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## Climate Change Impact Assessment and Adaptation Options in Vulnerable Agro-Landscapes in East-Africa

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### Abstract

By 2020 between 75 and 250 million people will be exposed to water stress due to climate change impacts. Coupled with expected increases in demand for food and other land based goods and services land use changes will occur, drastically threatening livelihoods of small-scale farmers. Rain fed mixed crop livestock systems of north-eastern and central Tanzania are likely to be most severely affected by these changes.

This project aims at assessing the regional impacts of climate change on agro-landscapes and environment in Tanzania (eastern Arc, Dodoma) and at designing adaptation strategies and practices for small-scale agriculture. Assessments on related land use sectors as forest, hydrology, nature conservation and biodiversity are additionally considered involving local partners and counterparts.

Driven by regional climate change scenarios, integrated agro-ecosystem models (including soil water and nutrient dynamics and soil-crop-atmosphere-management interactions) are used to assess combined climate change and management effects on crop production, water resources and soil fertility. These agro-ecosystem models are linked closely to hydrological models, which provide necessary boundary conditions such as groundwater level and get back the input from the root zone, e.g. surface runoff, seepage, erosion and nutrient leaching.

Complementarily, stakeholders can develop options of management practices in potential future agro-landscapes based on the same regional climate change scenarios. All three sustainability dimensions (social, environmental and economic) are targeted and discussed with decisions makers on the regional level. Stakeholder scenarios will be visualised and linked to the development of good agricultural practices.

Model outputs will be used to evaluate good practices for potential future climatic conditions. Stakeholder-based scenarios will be made compatible in an iterative process with model-based scenarios. Options for climate change adapted good practices embedded into region based scenarios of sustainable agro-landscapes are anticipated as key output of these exercises.

Rather than seeking climate-proof good practices for specific scenarios, this project will contribute to the development of farming systems and livelihood strategies that are robust across a range of possible future agro-landscapes. High emphasis is on the relevance for regional policy development.

**Keywords:** Climate change adaptation, impact assessment, land use change, modelling, scenario development