
Biobased Industry Center: Project Update

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Motivation

- Producers systematically apply more nitrogen than is optimal (*ex-post* realizations).

- Pressure to reduce N use in agriculture

- N and seed technology research is proceeding that may:
  - Increase expected yields (seed engineering)
  - Reduce variability of yields (N fixation)
Research Direction

If these technologies come to fruition, we may want to know:

- the likely response of farmers’ N-use
- sensitivity of N-use rates to technological costs
- the implications for the intensive and extensive margin
Proposal Objective #1

Model yield as a function of N and calculate expected returns under varying technology scenarios:

- technology that increases the expected yield (no change in variability)
- technology that decreases variability in yield (mean-preserving)

Simplifying assumptions made to date:

- All costs/returns fixed and known
- Only uncertainty is over yield outcome
Proposal Objective #1

Preliminary modeling suggests the following (obvious) results
- In a price vacuum, mean-increasing advances will at least not decrease N usage

Therefore, the next questions become:
- what are the relative “prices” for technologies \((P_N / P_{\text{Corn}})\) that induce N reduction?
- variability reducing and mean-increasing outcomes
Next Steps – Objectives 2 & 3

2. Consider locally relevant land-use decisions
   o Expected impacts to corn/soybean rotation

3. Develop prediction of land use changes due to extensive and intensive margin effects
   o use current land quality/capability class data
   o vary scenarios
   o invoke FAPRI model (grain and WorldNPK)
Questions?

Thanks for your time!