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A Corn Yield Function Considering the impact of water and weather

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**A Corn Yield Function
Considering the impact of water and weather**

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A Corn Yield Function

Considering the impact of water and weather

Federico J. Trindade

Department of Agricultural Economics – University of Nebraska – Lincoln

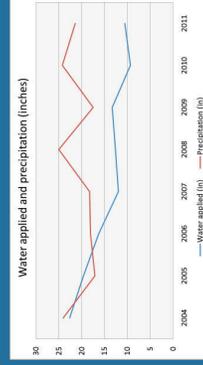
Introduction:

The objective is to develop a corn yield production function that accounts for amount of water used, traditional farm inputs and also for environmental variables.

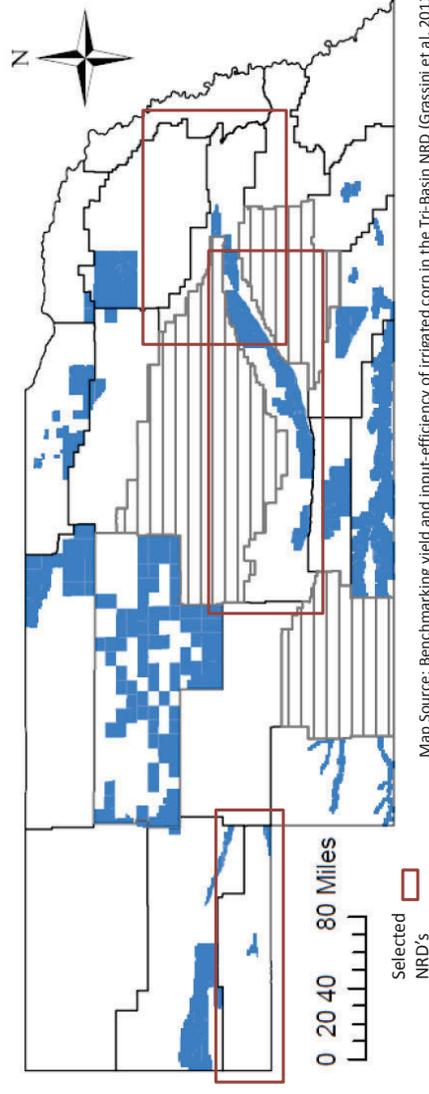
Model:

The model accounts for use of fertilizer, amount of water applied, dummy variables for previous crop, a time trend, weather variables (precipitation and degree days) and interrelation terms between some of them. The dependent variable is log of yield of corn. Two specification with different degree days intervals were considered.

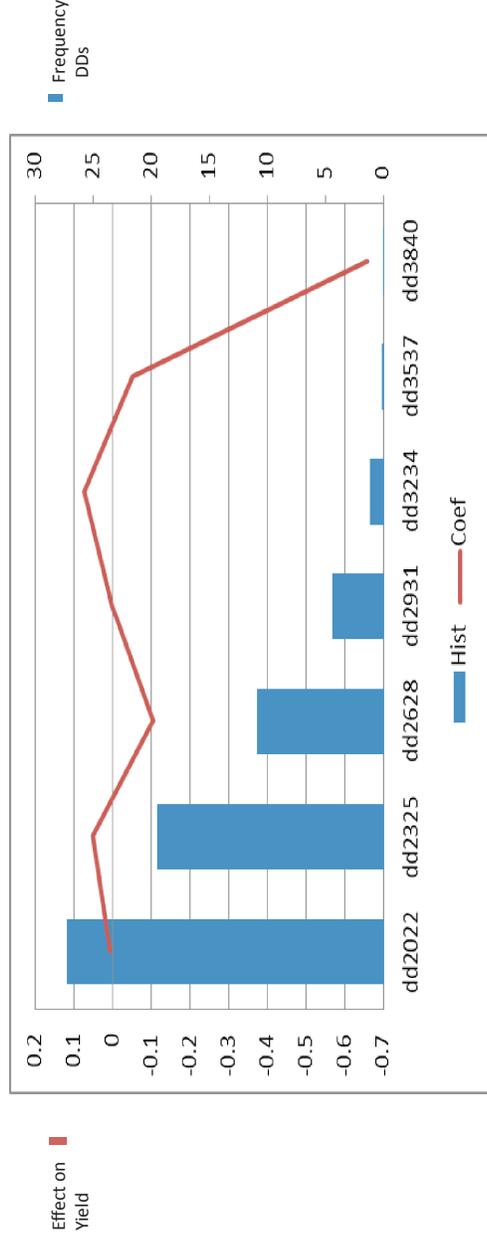
A profit maximizing behavior of the farmers was assumed. Instrumental variables to correct for endogeneity in the use of water and nitrogen were used. The period of analysis is yearly data from 2004 to 2011. The database consists in 26,598 observations.



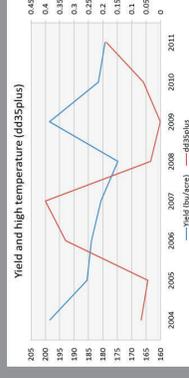
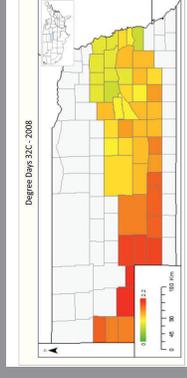
Location of the farms surveyed



Map Source: Benchmarking yield and input-efficiency of irrigated corn in the Tri-Basin NRD (Grassini et al. 2013)



Effect of extra day with different temperatures ranges over Yield and frequency of each range.



Results:

All the variables in the model with the exception of the dd2931 interval and the interrelation between nitrogen and time were found significant.

Amount of water applied was found to have a positive effect on yield, a 1% increase in the amount of water applied is associated with a 15% increase in yield.

High temperatures were found to be very important explaining decreases in yield: 24 extra hours during the growing season with temperatures between 35°C and 37°C decreases corn yield by 5% and with temperatures higher than 38°C decreases corn yield by 48%.

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