



## Some Key Trends in the World Corn Market

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This article is a companion to the March 13, 2015 *farmdoc daily* article, “Some Key Trends in the World Soybean Market.” As with the article on soybeans, objective of this article is to examine strategic consumption and production trends that underlie the current U.S. and world corn market.

### Data

The analysis starts with the 1996 crop year and ends with the 2014 crop year. The analysis revolves around comparing annual change between average consumption, production, harvested acres, and yield for the 1996-2000 and 2010-2014 periods. Use of averages for the two periods mitigates the impact of weather upon the annual change in variables of interest. The two 5-year periods bookend a period of explosive growth in U.S. corn ethanol production (see Figure 1). Sources of the data used in this article are (1) the U.S. Department of Agriculture (USDA), Foreign Agriculture Service “[Production, Supply, and Distribution Online](#)”; and (2) USDA, Economic Research Service “[Feed Grains Database](#)”.

### Consumption

Consumption is examined by both including and excluding U.S. corn used to produce U.S. ethanol. Note that U.S. consumption includes exports of corn and that corn used to produce ethanol is reduced by 29.5% to adjust for the distillers dried grain byproduct. DDGs are largely fed to livestock. The 29.5% adjustment factor is from the [Iowa State University Ethanol Profitability website](#).

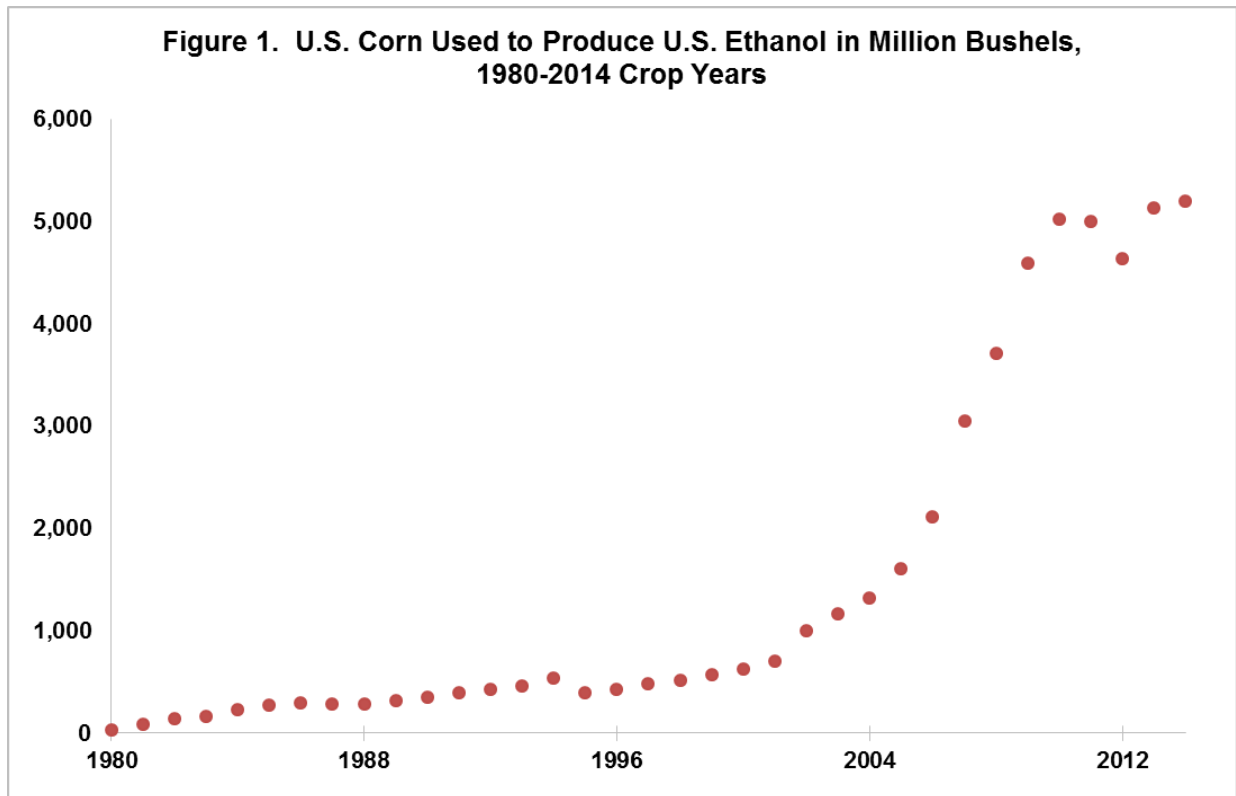
The two calculations reveal a stark difference in the growth of U.S. corn consumption: 251 million bushels per year when DDG-adjusted corn for ethanol is included vs. 25 million bushels per year when DDG-adjusted corn for ethanol is excluded. In short, DDG-adjusted corn for ethanol accounted for 90% of the growth in U.S. consumption of corn between 1996-2000 and 2010-2014.

For the world, annual growth of corn consumption declined from 891 million bushels per year to 665 million bushels per year when DDG-adjusted U.S. corn for ethanol is removed. DDG-adjusted U.S. corn for ethanol accounted for 30% of the world’s growth in corn consumption between 1996-2000 and 2010-2014. While a notable component of world consumption growth, U.S. ethanol was not the largest contributor.

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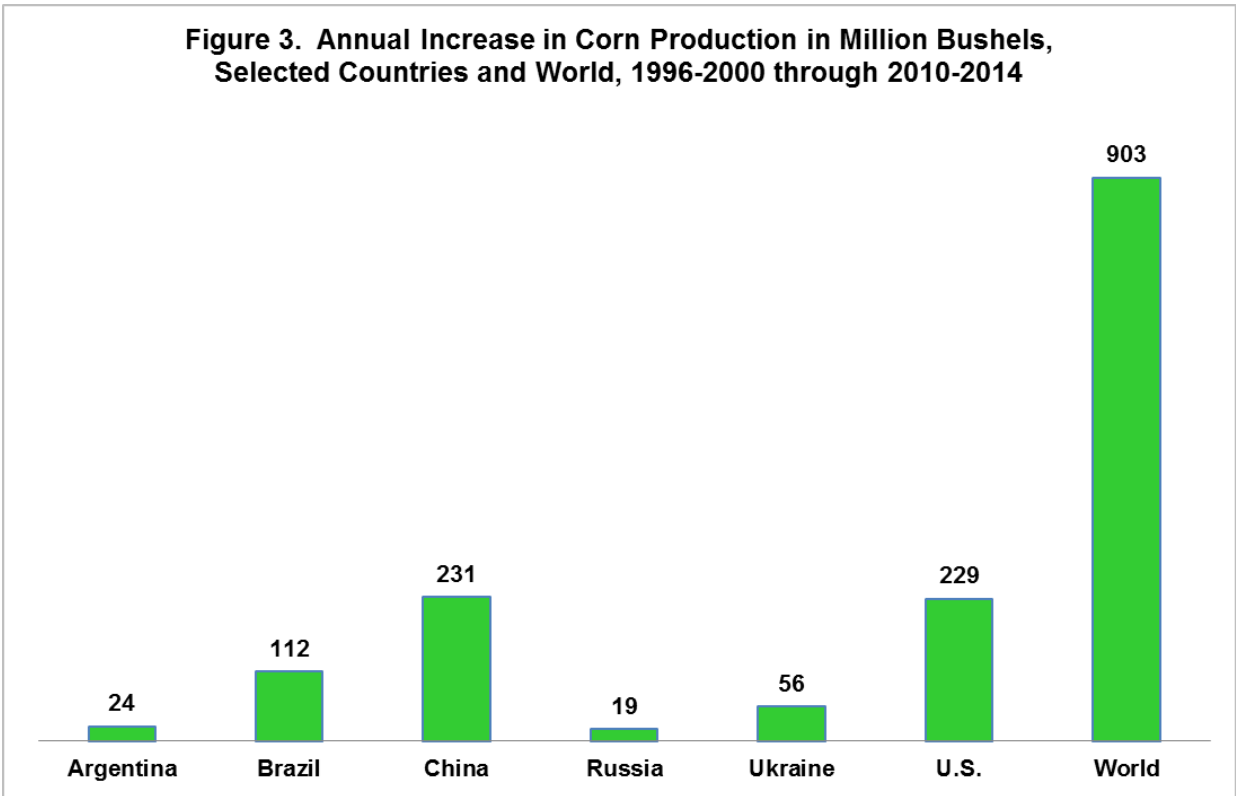
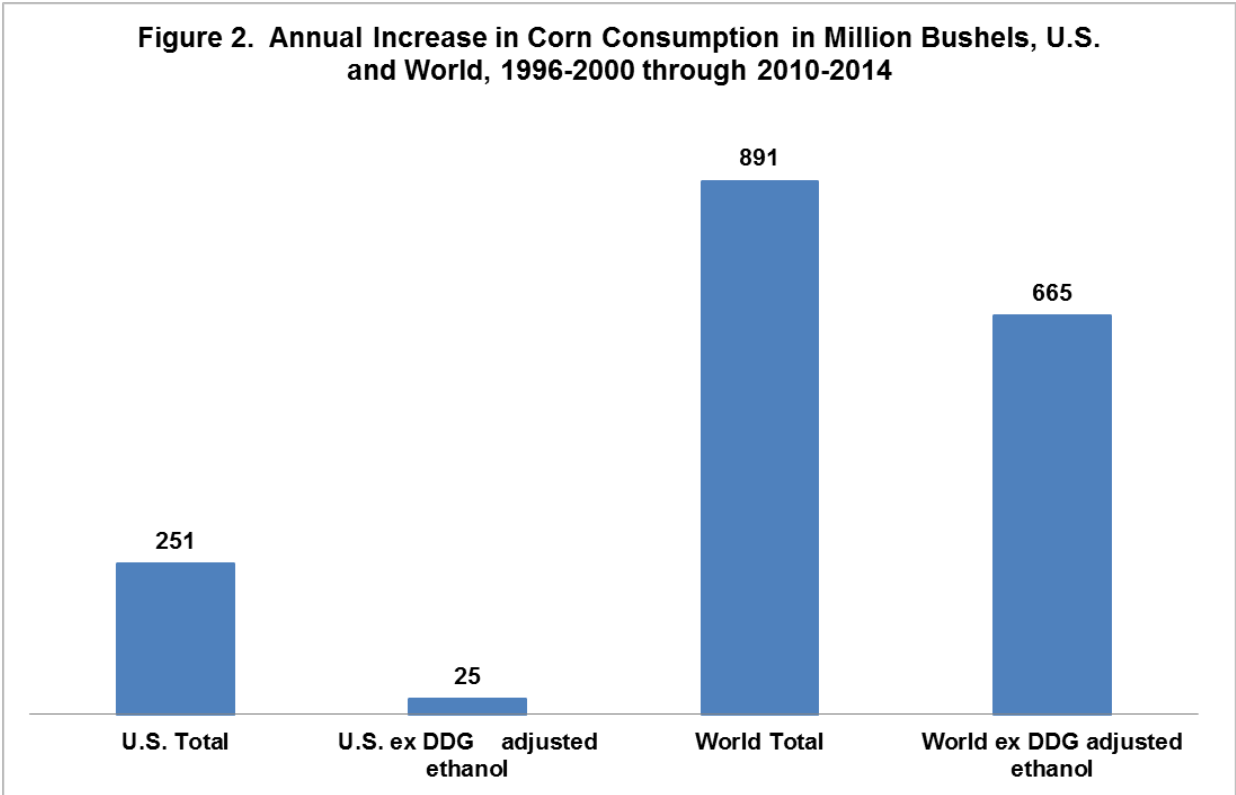
Feed and residual use accounted for 43% of the growth in world consumption of corn between the two periods.



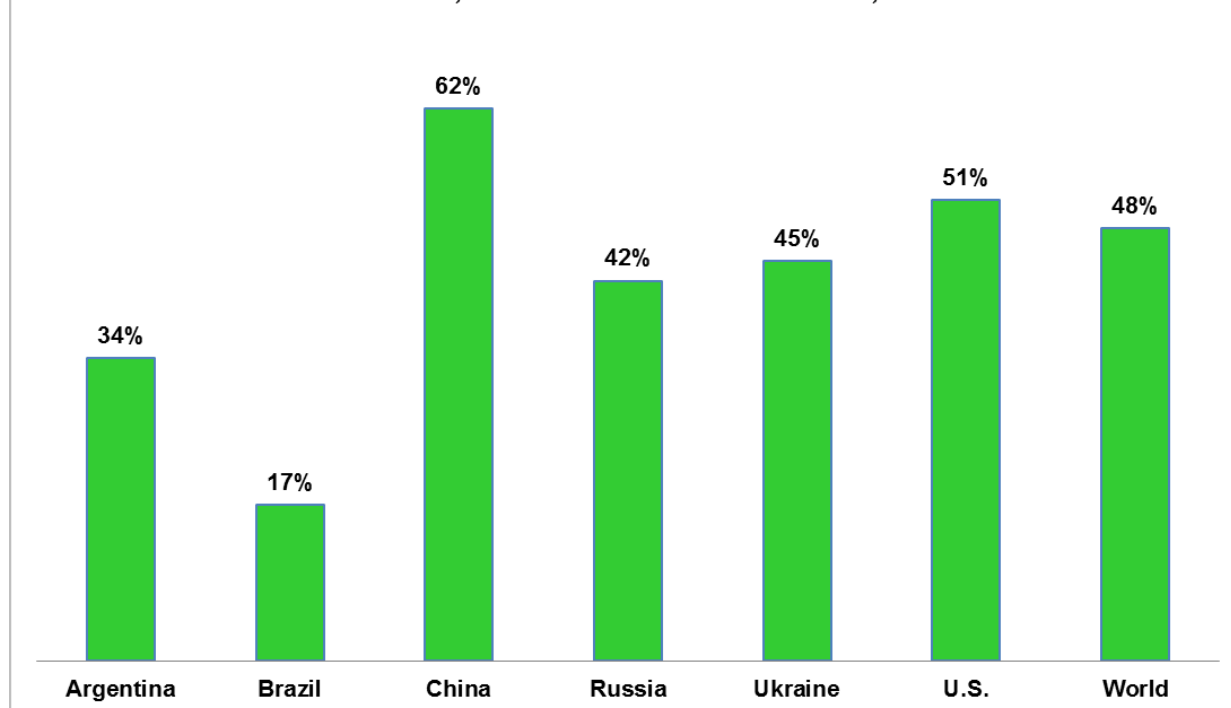
## Production

Not surprisingly given their interrelationship, the annual increase in production and consumption, including ethanol, of corn are similar for both the U.S. and world (see Figures 2 and 3). Growth in production was highest for the U.S., followed closely by China, with Brazil third among the countries listed in Figure 3. Taken together, the U.S. and China accounted for 51% of the world's increase in production between 1996-2000 and 2010-2014. Adding Brazil brings the three-country share to 63%.

Production can increase either because yield or harvested acres increased. To assess the relative role of these two factors, the increase in average harvested acres between 1996-2000 and 2010-2014 was multiplied by the average yield for 1996-2000. This value was divided by the increase in average production that occurred between the two periods. The method in essence assumes that yield did not change after 2000. For the world as a whole, the method found that more harvested acres accounted for 48% of the increase in production between 1996-2000 and 2010-2014 (see Figure 4). Thus, increases in yield and harvested acres were essentially equally important sources of growth in corn production for the world as a whole. The U.S. was similar to the world, with the increase in harvested acres accounting for 51% of the increase in production. China was more dependent on harvested acres, which accounted for 62% of its increase in production. In contrast, Argentina and, especially Brazil, was more dependent on yield, as their increase in harvested acres accounted for only 34% and 17%, respectively, of their increase in production. It is important to note that different methods can be used to make this division and thus this method should be treated only as advisory.



**Figure 4. Share of Increased Production Due to an Increase in Harvested Acres, Selected Countries and World, 1996-2014**



### Summary Observations

- U.S. consumption of corn other than via ethanol has grown by little since the late 1990s. A key strategic question emerges for the U.S. corn sector: Is it time to diversify its strategy for future growth in demand?
- If growth in U.S. consumption of corn more closely resembles the growth of non-ethanol consumption from 1996-2000 through 2010-2014, then U.S. acres of corn may need to decline since the increase in consumption can be met by the annual increase in U.S. corn yields. Such a situation could put sustained downward pressure on U.S. corn prices and bears watching.
- Response of U.S. consumption to lower prices will depend on what acres of corn does in the rest of the world since this directly impacts U.S. exports of corn. China appears to be committed at present to increasing acres planted to corn to try to minimize the loss of domestic food security in its feed grain market. The large role played by yield in the recent increase in production in Argentina and, especially, Brazil suggests these South American countries have improved their competitive advantage relative to the U.S., making them even more of an export competitor, everything else assumed the same. If this assessment is correct, it would mean that the recent period of farm prosperity produced a result similar to that of the 1970 period of prosperity, except that the crop involved is corn now vs. soybeans in the 1970s. The previous discussion in this bullet suggests a critical question confronting the U.S. corn market specifically and the price of corn more broadly is how does corn acreage in Russia and the Ukraine change relative to the U.S.?
- It is useful to put the strategic perspective of this article into the context of USDA's early forecast for the U.S.'s 2015-2016 crop year relative to the 2014-2015 crop year contained in the recent May 2015 [World Agricultural Supply and Demand Estimates](#) Report. USDA forecasts a 138 million bushel increase in total U.S. corn disappearance. Such an estimate is approximately half way between the two increases in U.S. consumption discussed above. The increase comes from an increase in exports and domestic feed and residual use. USDA forecasts a 1.4 million acre decline in harvested acres and projects a 4.2 bushel decline in harvested yield. The cumulative net impact is a 100 million decline in ending stocks. The projections with regard to consumption are clearly not

unreasonable, especially given the decline that has occurred in corn prices over the last couple of years. While clearly weather and acreage decisions will have a big impact as the crop year progresses, the strategic environment discussed above will also exert its influence. As with any analysis, the strategic assessment above is uncertain. Monitoring its evolution over the next two or so years, especially in regard to U.S. consumption and corn acreage around the world, will be critical to understanding the future of corn prices and the role that U.S. corn will play in the world corn market in the coming years.

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