The Agricultural Productivity Indicator Analysis System (APIAS): Tracking the agricultural impacts of climate variability and change

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Part 1: Construct & calibrate US-wide crop models on high-performance computational systems

1980-2010 Corn Production

1980-2007 Wheat Production

1980-2010 Soy Production
Part 2: Climate Trends

1980-2010 Precipitation Trends (AgMERRA)

1980-2010 Soy Yield Trends (APIAS)

Part 3: Mean and variability change scenarios for 2020s (median of 5 GCMs)

%Change in Maize Yield  %Change in Wheat Yield  %Change in Soy Yield

[{-40% to 40%}]

Alex Ruane et al. - NASA INCA Final Highlights – 01/21/15
Part 4: APIAS for any given site (example = Central Iowa Maize):

Overview: Allows rapid assessment of yield variability and trends at local and national level

Initial findings:
- Observed increase can’t be attributed to climate change.
- Yields likely to turn downward from current slight rise/flat conditions in next 30 years.
- Interannual variation in conditions more important than within season extremes, although this may be a function of the model rather than real observations.
- Climate changes projected to be most pessimistic for corn and soy, wheat production slightly increased in Southern Midwest while decreasing in Upper Midwest and Pacific NW.