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How Does the U.S. Fit Into Global Corn and Soybean Production?

By Chad Hart, Extension Economist, Iowa State University

Global agriculture has changed dramatically during the past 60 years. Production and demand have increased significantly, while the crop and livestock mix within individual countries has shifted to meet both internal domestic needs and export market potential.

Arguably, the most dramatic changes have occurred in the corn and soybean sectors. Figure 1 shows the expansion of global production of these crops over the past few decades. Reliable country-level corn production estimates started in 1964. For soybeans, good global coverage didn't start until 1977 with the addition of the South American countries to global soybean production estimates.

But as the figure displays for both crops, there has been an amazing growth pattern in worldwide production. Global corn production has increased by 500% since 1964. Global soybean production has increased by the same percentage since 1977.

Since 2000, global corn production has grown by 20 billion bushels, the equivalent of one and a third U.S. corn crops. Over the same time, global soybean production has increased by 7 billion bushels, the equivalent of one and three quarter U.S. soybean crops. It's clear that crop production outside the U.S. has expanded greatly, just as U.S. crop production has grown (Figure 1).

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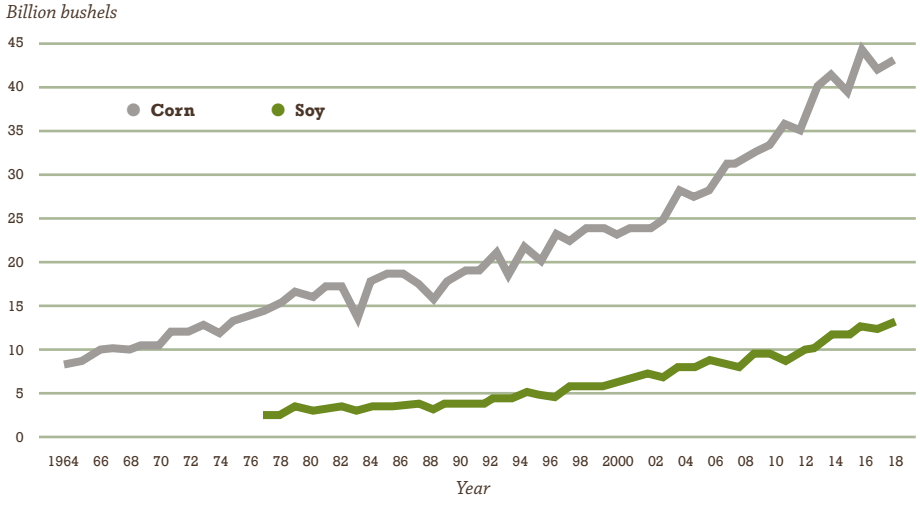
Figure 1. Global production



Source: USDA Foreign Agricultural Service (FAS) Production, Supply, and Distribution Data

U.S. Corn Trends

Corn is the primary U.S. feed grain, accounting for more than 95% of total feed grain production and use, according to the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA). The other major feed grains are sorghum, barley, and oats. More than 90 million acres of U.S. land are planted to corn, with the majority of the crop grown in the Heartland region.

Most of the crop is used as the main energy ingredient in livestock feed. Corn also is processed into a multitude of food and industrial products including starch, sweeteners, corn oil, beverage and industrial alcohol, and fuel ethanol. The U.S. is a major player in the world corn trade market, with between 10% and 20% of its corn crop exported to other countries.

Corn is grown in most U.S. States, but production is concentrated in the Heartland including Illinois, Iowa, Indiana, eastern portions of South Dakota and Nebraska, western Kentucky and Ohio, and the northern two-thirds of Missouri. The top corn-producing states, Iowa and Illinois, typically account for about one-third of the U.S. crop.

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Corn

For corn, the U.S. has consistently been the dominant global producer. Through the 1960s and 1970s, we produced over 40% of the world's corn. As Figure 2 shows, the droughts of 1983 and 1988, along with the floods of 1993, lowered the U.S. share below 40%.

But there has also been significant increases in corn plantings throughout the rest of the world. Argentina and Brazil expanded their corn acreage base in the 1990s and 2000s and continue to bring more area into production. Those two countries now provide 13% of the world's corn. One of the biggest shifts has been the expansion of corn production in China, as that country sought to be self-sufficient. Nearly a quarter of the world's corn is produced in China, but we've also seen corn expansion in Europe, Russia, Ukraine, and India.

Based on current conditions, one can divide global corn production into three roughly equal slices. The first slice comes from U.S. production, the second from China, Brazil, and Argentina, and the remaining third originates from the rest of the world (Figure 2).

Figure 2. Corn production shares over time

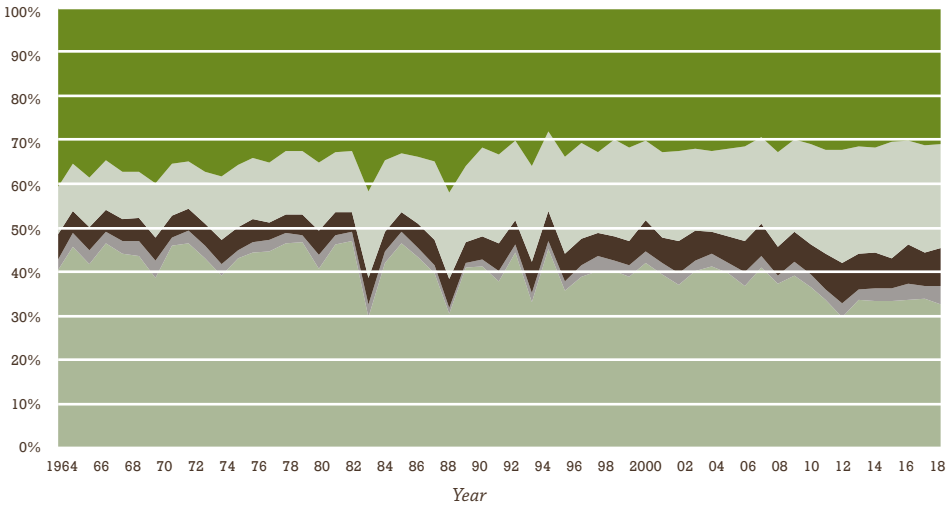
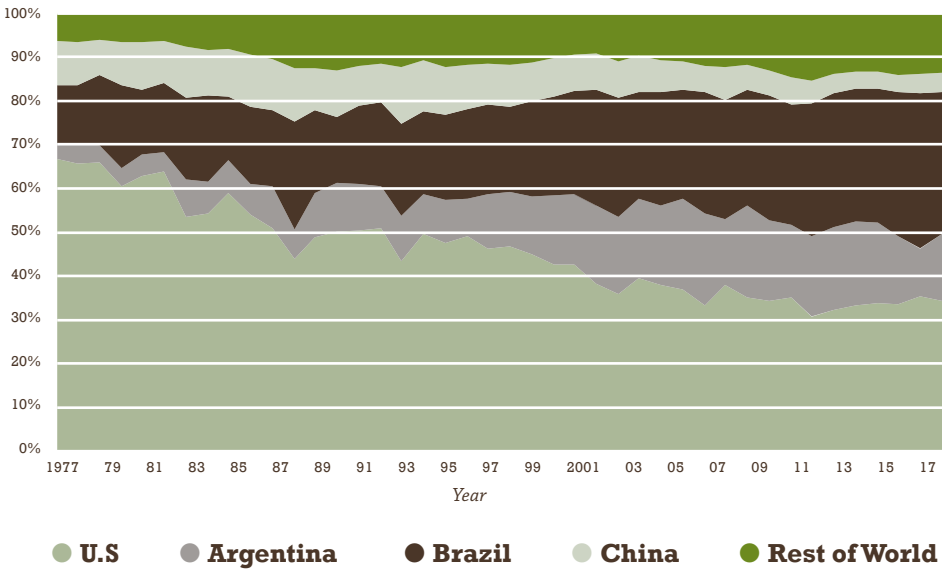


Figure 3. Soybean production shares over time



Source: USDA Foreign Agricultural Service (FAS) Production, Supply, and Distribution Data

Soybeans

The changes in global corn production are relatively tame, compared to shifts in global soybeans. In the mid-1970s, the U.S. was by far the largest producer of soybeans, with roughly two-thirds of the world's soybean crop.

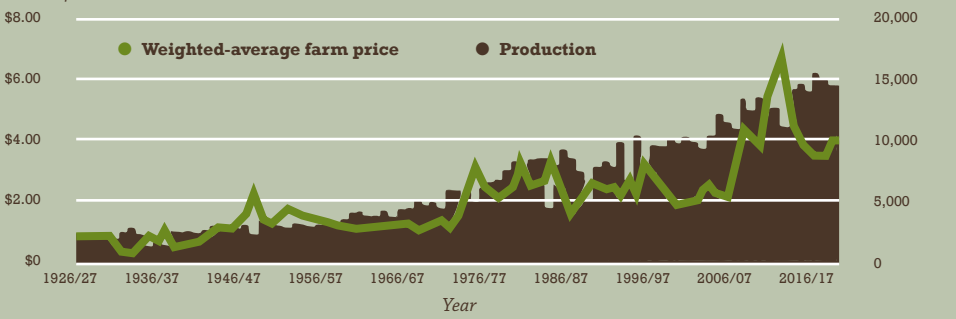
Slowly but steadily, global soybean production has moved to South America. The U.S. share dropped below 50% in the late 1980s and stayed below 50% since the mid-1990s. By 2010, we were producing approximately one-third of the world's soybean crop. The increases in soybean area and production recently have just been enough to maintain our production share.

Meanwhile, South American soybean production has skyrocketed. Now over half of the world's soybeans are produced there. This shift has been driven by

U.S. Corn Trends continued from page 1

Because of provisions in the Federal Agriculture Improvement and Reform Act of 1996 that permit farmers to make their own crop planting decisions based on the most profitable crop for a given year, corn acreage in the U.S. has increased from a government-mandated low of 60.2 million planted acres in 1983 to close to or exceeding 90 million acres since 2010. Much of this growth in area and production is a result of expanding ethanol production, which now accounts for nearly 40% of total U.S. corn use.

U.S. production and corn price received by farmers



a couple of major factors, including the relative production advantage soybeans has over corn in South America and the availability of new croplands in South America versus the land constraints here in the U.S.

China is the ancestral home of soybeans. Yet, it has long since given up the production crown. The vast majority of cropland in China is targeted for wheat, cotton, corn, and rice production (Figure 3).

Top Producing Countries

Table 1 outlines the current top 10 producing countries for corn and soybeans. For corn, the U.S. retains a dominant spot, well ahead of China. Brazil, the European Union, and Argentina round out the top five countries.

Countries 6–10 highlight the increase in corn production around the globe. Ukraine has shifted land from wheat to corn. India has invested in increased crop production. Mexico and Canada have boosted their corn production over the years to match the growth in their livestock industries. And Indonesia shows the potential for southeast Asia to produce corn.

In soybeans, the U.S. is now in a close race with Brazil for the top spot. Argentina is in third, well behind the U.S. and Brazil. With Paraguay at #6, Bolivia at #10, and Uruguay just outside the top 10, South America has become the dominant continent for soybean production. China and India lead the charge for eastern Asia, while Ukraine and Russia have moved up in soybean production in western Asia.

Table 1.
Current Top 10 Producers

Rank	*Corn*	*Soybean*
1	United States	United States
2	China	Brazil
3	Brazil	Argentina
4	European Union	China
5	Argentina	India
6	Ukraine	Paraguay
7	India	Canada
8	Mexico	Ukraine
9	Canada	Russia
10	Indonesia	Bolivia

Global production patterns continue to shift. The Black Sea region and South America continue to add land to the production mix. U.S. production growth is reliant on yield growth. So while the U.S. is the major producer in the corn-soybean realm, other countries and trade partners are growing in importance.

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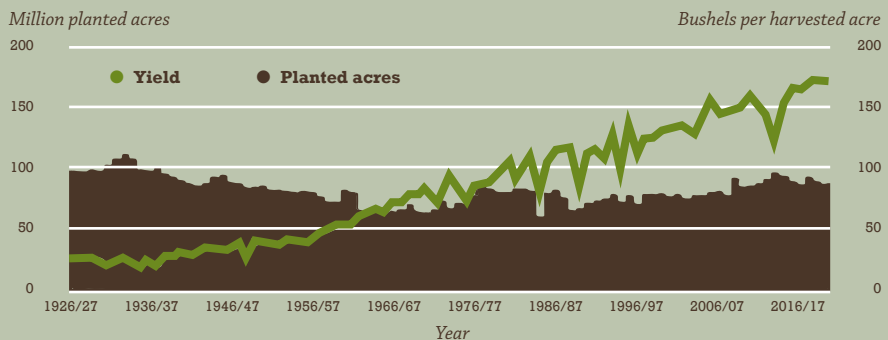
U.S. corn acreage and yield



Source: USDA, World Agricultural Outlook Board, World Agricultural Supply and Demand Estimates. Updated June 2018.

U.S. Soybean Trends

Soybeans, the dominant oilseed in the United States, account for about 90% of U.S. oilseed production, according the Economic Research Service (ERS) of the U.S. Department of Agriculture (USDA). The other major oilseed crops are cottonseed, sunflower seed, canola, rapeseed, and peanuts.

Large-scale production of soybeans did not begin until the 20th century in the United States, but since then area planted to soybeans has expanded rapidly. Increased planting flexibility, yield improvements from narrow-rowed seeding practices, a greater number of 50-50 corn-soybean rotations, and low production costs (partly due to widespread adoption of herbicide-tolerant varieties) favored expansion of soybean acreage.

U.S. soybean acreage and yield

Note: 2018f is a forecast for the 2018/2019 fiscal year
Source: USDA, National Agricultural Statistics Service

U.S. soybean exports and share of production exported

Source: USDA, Economic Research Service

More than 90 million acres of soybeans were planted in 2017, and in 2018 acres planted to soybeans in the U.S. exceeded corn acres for the first time since 1983, according to the ERS. Acreage tends to be concentrated where soybean yields are highest.

Midwestern soybean producers generally have higher yields and lower per-acre cash costs than Southern and Eastern producers. More than 81% of 2018 U.S. soybean acreage was concentrated in the upper Midwest, although significant amounts were still planted in the historically important areas of the Delta and Mid-Atlantic.

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