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AFRICA CLIMATE CHANGE RESILIENCE ALLIANCE

The national picture: climate trends in Uganda

ACCRA BRIEFS

With agriculture providing about 70% of Uganda's export earnings and the primary economic activity for much of its population, livelihoods are particularly sensitive to the fluctuations and uncertainties of seasonal rainfall – whether premature, delayed, prolonged or failed.[1] The Ugandan Ministry of Water and Environment recognises climate as 'not only a natural resource, but a key determinant of the status of other natural resources'.[2] The Ugandan government is also concerned about climate variability to the extent that it has listed climate change as a key factor to consider in the country's development.

However, accurate, long-term meteorological data is largely lacking in Uganda. The observation and analysis of what meteorological data does exist, faces difficulties linked to a fragile network of weather stations and gaps in station records due to poorly equipped facilities, lack of investment in infrastructure and personnel, and local conflict. Given these difficulties in the meteorological record, climate models were used to provide a more useful indication of future climate trends in Uganda.[3]

As the projections suggest, the anticipated changes in Uganda's climate may make the country and its people more vulnerable.[4] The reasons for this stem not only from the severity of the predicted impacts, but also the low level of adaptive capacity.

Climate projections for Uganda: All values are anomalies relative to the mean climate of 1970-1999: a summary.

The mean annual temperature is projected to increase by between 1.0 and 3.1°C by the 2060s, and between 1.4 and 4.9°C by the 2090s.

All projections indicate increases in the frequency of days and nights that are considered 'hot' in the current climate.

All projections indicate decreases in the frequency of days and nights that are considered 'cold' under current climatic conditions. These 'cold' events are expected to become increasingly rare, and may not occur at all by the 2090s according to projections under the highest emissions scenarios.

The models consistently project overall increases in the proportion of rainfall that falls in 'heavy' events (i.e. with greater intensity).

Projected increases in rainfall are most extreme in the short rainy season.

This is one in a series of ACCRA briefs developed as an output of ACCRA's research and capacity-building work conducted in 2010-11, in three sites in Ethiopia, and in Uganda and Mozambique. See http://community.eldis.org/accra/ to find out more about ACCRA and to subscribe to our monthly update.

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ACCRA research sites (Bundibugyo, Gulu and Kotido): climate trends and projections

As in much of rural Uganda, accurate, long-term meteorological data is largely missing in each of ACCRA's three research sites. Even where formal weather stations exist, gaps and uncertainties are common in recorded data. For example, since the Bundibugyo site has no weather station, the research team gathered information from the adjacent district in Kasese, 50km away and subject to entirely different geography and climate. Data from the Kasese station also has significant gaps due to internal conflict and poor station management. Although the Kasese data provides a useful indication of how temperatures and other variables may have changed, it cannot be interpreted as a direct reflection of possible climate change in Bundibugyo. It is essential that the limitations of the data currently available in Uganda are recognised.

A summary of variables at all three sites (Figure 1) was generated using a Regional Climate Model (RCM).[i] While RCM data is helpful in establishing trends, such models are fraught with uncertainties, particularly at smaller scales. When triangulated with other data sources, increasing trends in both maximum and minimum temperatures become evident in all three sites. However, the available data on total annual rainfall shows no significant changes at Gulu and Bundibugyo whilst Kotido shows a decreasing trend. Full data can be reviewed in the ACCRA Synthesis Report for Uganda 2011 at http://community.eldis.org/accra/

Figure 1

Gulu: (all variables are for 1970-2050)

- Increasing average temperatures
- Slight increasing trend in consecutive dry days
- Slight decreasing trend in consecutive wet days
- No significant change in total precipitation

Kotido: (all variables are for 1967-2050)

- Significant increase in minimum temperatures
- Increasing trend in warm nights
- Decreasing trend in cool days
- No significant changes in consecutive wet days and consecutive dry days.
- Decreasing trend in total annual precipitation, and heavy precipitation days
- Slight decrease in the number of very wet days.

Bundibugyo: (all variables are for 1972-2015)

- Significant increase in minimum temperatures
- Decreasing trend in the number of cool days
- Slight decrease in the number of consecutive dry days
- No significant change in consecutive wet days, or total number of very wet days, or heavy precipitation days

Community perceptions of hazards and trends

The ACCRA study did not attempt to quantify the current climate impacts in its three selected sites, but did highlight the vulnerability of rural livelihoods to current weather conditions and future changes, both weather and non-weather related. It also examined how communities are responding to changes they are observing. Communities reported varying changes in climate patterns. Respondents in all three sites pointed to alterations in seasonality (i.e. changes in the onset and duration of rainfall), as well as greater variability and uncertainty in rainfall patterns. In Kotido and Gulu, communities had the perception of longer periods of drought.

Gulu: perceived impacts of hazards and trends (climate and non-climate) and changes in livelihoods

Unpredictable rainfall patterns: since the 1980s the rains have become more unpredictable affecting agriculture. During heavy rains the roads become impassable, children fail to attend school, and water sources become contaminated more often than before as the community shares them with animals.

Increasing prolonged droughts: Increased frequency of drought and intense heat affected human health, crops and animals. About 72% of people have been affected during such prolonged droughts; the numbers of water sources that have dried during drought include 74 boreholes, 48 shallow wells and 28 springs.[5] However, there could be other factors contributing.

Increased temperatures: increased incidences of pests and crop diseases (e.g., cassava mosaic disease) and animals (e.g., foot and mouth) are associated with increasing temperature. Respondents reported an increase in malaria cases among children.

Other drivers of vulnerability: 61% of Gulu people earn below US$1 per day compared to a national average of 31 %; high HIV/AIDS prevalence at 12.8% (national rate is 6.4%).[6] The 1987-2007 armed civil conflict has left a large number of vulnerable individuals (e.g. widows and orphans). Communities have resorted to natural resource exploitation (e.g. brick making in wetlands, charcoal burning in forests).

Below: Community focus groups discussing with researchers in Lajwetek Village in Gulu

i Simulations were run using the PRECIS regional climate model. Information is derived from the Department of Meteorology and sourced from the unpublished site reports.

Kotido: perceived impacts of hazards and trends (climate and non-climate) and changes in livelihoods

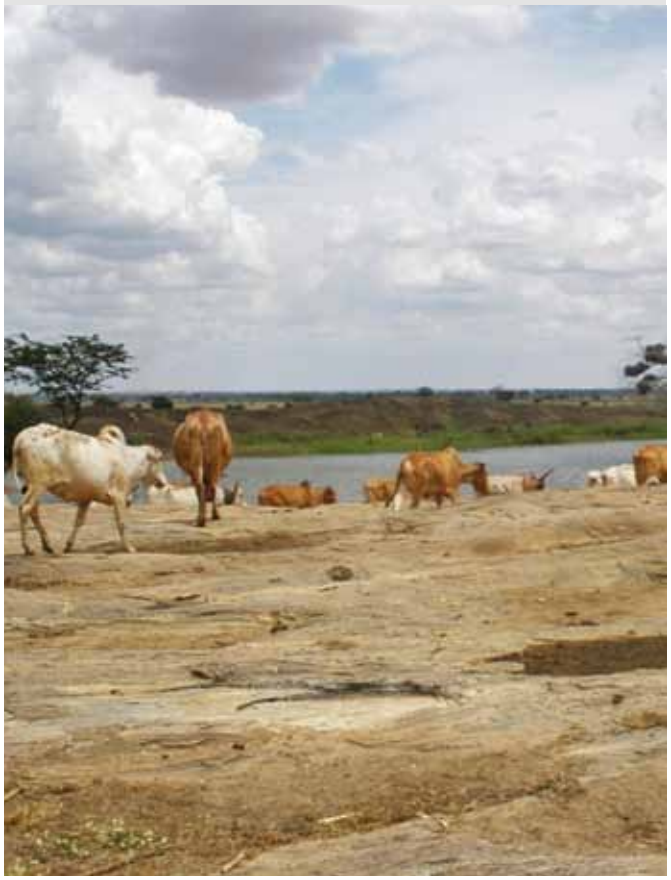
Increasing drought periods: The community mentioned a higher frequency of dry spells and chronic food insecurity, due to crop failure and a reduction in livestock during 2006-2009. In addition, the introduction of the 'protected kraals' system may have played an important role in spreading livestock diseases.[7]

Increased intensity of flash floods and flooding: has led to the erosion of crop fields, silting of river beds, loss of livestock, human life, vegetation, property, and destruction of roads and bridges. Most water sources become contaminated, leading to outbreaks of diseases (e.g. cholera).

Increasing temperature: the community associated increased temperatures with the increased prevalence and severity of epidemics of tick-borne animal diseases, crop pests and diseases (e.g. honey dew in sorghum) over the past decade.

Other drivers of vulnerability: 82% of people earn below US$1 per day; adult literacy rate of 4 % (compared to national average of adult literacy 49 %); wide gender disparity in literacy (5% in females, 12% in males); infant mortality rate of 105/1,000 (76/1,000, national average);[8] water-stressed and sparsely vegetated. The major livelihood fall-back is charcoal burning – also a threat to the environment.

Below: Rengen sub-county, Kotido district, in dry season
Cattle face difficulty in finding pasture



Bundibugyo: perceived impacts of hazards and trends (climate and non-climate) and changes in livelihoods

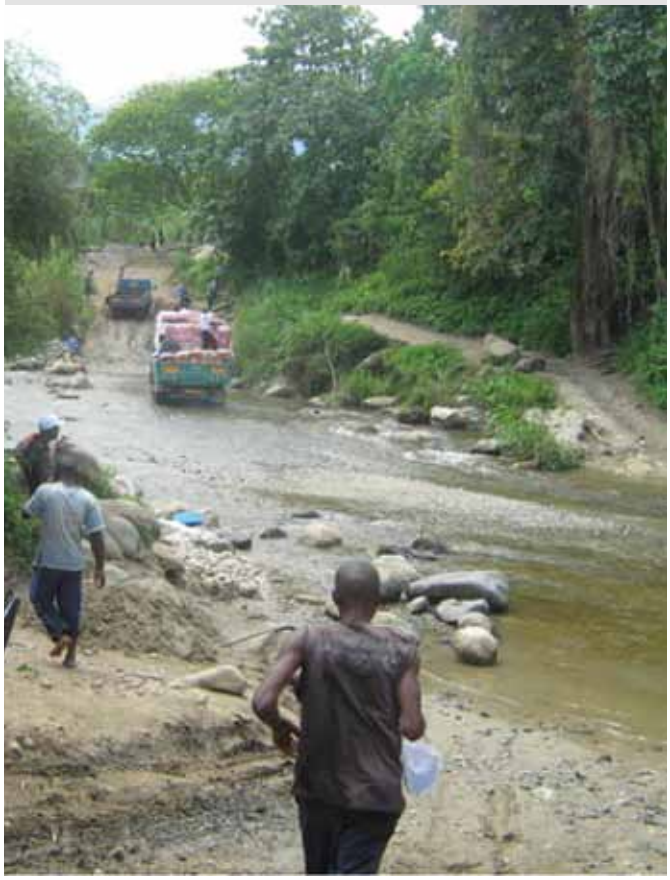
Prolonged rainfall: the community reported since 2000, the traditional two rainy seasons of March-May and August-October have tended to merge into one long season. Increased intensity of rainfall was mentioned with incidences of soil run-offs and landslides that destroy crop gardens, roads, bridges, property and human life.

Unpredictable rainfall: both high and low lands reported the negative impact of unpredictable seasons on cropping patterns and resultant low yields leading to reduced food availability.

Increased temperatures: the community associated high temperatures with crop pests and diseases; most traditional crops (cassava, beans, banana, coffee and cocoa) have been attacked by diseases and the highland community mentioned having switched to seasonal and perishable crops, like vegetables, which they say may threaten their food security.

Other drivers of vulnerability: high poverty levels (60%); low overall literacy levels (49.6%, compared to overall literacy 75% nationally); in 2010, 0.2% of households had access to electricity and 98% depended on firewood/charcoal; high under-5s mortality (174/1000, compared to 134/1000 nationally) ; and high population growth.[9] The conflict between government forces and Allied Democratic Forces from 1996-2002 has exacerbated the area's lack of development. Alternative livelihoods include sand mining, stone quarrying and charcoal burning.

Below: Damaged infrastructure in Bundibugyo



Recommendations drawing on ACCRA's research findings

District governments must make services available to support communities to pursue **sustainable livelihood choices in a changing climate and to protect them from maladaptation.**

District governments must guide communities (e.g. through alternative specific district livelihoods programmes) to ensure **communities indulge in sustainable adaptation rather than 'maladaptation'.**

Central government must **invest in reliable and accurate meteorological data production.** The government needs to invest more in infrastructure and human capacity for collecting, disseminating and using relevant knowledge and information at macro and micro levels.

Central and local governments must mainstream climate change across sectors, particularly in national priority areas, such as roads, water and sanitation, health, agriculture - NAADS and education. Climate variability and trends must be factored into budgetary allocation. Communities respond to multiple pressures, and not to one singular event – whether due to increasing uncertainty in seasonality, changing economic markets, or diminishing natural resources. Issues of climate variability and change cannot be addressed in isolation. Wider development challenges, such as poverty reduction, population growth, natural resource management and urbanisation, also need to be taken into account.

References

[1] National Planning Authority (NPA) (2010) National Development Plan (2010/1 – 2014/15), Uganda. Kampala: NPA. p418.

[2] Ministry of Water and Environment (MWE) (2007) Climate Change: Uganda National Adaptation Programmes of Action, Uganda. Kampala: MWE. p69.

[3] McSweeney, C., New, M., and Lizanco, G., (2007) Climate Change Country Profiles: Uganda. Oxford: United National Development Programme.

[4] Wheeler, D., (2011) Quantifying vulnerability to climate change: Implications for Adaptation Assistance. Working Paper No. 240. Center for Global Development

[5] Gulu District Disaster Management Committee (DDMC) (2009). Meeting minutes. Gulu.

[6] Health Management Information Systems (2009). District Health Office.

[7] KDDP, Kotido District Development Plan 2010-2013. Kotido.

[8] UNOCHA (2009). Special Report No. 3: October 2008-January 2009.

[9] UBOS: National Housing and Population Census (2009)

Cover: Groundnuts and Maize drying up during a dry season in Gulu District
Below: Brick making in Gulu as an alternative income source.

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