



Climate Change Information Fact Sheet

UGANDA

<i>Definitions</i>
Ensemble: A collection of model simulations characterizing a climate prediction or projection. [IPCC AR5]
Representative Concentration Pathway (RCP): Scenarios that include time series of emissions and concentrations of the full suite of greenhouse gases and aerosols and chemically active gases, as well as land use/land cover. RCPs usually refer to the portion of the concentration pathway extending up to 2100, for which Integrated Assessment Models produced corresponding emission scenarios. [IPCC AR5]
RCP8.5: Generally, high emissions. One high pathway for which radiative forcing reaches $>8.5 \text{ W m}^{-2}$ by 2100 and continues to rise for some amount of time. [IPCC AR5]
RCP4.5: Generally, moderate emissions. One of two intermediate stabilization pathways in which radiative forcing is stabilized at approximately 4.5 W m^{-2} after 2100. [IPCC AR5]

CLIMATE IMPACTS AND VULNERABILITIES

TEMPERATURE

Current (based on historical climate conditions and recent trends, generally over the past few decades)

Mean annual temperature has increased across a southeast ($-0.02^\circ\text{C}/\text{year}$) to northwest ($-0.03^\circ\text{C}/\text{year}$) gradient over the time period 1950-2002, with high statistical confidence [CW], or by about 1.3°C since 1960 [UNDP]. The greatest observed increase in temperatures has occurred during the months of March to May [CW]. Between 1960 and 2003, the average number of hot days per year increased by 74 (an increase of over 20%); the average number of hot nights per year has increased by 136 (an increase of over 37%) [UNDP]. Annually, average monthly temperature peaks in February-March. For the period 1960-1990, the average temperature in those months was 23.5°C ; for the period 1990-2009, it had risen to 24.7°C . The annual average monthly minimum temperature occurs in July; during 1960-1990, it was 21.5°C . During 1990-2009, it had risen to 22.3°C [CCKP].

Future: 2030 (generally 2020-2049)

The mean annual temperature in the country is projected to increase by 0.35°C , 0.90°C , and 1.41°C by 2030 for the 10th, 50th, and 90th percentiles for the RCP4.5 model ensemble runs, and by 0.56°C , 1.01°C , 1.48°C for the RCP8.5 10th, 50th, and 90th percentile model ensembles, respectively. Maximum temperatures are projected to increase by 0.90°C to 1.02°C , and minimum temperatures by 0.96°C and 1.04°C for the RCP4.5 and RCP8.5 median model ensemble. [CCKP]. All projections indicate substantial increases in the frequency of days and nights that are considered "hot" in current climate. Annually, projections indicate that "hot" days will occur on 10-27% of days by the 2030s [UNDP].

Future: 2050 (generally 2040-2059)

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PRECIPITATION AND FLOODING

Current (based on historical climate conditions and recent trends, generally over the past few decades)

From 1960-1990, Uganda's average annual rainfall was 1160.5 mm, with a peak of 150 mm in April [CCKP]. It experiences two distinct wet periods: the short rains in October to December and the long rains in March to May [UNDP]. Statistically-significant decreases in annual average rainfall have been observed since 1960, at an average rate of 3.4 mm (3.5%) per month per decade, but this trend is strongly influenced by particularly high rainfall totals in 1960-61. This trend is most pronounced in March to May, with a decrease of 6.0 mm (4.7%) per month per decade [UNDP]. Trends in extreme indices based on daily rainfall are mixed - there is no significant trend in the proportion of rainfall occurring in heavy events [UNDP].

Future: 2030 (generally 2020-2049)

The median ensemble runs for RCP4.5 and 8.5 indicate an average annual rainfall increase of 0.2 mm/day by the middle of the 2030s. [USGS] There is significant variability across months (some months indicate increases in rainfall, and others indicate decreases). By 2030, the RCP4.5 10th percentile (-22%), median (2.0%), and 90th percentile (27%) ensembles for mean annual precipitation indicate high uncertainty in the direction and amount of change across the models. These results are similar to RCP8.5 (-23%, 1.4%, and 25%). [CCKP].

Future: 2050 (generally 2040-2059)

Projections of increases in mean annual rainfall are broadly consistent for median RCP4.5 and 8.5 scenarios at mid-century. The median ensemble runs for RCP4.5 and 8.5 indicate an average annual rainfall increase of 0.4 mm/day by ~2060. [USGS] There is significant variability across months (some months indicate increases in rainfall, and others indicate decreases). The RCP4.5 10th percentile (-22%), median (2.2%), and 90th percentile (33%) ensembles for mean annual precipitation in Sri Lanka indicate high uncertainty in the direction and amount of change across the models. These results are similar to RCP8.5 (-25%, 2.7%, and 31%). The number of days of extreme and heavy precipitation are projected to increase by mid-century for both the median ensemble A2 and B2 scenarios [CCKP]. The proportion of rainfall falling in heavy events is projected to increase, with increases in annual rainfall ranging from 0 to 15% by the 2090s, with the greatest increases occurring in the rainy seasons of March to May and October to December [UNDP]. Consistent with increasing rain, increases in runoff and annual high flow are projected by mid-century for the median A2 and B1 scenarios [CCKP]. The Upper Nile Basin region of Uganda could see an increase in runoff through 2039, but a decrease in the second half of the 21st Century [IPCC AR5].

DROUGHT

Current (based on historical climate conditions and recent trends, generally over the past few decades)

Uganda has experienced cyclical (within a range of 10 to 12 years), frequent, and severe droughts in most parts of the country, especially the northern and western parts [Uganda, 2008]. Historically, drier-than-average seasons have occurred during La Nina years [UNDP]. In 2010 to 2011, Uganda experienced rainfall deficits across most of the country, which resulted in depleted soil moisture [Uganda, 2012].

Future: 2030 (generally 2020-2049)

Estimates are highly uncertain and information is not readily available. Consider future drought conditions based on the most extreme past experience.

Future: 2050 (generally 2040-2059)

Future precipitation projections for the region show changes in the scale of the rainfall probability distribution, indicating that extremes of both signs (floods and droughts) may become more frequent in the future [IPCC AR5]. Increases in annual low flow for the B2 median scenario are projected by midcentury [CCKP].

WINDS AND OTHER STORMS

Current (based on historical climate conditions and recent trends, generally over the past few decades)

Uganda has experienced rare, but damaging, wind and dust storms on several occasions [WMO]. Direct wind impacts from tropical storms are not common as the country is landlocked.

Future: 2030 (generally 2020-2049)

Large uncertainties surround projected changes in tropical cyclone landfall from the southwest Indian Ocean that have resulted in intense floods during the 20th century [IPCC AR5].

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Climate information sources	CCKP = World Bank Climate Change Knowledge Portal (CCKP)
	CW = Climate Wizard
	IPCC AR5 = Niang et al., 2014. WGII Ch22 Africa
	Uganda, 2008 = Uganda Ministry of Agriculture Animal Industry and Fisheries and the Office of the Prime Minister, 2008. Review and Analysis of Existing Drought Risk Reduction Policies and Programmes in Uganda: National Report on Drought Risk Reduction Policies and Programmes. United Nations International Strategy for Disaster Reduction (UN-ISDR)
	Uganda, 2012 = Uganda Office of the Prime Minister, 2012. The 2010–2011 Integrated Rainfall Variability Impacts, Needs Assessment and Drought Risk Management Strategy. Global Facility for Disaster Reduction and Recovery (GFDRR)
	UNDP = United Nations Development Programme (UNDP), 2012. Climate Change Country Profiles: Uganda
	USGS = Alder, J.R. and Hostetler, S.W., 2013. CMIP5 Global Climate Change Viewer. US Geological Survey.
	WMO = World Meteorological Organization. Unknown. The Uganda Meteorological Services data observations, management, seasonal forecasting and early warning system for extremes.