

MODELING EFFECTS OF CLIMATE CHANGE AND VARIABILITY ON SORGHUM YIELD IN ETHIOPIA

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Sorghum is one of the most important staple crops with significant area coverage in Ethiopia. Ethiopian agriculture is prone to frequent droughts and extreme weather events and these are expected to intensify due to climate change and variability. The objectives of this study were to investigate the impacts of climate change and variability on sorghum yield and evaluate the effects of adaptation strategies in mitigating climate change impacts on sorghum production. The Model for Nitrogen and Carbon in Agro-ecosystems (MONICA) was developed at 10 km grid scales. The model was calibrated using observed data for two sorghum cultivars (Meko and Tehsale). The calibrated model was used to assess climate change impacts and identify viable adaptation options (e.g., onset date, targeted fertilizer rate) for sorghum cropping systems in Ethiopia. Sorghum yield was estimated for 2011-2040 period under four Representative Concentration Pathways (RCP2.6, RCP4.5, RCP6, and RCP8.5) of the Fifth Assessment Report (AR5) by the Intergovernmental Panel on Climate Change (IPCC). Results showed that climate change will negatively affect sorghum yield. Without adaptation strategies up to 50% sorghum yield reduction is expected. Model simulations showed that climate change adaptation strategies could mitigate negative impacts of climate change and could likely result in an overall increase in sorghum yield. This study highlights the significance of adaptation strategies in mitigating the negative effects of climate change and variability in the region.

PRESENTER BIO: Mr. Fikadu G. is a graduate student in the department of Agricultural & Biological Engineering at the University of Florida. Fikadu is an agro-meteorologist with more than 7 years of research experience on climate change and crop simulation modeling.