The Complex Drivers of Yield Variability for Maize in East Africa

Olivia Woldemikael[1], Cheryl Palm[2], Clare Sullivan[2], Kevin Tschirhart[2]

[1]Environmental Science, Columbia University, New York, NY, USA [2]Agriculture and Food Security Center, Lamont-Doherty Earth Observatory, Palisades, NY, USA

The African agricultural sector is characterized by smallholder farms using low rates of agricultural inputs and severely degraded soils. Though average yields remain low, East African agricultural systems experience high variation in yields regionally, as within similar agro-ecological zones and villages. Understanding the causes of this heterogeneity can lead to targeted approaches to improve crop yields at these four East African sites used in the study and even, at a larger scale. Representative households from each site were chosen to examine the interaction of key factors involved in agricultural management practices and social conditions, along with local environmental and climate factors, to influence on yield. CART (classification and regression tree) analysis was used to link significant determinants to yield rates for individual sites and across sites. The analysis revealed that factors with the strongest impact on yield were management practices related to planting density, planting date, plot area, and fertilizer application. Environmental and general site-specific variables had a lesser impact with the exception of the site in Sauri, Kenya. The results indicate similar best agricultural management practices across the four different sites.