A High-Resolution CMS System for East Africa: 
*Unifying Top-Down Atmospheric Inversion and Bottom-Up Next-Generation Vegetation-Soil Models and Observations*

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Objective: Develop the first CMS prototype in EA that integrates “bottom-up” land model simulations constrained by multiple satellite observations and “top-down” carbon inversion to quantify carbon budgets at 0.5° x 0.625° (2009-2024)

Stakeholders (1st workshop in December 2021)
- Ministries of agriculture (Ken, Eth, Tan, Uga)
- CGIAR Research Program on Climate Change and Food Security (CCAFS), ICRAF
- Ag-transformation, climate change commissions working on NAPs and NDCs

Task 1: Incorporate the state-of-the-art soil C model (SOMic) into CLM5

Task 2: Assimilate satellite land variables (MODIS LAI, GOSAT/OCO2/3 SIF, SMAP soil moisture) into CLM5-DART to constrain C fluxes/storage simulations

Task 3: Develop high-resolution C flux inversion with satellite xCO₂ (GOSAT, OCO-2/3), xCO (MOPITT), and CLM5-DART NBP as prior

Task 4: Re-optimize C fluxes/storage via constraints of NBP and biomass burning fluxes from posterior CMS-Flux-Africa

Task 5: Validation and uncertainty quantification

Task 6: Stakeholder engagement