There has been a persistent increase in the US average corn yield over time. These higher yields are generally associated with improved corn production practices and the development and adoption of yield-enhancing technology. Some believe that the trend yield has been increasing at a faster rate since the mid-1990s and will increase at an even faster rate in the future due to biotechnology-driven improvements in seed genetics. In a similar vein, the consistency of annual average yields near trend value since 1996 is cited as evidence of reduced risk of a one-time weather-related shortfall in corn production. There appears to be growing confidence within the corn production industry that corn yields are “bullet proof.” As the yield shortfalls of the 1970s, 1980s, and early 1990s appear further in the rear view mirror, less concern is expressed about such risks in the future.

Generally overlooked in the “higher trend, reduced risk” yield argument is the role that weather patterns play in determining corn yields over time. Our crop weather models for Illinois, Indiana, and Iowa suggest that the relatively high corn yields since the mid-1990s were the result of a period of favorable weather for corn production, not an increase in the underlying corn trend yield. The incidence of low average summertime precipitation or above average summer temperatures in the Corn Belt has been less frequent since 1995 than in the period from 1960 through 1995, particularly from the mid-1970s through the mid-1990s. If this pattern is not well-understood or ignored, the high yields in recent years can be easily attributed to technology instead of weather.

Our yield models suggest that the US average corn yield could drop sharply from recent levels in the event of adverse weather conditions. Based on yield and weather relationships since 1960, for example, the 2010 average yield could be as low as 135 bushels if growing conditions reflected the average of the poorest 10 percent of the growing seasons since 1960. A poor growing season anytime soon would require a substantial reduction in corn consumption because of modest inventory levels. Year ending stocks would likely be reduced to near pipeline levels and the average farm price of corn would likely be very high compared to recent averages. It is this scenario that would be troublesome for users of corn and likely result in a higher rate of increase in food costs. Due to the mandates for renewable biofuels production and the relative insensitivity of exports to price, most of the burden of a production shortfall would be shouldered by the domestic livestock industry.

We are certainly not forecasting poor growing conditions and low corn yields in 2010. However, history suggests that such a shortfall has a high probability of occurring sometime. The general lack of concern about a weather-induced shortfall in U.S. corn production suggests that market participants and policymakers may be ill-prepared to
cope with such a shortfall should it occur. It might be prudent to develop policy responses to a shortfall before it occurs so that market participants are not caught off guard. Policy responses would likely have to include some temporary adjustments in the programs supporting the ethanol use of corn.