Integrating National Household Survey Data and Climate Change Analysis

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Outline of presentation

• Survey data available
• Topics covered by surveys
• Mapping and analysis to date
• “Adding economics”—Strategy for integrating food security dimension with modeling of climate, crop, land use, and water resources
• “Adding nutrition” . . .
Kenya

- Nationally representative rural household survey
  - Partners: Tegemeo Institute, Kenya Bureau of Statistics
- 1243 households in all 5 panel waves
Types of data included

- Household demographics; assets
- Land use; land transactions for last 10 years
- Soil, water, environmental conservation practices
- Crop/livestock production; amt + cost of inputs
- Hired and family labor use
- Crop/livestock sales and purchases
- Selected dry food items purchased
- Food security (use of relief food; coping mechanisms)
- Nonfarm activities
- Weather patterns; climate change since 10 years
Include map of Kenya regional summary statistics here (perhaps juxtaposed with map of rainfall...)
Maps of Kenya Data

• Maize production and sales (needs to link to Flash file that animates the display of production and sales by year)
Mozambique

• National Agricultural Household Survey
  – Partners: Ministry of Agriculture
  – Panel component: 2002 & 2005
• 4,059 households in panel

Include map of TIA household locations here...
Types of data included

• (to be added; may not be significantly different than Kenya data)
Change in marketed share of hh production 2002-2006

-1.00 - 0.50
-0.49 - 0.25
-0.24 - 0.00
0.01 - 0.25
0.26 - 0.50
0.51 - 0.82
no sales

MILHO
ARROZ
MEXOIERA
AMENDOIM GRANDE
FEIJÃO NHEMBA
FEIJÃO MANTEIGA
Zambia

- Nationally representative rural household survey
  - Partners: Central Statistical Office, Ministry of Agriculture and Cooperatives
- 4,286 households in all 3 panel waves
- 4th wave planned in 2011
Types of data included

• (to be added; may not be significantly different than Kenya and Mozambique data)
Centroids of SEAs used in the Zambia survey
Mapping surplus and deficit zones

△ = Surplus zones

🔴 = Deficit zones
Cross-border proximity of ▲ and △

Major Markets (annual purchases, tons)
- □ >50,000 and <100,000
- □ >100,000

Net Sales (annual tons per square km)
- □ <=.1
- □ >.1 and <=0
- □ >0 and <=1
- □ >1 and <=10
- △ >10
Cross-border proximity of ▲ and ●
Surplus millet and sorghum production in West Africa
Surplus millet and sorghum market flows in West Africa
Adding Economics (1)

• Use household panel data along with high-resolution historical climate data
  – Econometric analysis to estimate relationship between climate variables and:
    • Small farm behavior (crop choice, market participation)
    • Farm household outcomes (levels & variability of yields & income, net calorie availability, other indicators of food security)
Adding Economics (2)

• Use survey data and econometric results to construct farm models to explore responses to projected changes in climate (e.g., length or variability of growing season):
  – LP farm models optimize farm production choices (crop choice, input levels) under defined set of farm constraints and environmental parameters
  – Agent-based models: allow greater diversity of farm type; may not assume optimization
  – Aggregate farm responses give landscape-level responses to climate change scenarios
Adding Economics (3)

• This is a medium/long-term research agenda
  – Econometric work alone may occupy first year

• In principle, would allow for more dynamic and theoretically consistent agricultural responses to climate change scenarios
  – shifting production potentials will drive land use/cover changes and rural resettlement
    • this may in turn feed into climate change modeling
  – will alter spatial location of supply & demand
    • trade responses conditioned by infrastructure & market institutions