The Agricultural Productivity Indicator Analysis System (APIAS):

Tracking the agricultural impacts of climate variability and change

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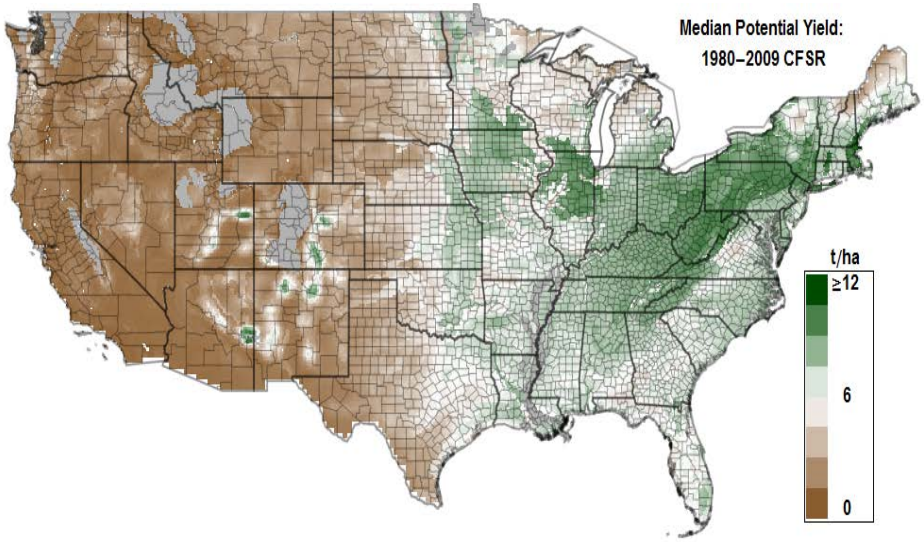
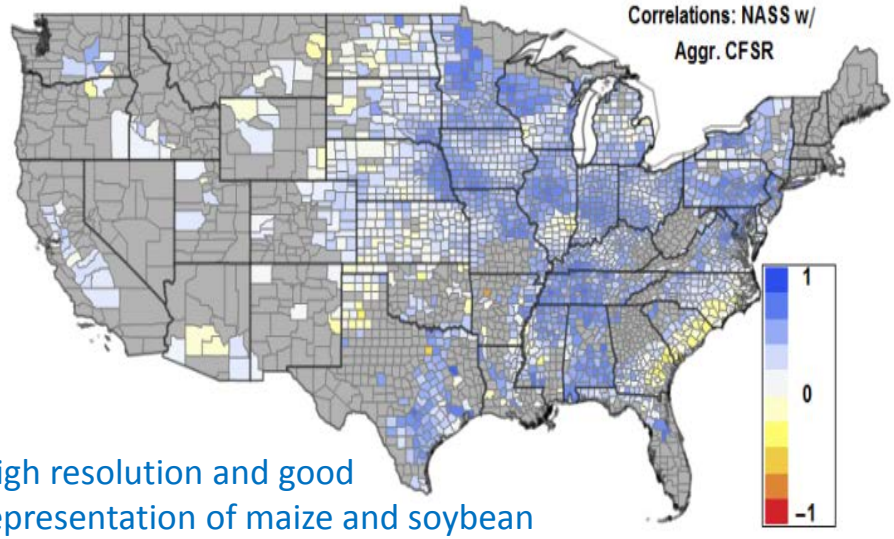
Climate and agricultural modeling to address key topics for agricultural impacts:

1) How is climate change affecting agricultural production in different US regions?
2) How does the signal of climate change compare to the effects of climate variability, extreme events, and uncertainties in recent agricultural impacts?
3) Are particular crops and regions near critical thresholds that will jeopardize or enable future agricultural productivity?
4) How do recent years' agricultural impacts compare to projections for the upcoming climate normal?

Agricultural modeling: Use the pDSSAT gridded crop model at 5 arc-minute resolution





High resolution and good representation of maize and soybean

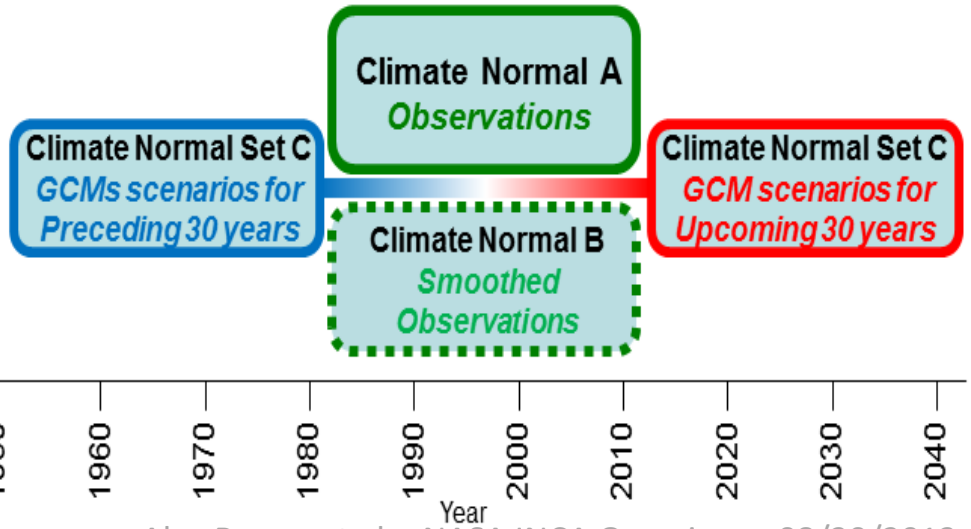
Climate data and scenarios: Drive pDSSAT with climate datasets representing three climate normals:

A) **Observations of last 30 years:** based upon AgMERRA (bias-corrected version of MERRA-Land/SRB/others; intercomparison of other datasets underway)

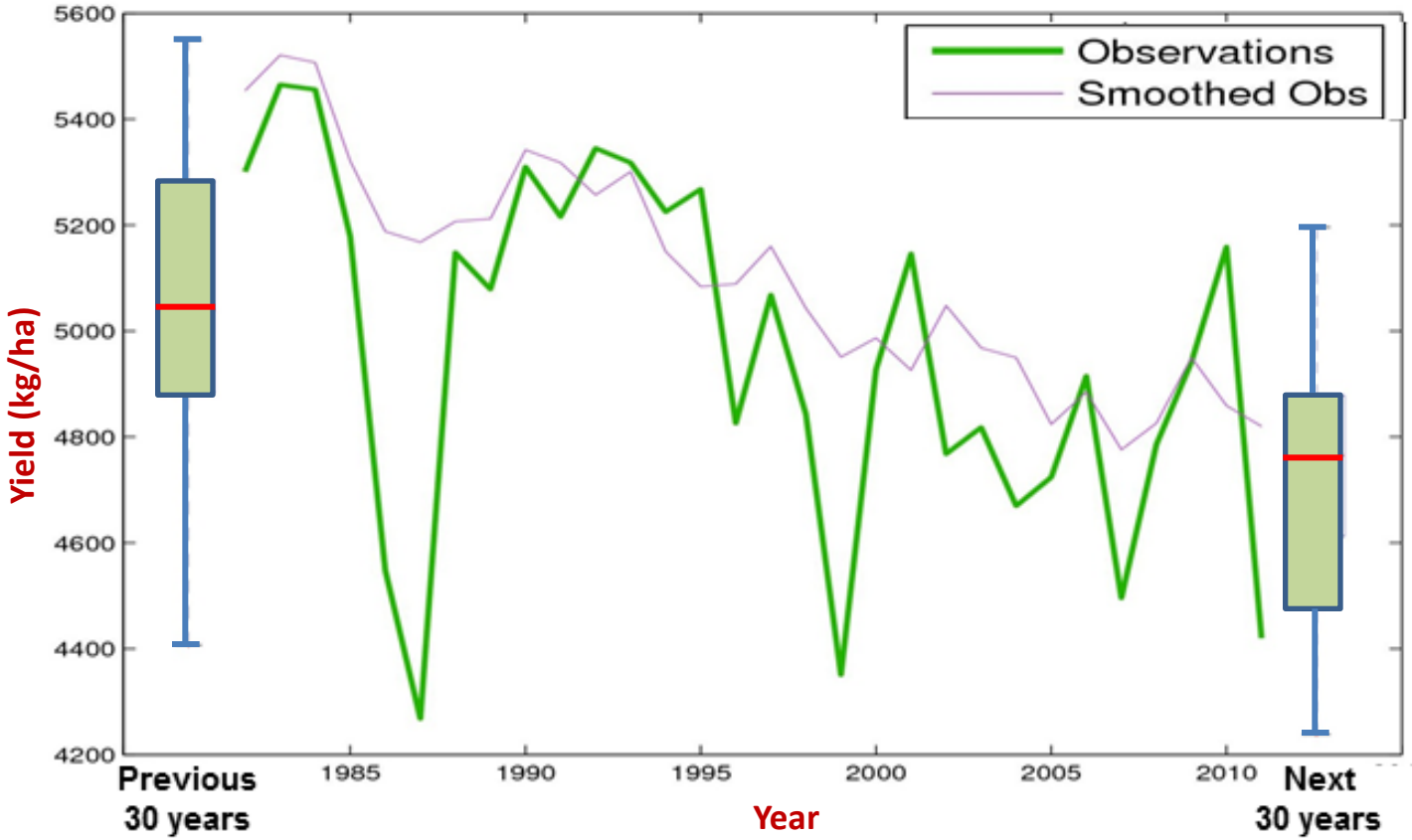
B) **Smoothed observations of last 30 years:** same as above but with 30-day smoothing to gauge effects of sub-seasonal climate extremes

C) **Scenarios for preceding and upcoming 30 years:** based upon CMIP5 projections

Schematic of climate datasets examined



Hypothetical example of APIAS results for a single county:



- **Analysis may be performed on a variety of spatial scales (e.g., county, state, region) and may differ by crop and management type (e.g., irrigated and rainfed systems).**
- **Seeking to identify**:
  - Areas breaking from expected trend
  - Historical events profoundly affected by sub-seasonal climate extremes
  - Farming systems that may be on the verge of threshold shifts in productivity