Influence of Weather and Technology on Corn Yields

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2007 Illinois Farm Economic Summit
The Profitability of Illinois Agriculture: Where to from Here?
Conventional Wisdom

2007 Illinois Farm Economic Summit
Illinois Corn Yields, 1960-2006

1960-1995: +1.5 bu./yr.

1996-2006: +3.1 bu./yr.
Illinois Corn Yields, 1960-2006


1992-2006: +2.0 bu./yr.
Regression Models of Corn Yield

- **Yield**: State Average for Illinois, Indiana, Iowa
- **Technology**: Linear Time Trend
- **Precipitation**: Sep-Apr, May, June, July, August
- **Temperature**: May, June, July, August
- **Weather Data**: Monthly Average
- **Time Period**: 1960-2006
Regression Models of Corn Yield

- **Yield**: State Average for Illinois, Indiana, Iowa
- **Technology**: Linear Time Trend
- **Precipitation**: Sep-Apr, May, June, July, August
- **Temperature**: May, June, July, August
- **Model Fit over 1960-2006**:
  - Illinois – 95%
  - Indiana – 94%
  - Iowa – 94%
Effects of Technology, 1960-2006
(assuming average weather)

Illinois: +1.9 bu./yr.
Indiana: +1.8 bu./yr.
Iowa: +2.0 bu./yr.
Effects of Technology, 1960-2006
(assuming average weather)

Illinois: +1.9 bu./yr.
Indiana: +1.8 bu./yr.
Iowa:     +2.0 bu./yr.
Effects of Precipitation, 1960-2006

June Precipitation

July Precipitation

Yield (bu./acre)

Precipitation (inches)

Illinois
Indiana
Iowa

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Effects of Temperature, 1960-2006

July Temperature
- Departure From Average Temperature (degrees Fahrenheit)
- Change In Yield (bu./acre)
- Illinois
- Indiana
- Iowa

August Temperature
- Departure From Average Temperature (degrees Fahrenheit)
- Change In Yield (bu./acre)
- Illinois
- Indiana
- Iowa

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Are Trend Yields Increasing Faster at the State Level?

- **Illinois**: +1.8 bu./yr. (1960-1995), +1.9 bu./yr. (1996-2006)
- **Indiana**: +1.8 bu./yr. (1960-1995), +1.8 bu./yr. (1996-2006)
- **Iowa**: +1.9 bu./yr. (1960-1995), +2.0 bu./yr. (1996-2006)
**New Seed Technology**

**Agrisure™ Traits: New Choices. More Control. Maximum Yield.**

Agrisure traits from Syngenta provide growers with unsurpassed performance, more freedom to choose crop inputs and higher yields. With Agrisure traits come with industry leading assurances and the option to participate in AgrEdge™ corn program to maximize corn profitability by combining premium genetics, Agrisure traits, and superior crop protection. Agrisure™ traits include Touchdown Total™ herbicides, Force® insecticide, and Cruiser Extreme® seed treatment.

**Monsanto's Yield Boom**

**2007 Crop Genetics Pipeline**

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| 400 bushels per acre corn yield no longer a pie-in-the-sky goal |

BY: Anne Fitzgerald

A generation ago, Iowa farmers would not have imagined harvesting 400 bushels of corn per acre yields on the horizon.
Key Illinois Weather Variables, 1960-2006

Total June-July Precipitation

Average = 8.0"

Average July-August Temperature

Average = 74.2°
Key Indiana Weather Variables, 1960-2006

Total June-July Precipitation

Average = 8.4"

Average July-August Temperature

Average = 73.2°
Total June-July Precipitation

Average = 8.8"

Average July-August Temperature

Average = 72.9°
The United States had so little variability in weather and grain production in the past two decades (until 1974) that an attitude of complacency had developed. There was frequent reference in the early 1970’s to the fact that technology had advanced to such a level that weather was no longer a significant factor in grain production.

—L. Thompson, Iowa State, 1975
Alternative Trend Yield Projections to 2030 for Illinois Corn Yields

1940-1959: +1 bu./yr.
1960-2006: +1.7 bu./yr.
2007-2030: +1.7 bu./yr. +3 bu./yr. +6 bu./yr.