

Translating Yield Decline to a “Dead Date”

We analyzed research on the impact of climate change on crop yield to arrive at a “dead date”

- Climate change will continue to disrupt the US food system across crop production, logistics, manufacturing, and distribution
- We looked at research on how climatic shocks and extreme weather will drive crop scarcity (by lowering crop yields) which contribute to price spikes (due to scarcity), creating more volatile crop pricing and availability
- These price increases may push input costs of current food products to extreme levels, pushing them out of their everyday and affordable price points
- Our analysis used instances where yields declined due to weather or other ‘system shocks’, and examined associated price impacts
- We quantified that relationship and applied it to different future yield decline scenarios to see how prices may change

Arriving at a Crop's "Dead Date"

- **Researched Impact of Climate Change on Yield Decline for Selected Crop:** Analyzed academic studies that explore the past and future impacts of climate change on US crop yields
- **Analyzed Impact of Weather/Extreme Shocks on Yield Decline & Price:**
 - **Crop Forecasts vs. Actuals:** Leveraged USDA data to analyze pre-planting yield forecasts and compared to harvest actuals
 - **Weather Events:** Mapped extreme weather events by year to explore connections between yield declines and extreme weather
 - **Calculated Notable Decreases/Increases:** Looked at periods where forecasts vs. actuals deviated and quantified the deviation; calculated relevant price changes
- **Quantified Assumptions and Projected Price Increases**
 - Prioritized select yield declines from academic studies (e.g., yields will decline 20% by 2050)
 - Looked at data where yields declined/prices increased; calculated a ratio to quantify the magnitude between the decline/increase
 - Applied ratio to % declines identified in academic studies (e.g., if yields decline 5%, and prices go up 2%, what happens if yields decline 1%)
 - Used current pricing for key commodity and applied relevant % increase to model price increases into 2050 (e.g, under a 20% yield decline scenario, what will happen to prices by 2050)
 - We also analyzed production inputs for bread (wheat) and eggs (feed) leveraging correlations between commodity pricing and finished goods retail pricing to determine how increases in ingredient pricing will push retail prices into new categories
- **Selected a "Dead Date"**
 - We selected "date dates" based on when the price for the commodity would push the finished food product outside the everyday and affordable category

Sources

- Impacts of Climate Change on US Soybean Production ([Source](#), [Source](#), [Source](#))
- US Soybean Yields ([Source](#), [Source](#))
- US Soybean Pricing ([Source](#), [Source](#), [Source](#))
- Global Soybean Production ([Source](#))
- Global Soybean Pricing ([Source](#))
- Soybean Oil ([Source](#), [Source](#))

