Scenarios: Fertilizer

• 10% tax on nitrogen (N) fertilizer price

• Adverse supply shock
  – Higher production cost
  – Increase in global area by 0.002%

• Greenhouse gas results:
  – Decrease in emissions from nitrogen over the projection period (average: -0.153%) in the U.S.
  – Decrease in global N fertilizer emissions by 0.006%
  – Increase in emissions from land-use change by 0.084%

• Net increase in emissions: 0.03%
Additional Scenarios

• Low Energy Scenario
  – Crude oil price fixed at USD 75 from 2011/12 onward
  – Increase in cropland in Argentina, Brazil, and China
  – Increase in emissions from LUC by 1.074%
  – Net increase: 0.40%

• Credit and Duty Scenario
  – Positive demand shock for corn
  – Almost no increase in Brazil
  – Increase in emissions from LUC by 1.681%
  – Net increase: 0.62%
Improvements

• Fertilizer rates
  – Replacement of static fertilizer rates by dynamic rates

• Pasture model
  – Introduction of a stocking rate elasticity, i.e., stocking rate based on cattle herd increase
    • Example: stocking rate elasticity = 0.5%
    • Increase in cattle herd by 1% ➔ stocking rate increase of 0.5 x 1 = 0.5%
Forest Model

• International forest model
  – Importance of idle land and yield increase on deforestation using the Forest Resource Assessment data from 2010
• Analysis of 143 countries and 18 major commodities
• Spatial information on crop specific location
• In progress:
  – Matching forest area with information about production and crop location
U.S. Idle Cropland

Illinois

Difference in Idle Land

Difference in Crop Area

Indiana

Difference in Idle Land

Difference in Crop Area

Iowa

Difference in Idle Land

Difference in Crop Area

Kansas

Difference in Idle Land

Difference in Crop Area

Michigan

Difference in Idle Land

Difference in Crop Area

Minnesota

Difference in Idle Land

Difference in Crop Area

Missouri

Difference in Idle Land

Difference in Crop Area

Nebraska

Difference in Idle Land

Difference in Crop Area

North Dakota

Difference in Idle Land

Difference in Crop Area

Ohio

Difference in Idle Land

Difference in Crop Area

South Dakota

Difference in Idle Land

Difference in Crop Area

Wisconsin

Difference in Idle Land

Difference in Crop Area