



UGANDA CLIMATE CHANGE FINDINGS¹

CURRENT CLIMATE

General Climate

Uganda lies within a relatively humid equatorial climate zone, but the topography, prevailing winds, and water bodies cause large differences in rainfall patterns across the country. Average annual rainfall ranges from 800mm to 1500mm, generally falling in two seasons in the south (March to May and September to November), and in one season in the north (April to October); see Figure 1.

Temperature, on the other hand, varies mainly with altitude and changes little from season to season.

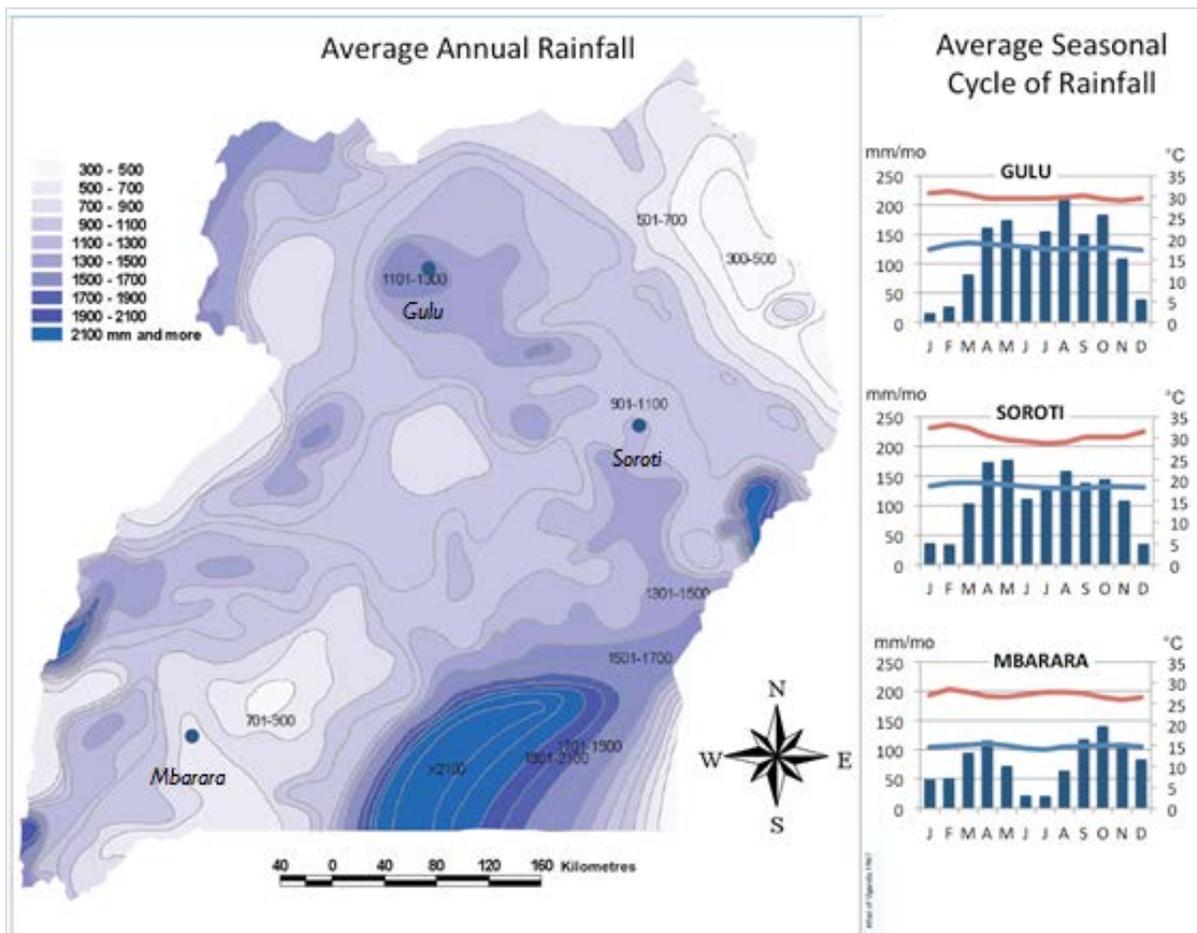


Figure 1: Map of annual rainfall and graphs of average seasonal rainfall and temperature for three sites. Source: Ugandan Meteorological Service.

¹ For a complete discussion of methods, and a full bibliography, see the ARCC Uganda Vulnerability Assessment Report.

Interannual Variability

Changes in sea surface temperatures in the distant tropical Pacific, Indian and, to a lesser extent, Atlantic Oceans strongly influence annual rainfall amounts and timing in Uganda. Year-to-year variations in annual rainfall can be considerable, and the onset of seasons can shift by 15 to 30 days (earlier or later). In some locations, the length of the rainy season can also change by 20 to 40 days from year to year. In contrast, temperature varies very little from year to year, on the order of 0.5 °C.

Long-term Trends

The project compared records from 16 different climatic zones over two 30-year periods, from 1951 to 1980 and from 1981 to 2010 to determine long-term trends in temperature and rainfall. The analysis identified no significant differences in average annual rainfall, save a modest decrease in the northern districts of Gulu, Kitgum, and Kotido, as well as Kasese in the west. The analysis also did not identify any significant shifts in the start or end of the rainy seasons, or the length of rainy seasons.

Overall, the data indicate no clear changes in rainfall in Uganda. The analysis did, however, identify a statistically significant increase in temperature between the two 30-year periods, ranging from 0.5-1.2 °C across the country.

PROJECTED CHANGES IN CLIMATE

Global projections downscaled to Uganda reveal no projected significant change in annual rainfall between now and the 2015-2045 period. There are indications, however that there may be an increase in precipitation during December, January, and February, which historically has been the dry season across the country. This increase could have a significant impact on livestock and agriculture — especially on perennial crops and post-harvest activities. Projections also indicate that the warming trend identified in the data will continue at a slightly higher rate into the 2015-2045 period for all of Uganda.

Techniques and Tools Used for Developing the Climate Projections

- *General Circulation Models (GCM)* are numerical representations of the multitude of processes and interactions occurring in the climate system. They simulate changes in climate based on modifications in atmospheric gas composition due to human activities. Constraints in computing capacity lead to a coarse resolution of 120-200 km², dividing Uganda into about eight “grid cells.”
- *Downscaling techniques* are used to transform the coarse resolution information generated by the GCM to finer scales. These techniques account for differences in climatic conditions not captured by GCMs and correct for any biases in the results.
- The Intergovernmental Panel on Climate Change recommends *multi-model and multi-scenario approaches and assessment of the range of projected climate changes* to address uncertainty concerning future emissions, as well as the imperfect representation of climate processes and interactions in the models. Different emission scenarios and different models produce different results, and it is essential to recognize and assess the differences in these projected climates.

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