

The impact of climate change and climate variability on agricultural productivity in the Teso farming system

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Introduction

Climate change and climate variability are major threats to the environment as well as livelihoods of the rural poor in Uganda. The threat is higher in the arid and semi-arid regions due to the limited livelihood options and perpetual exposure to the climatic extremes of drought and floods. However, there have been limited studies to-date addressing climate change impacts on agricultural productivity in the semi-arid regions at spatially explicit scales, which has undermined the development of appropriate adaptation strategies. The thrust of this two year ongoing study is to assess the impact of climate change on sorghum, a key food security crop in the Teso farming system of Uganda. The study is addressing the following objectives:

- To characterize the patterns and trends of climate change and variability in the Teso farming system of Uganda.
- To determine the impact of climate change on the yields of sorghum.
- Identify the existing and feasible coping and adaptation strategies to climate change and climate variability.

Study area and Methodology

The study is being conducted in Soroti district. Soroti district is located in Eastern Uganda. It is frequently exposed to both drought and floods. The communities are dependent on livestock and annual cropping for livelihood. The soils are light textured and vulnerable to erosion.

The methodological framework of the study is shown in Figure 1. A combination of biophysical and socio-economic methods are being used to generate the data needed to answer the project objectives.

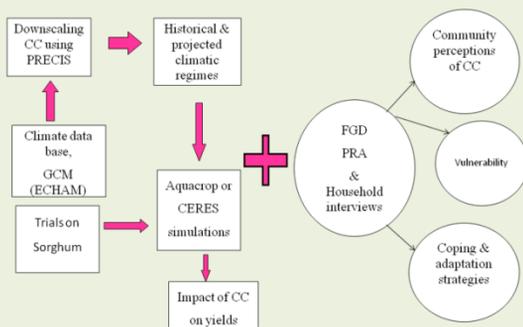


Fig 1 Methodological framework of the study

A regional climate model, PRECIS (providing regional climates for impact studies) is being used to downscale and project climate changes for the study area at a scale of 25km. The outputs from PRECIS will be input in the DSSAT model to simulate sorghum yields under changed climatic regimes. In addition to the modeling components, experimentation is being undertaken to elicit sorghum yields under current climates to facilitate better calibration of the models and projections. Household interviews, Focused Group Discussions and Participatory Rural Appraisal (PRA) are being used for collection of data pertaining to coping and adaptation strategies.

Preliminary results

The PRECIS modeled and projected climatic patterns for Soroti and Uganda are illustrated in Figures 2a and 2b. The results indicate shifts on the onset and cessation of rains. These patterns have been corroborated by qualitative data obtained from interviews with farmers in the field.

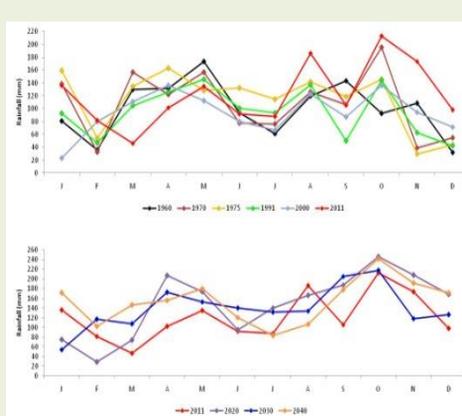


Fig 2a. PRECIS projected climate over Soroti, 1960-2040.

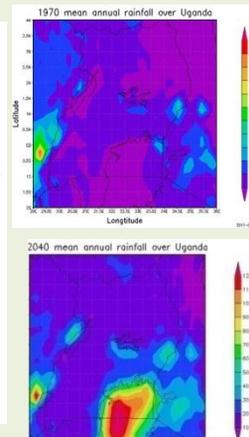


Fig 2b. PRECIS project climate over Uganda 1970 & 2040.

The majority of respondents are aware of climate change (Figure 3). Respondents perceive climate to be changing as characterized by changes in drought and flood patterns as well as shifts in onset and cessation of rains. Other indicators of climate change include reduced crop yields, stronger winds, higher temperatures and the drying of wetlands. The perceived major causes of climate change are the cutting of trees, cultivation of wetlands, bush burning and poor farming practices. Climate change and climate variability have had effects on the cropping pattern, with uncertainty on planting time and other field operations.

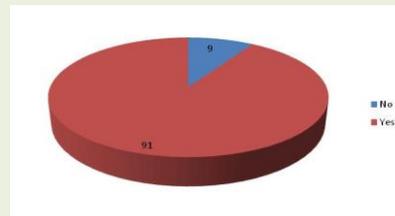


Fig 3. Awareness of climate change.

Ongoing work

- Continuation of field experiments.
- Further downscaling.
- Crop model calibration and running.
- PRA and FGD (e) feedback to the stakeholders.

The project results will generate policy options for climate change mitigation and adaptation.

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