Spatial variation of crop yield response to climate change in East Africa

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Abstract:

There is general consensus that the impacts of climate change on agriculture will add significantly to the development challenges of ensuring food security and reducing poverty, particularly in Africa. While these changes will influence agriculture at a broad scale, regional or country-level assessments can miss critical detail. We use high-resolution methods to generate characteristic daily weather data for a combination of different future emission scenarios and climate models to drive detailed simulation models of the maize and bean crops. For the East African region, there is considerable spatial and temporal variation in this crop response. We evaluate the response of maize and beans to a changing climate, as a prelude to detailed targeting of options that can help smallholder households adapt. The results argue strongly against the idea of large, spatially contiguous development domains for identifying and implementing adaptation options, particularly in regions with large variations in topography and current average temperatures. Rather, they underline the importance of localised, community-based efforts to increase local adaptive capacity, take advantage of changes that may lead to increased crop and livestock productivity where this is possible, and to buffer the situations where increased stresses are likely.

Crosscutting Themes: Adaptation, Sociodemographic Vulnerability, Vulnerable Population

Adaptation: Secondary Health Impacts of Adaptation, Vulnerability Assessment

Vulnerable Population: Low Socioeconomic Status, Workers

Exposure: Food Security

Food Security: Crop Productivity, Food access/distribution, Livestock Productivity

Geographic Feature: Tropical

Geographic Location: Non-United States

Non-United States: Africa

Health Impact: General Health Impact

Model/Methodology: Exposure Change Prediction

Resource Type: Research Article
Climate Change and Socioeconomic Scenarios: Special Report on Emissions Scenario (SRES), Other Climate Change Scenario, Specify

Timescale: Long-Term (>10 years)