

SMARTLAND – ENVIRONMENTAL SENSING OF ECOSYSTEM SERVICES FOR DEVELOPING CLIMATE-SMART LANDSCAPE FRAMEWORK TO IMPROVE FOOD SECURITY IN EAST AFRICA



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Changes in land use and land cover in sub-Saharan Africa due to agricultural expansion, conservation and urban growth have impact on ecosystem services, radiation balance of the land surface, gas exchange, water cycle, habitats and biodiversity. Consequently, negative changes in livelihoods and climate at different scales have been experienced. In Africa almost all agricultural systems are rain-fed and vulnerable to climatic variability. Innovative and transformative measures are urgently needed to assist farming communities to cope with the changes in order to increase food security and reduce poverty.

We aim to develop climate-smart landscape framework, which would take into account both the needs of climate stability, and sustainable agriculture fed by ecosystem services such as water provision, pollination and fertile soil. Framework building area is Taita Taveta County, Kenya in which consortium has long research history, instruments, data and partnerships.

Project aims to 1) model land cover changes and ability of vegetation to sequester carbon, harvest water and evaporate water, 2) assess land-atmosphere interactions by environmental sensing by measurements of eddy covariance, of soil respiration by gas chambers on various land cover types and crop and tree transpiration on agricultural lands, 3) assess soil-crop system functioning at agricultural lands by measurements of soil infiltration capacity, water retention properties, crop growth and crop water availability in different cultivation systems and weather conditions, 4) study potentiality of transition to climate smart landscapes for sustainable development, and 5) disseminate the results to stakeholders, decision-makers and scientific community at the highest levels.

Climate Smart Landscape approach is a global development goal guiding the transformation of agricultural systems to integrate adaptation, mitigation and food security. It fosters resilience of agricultural systems to climate change to secure the sustainable provision of food while reducing greenhouse gas emissions. Landscape scale interactions through soil, water and nutrient management along with agroforestry, livestock husbandry, and forest and grassland management are needed, and require interactions between economic, ecological and social processes.

Through research collaboration between earth system, sustainability and agricultural sciences we are aiming to build a framework applicable throughout in Kenya, East Africa and Africa in general.



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