India, Russia, and Ukraine, among others, have—through rising production efficiencies, changes in export policies, closer proximity to foreign markets, and beneficial trade agreements—reduced U.S. export market shares. Such competition will continue in the future, putting pressure on U.S. producers to increase efficiency and continue reducing production costs.

This report complements the *USDA Agricultural Projections to 2028* report that was developed in late 2018 and released in March, 2019 by providing an in-depth look at those factors most critical to U.S. farmers' ability to compete in global commodity markets. While trade tensions with China clearly affected the U.S. export projections, other factors were also at play, including China's high grain stockpiles and a producer subsidy equivalent to $271/acre on soybean area, with a smaller subsidy for corn producers (USDA, FAS, 2019). China's future agricultural and trade policies likely will continue to figure prominently in trade prospects for all exporting countries.

Armed with the information provided in this report and the discussions of trade and production trends, the reader can adapt the projections to circumstances that were not known at the time the projection were made.

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