IRC + water for people

Climate Change, Water Resources, and WASH Systems

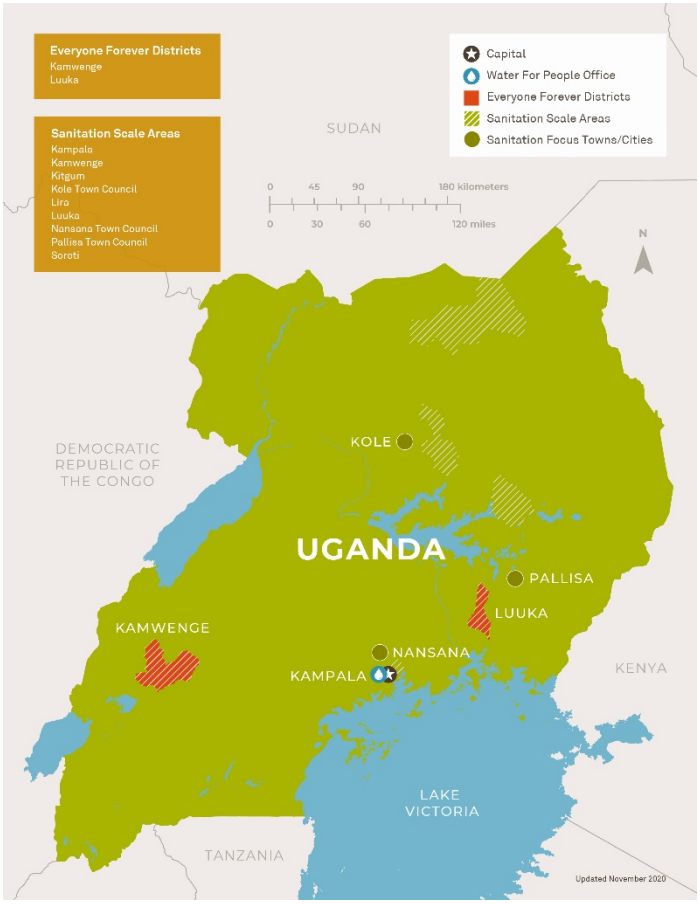
COUNTRY CASE:

UGANDA

	Risk	Programming	Policy & Planning	
Polluted water	Medium	Focused	NAP	No
Too little water	Medium	Related	National climate policies & plans	Comprehensive
Too much water	Medium	Focused	Extent WASH is included	Large

Climate trends and impacts on water resources

The climate of Uganda is characterized by variability over space and time. This variability is manifested in high rain fall, prolonged dry seasons, and changing time periods of the two. The climate variations are accompanied by fluctuations in water levels of lake basins, which contribute to flooding in the lake and river catchments and consequently impact drinking water when contaminants and pathogens are discharged into surface and underground drinking water sources. The variations in water levels of Lake Victoria over the years as depicted in figure 1 below, is a manifestation of climate change effects on water resources. The significant increase in water levels in the 1960s was significantly due to the high inflows arising from high rainfall for a sustained period. However, the decline in water levels of the lake late in the 2000s is consequent of both climate change and non-climate change factors. The non-climate factor was mainly power generation on Owen Falls Dam.



Increased climate variability and unpredictability are the most significant expected changes in Uganda, and rising temperatures are much more anticipated than an increase average rainfall. A temperature increases of 1.5°C is expected in the next 20 years, and a hike of up to 4.3°C is expected by the year 2080. This upward curve in temperature could result in substantial impacts on water resources and related ecosystems, food security, water resources management (WRM), health of the population, settlements, and infrastructure.[1] The impacts could manifest in form of drying up of surface water, dwindling of groundwater sources, water scarcity for domestic,

[1] Hepworth, N. and Goulden, M. (2008). Climate Change in Uganda: Understanding the implications and appraising the response. LTS International, Edinburgh.

industrial, and agricultural purposes, rendering water and sanitation infrastructure unusable, and high costs to develop higher technological infrastructure alternatives that are considered more resilient to the potential climatic change issues.

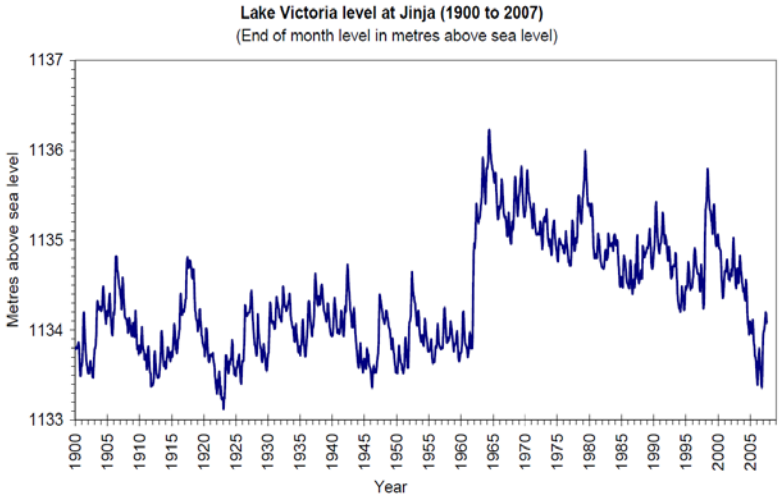


Figure 1: Water level fluctuation of Lake Victoria between 1900-2007

Climate and WASH policy and initiatives

Policies in Uganda that provide for climate change, WRM, and WASH as related components include:

- The National Development Plan (NDP) III (2020-2025) brings a holistic and programmatic approach to planning. It earmarks climate change, natural resources and environment, and water management among the key 18 programs. It specifies the need to sustain the increasing population while addressing and managing the effects of climate change on livelihoods, incomes, and prosperity. Climate change mitigation and environment management are critical to the achievement of increased household incomes and improvement of quality of life of the population. Sufficient precipitation that maintains or increases forest and wetland cover is vital for hydropower generation, agriculture, fisheries, domestic water supply, industry, navigation, tourism, wildlife, and ecosystems. Proper wetland management is necessary to mitigate flood risks, maintenance of aquatic ecosystem, and access to fresh water. NDP III also aims to: (1) ensure availability of adequate and reliable fresh water resources for all uses, (2) increase forest, tree, and wetland coverage and restore and protect hilly and mountainous areas and rangelands, (3) maintain or restore a clean, healthy, and productive environment, (4) reduce climate change vulnerability and carbon footprint, (5) reduce human and economic loss from natural hazards and disasters, and (6) increase incomes and employment through sustainable use and value addition to water resources, forests, rangelands, and other natural resources.
- NDP I (2010–2015) and NDP II (2016-2021) acknowledge addressing climate change challenges as core in fostering sustainable national economic and social development. The plans provide for integration of climate change into water resources planning for a more resilient water sector, reduced water scarcities and related conflicts, and accelerated sustainable water infrastructure. The plans also provide for implementation of resource management reforms and promotion of community-based WRM, as well as implementation of water source protection for sustainable water supply.
- The National Climate Change Policy (2015) ensures integration of climate change in national efforts for sustainable conservation, access, utilization, and management of water

resources. It stipulates inadequate water and sanitation services (which affects women more than men) as one factor accounting for the Ugandan economy's vulnerability to climate change. Another policy objective is to ensure that climate change is integrated in planning, decision making, and investments in all sectors. As one of the guiding principles, climate change is considered a multisectoral issue and requires all sectors and stakeholders to mainstream it in interventions, thereby mandating the WASH sector to mainstream climate change.

The Standard National Climate Change indicators include WASH (Box 1).

Box 1: Uganda WASH related climate change indicators

1. INDICATOR G1: Incidences of hygiene/water-borne related disease occurrence reported at health centers.
    - Definition: Waterborne diseases are caused by pathogenic microorganisms that most commonly are transmitted in contaminated fresh water. Infection commonly results during bathing, washing, drinking, in the preparation or the consumption of food thus infected. Examples of hygiene/water-borne related diseases include diarrhea, cholera, hepatitis A, typhoid fever, bilharzias, dysentery, and the like.
    - Rationale: Water-borne diseases cause about 1.8 million human deaths annually. The World Health Organization estimates that 88% of that burden is attributable to unsafe WASH services. Water-borne diseases are highly associated with environmental degradation and lack of proper and clean water management practices.
2. INDICATOR G2: Number of community members sensitized on hygiene and water-borne diseases.
    - Definition: Measures the reach of information on hygiene and water-borne diseases.
    - Rationale: People with correct information about the importance of maintaining good hygiene and drinking clean water, as well as the dangers of not doing that, are more likely to adhere to the recommended practices. Environmental degradation contributes to poor hygiene and increased water-borne diseases.
    - Numerator: Number of community members sensitized on hygiene and water-borne diseases.
3. INDICATOR J2: Percentage of Local Governments (LGs) implementing Change Climate interventions in their District Development Plans (DDPs).
    - Definition: Measures the extent of districts implementing planned Climate Change activities.
    - Rationale: It is one thing to include climate change activities in workplans and another to implement them. Including climate change in DDPs ensures implementation of mitigation and adaptation measures.
    - Numerator: Number of LGs implementing climate change interventions in their DDPs.
4. INDICATOR J1: Percentage of LGs that have integrated climate change interventions in their DDPs.
    - Definition: Measures the coverage of climate change mainstreaming interventions across the country. Climate change mainstreaming is implied by incorporation of various climate change activities in DDPs.
    - Rationale: Mainstreaming climate change interventions into DDPs implies commitment to implement climate change activities and high likelihood of climate change activities being implemented.
    - Numerator: Number of LGs that have mainstreamed climate change interventions in their DDPs.
    - Denominator: Total number of LGs in Uganda.
5. INDICATOR J3: Number of LGs spending at least 5% of their non-wage budget for Climate Change activities.
    - Definition: Tracks the proportion of district budgets that are spent on climate change interventions. Climate change interventions require adequate budgeting.
    - Rationale: Implementation of climate change interventions requires adequate budgeting for the right scale and scope.
    - Numerator: Number of LGs spending at least 10% of their budget on Climate Change activities per year.
6. INDICATOR L1: Percentage of education institutions with functional water facilities.
    - Definition: Tracks availability of water in education institutions during drought periods.
    - Rationale: The availability of water supply at education institutions during throughout the year implies the functionality of the water supply system.
    - Numerator: Number of education institutions with functional water facilities.
    - Denominator: Total number of education institutions in the catchment area.
7. INDICATOR L2: Percentage of education institutions implementing Climate Change mitigation and adaptation activities.
8. INDICATOR L3: Proportion of education institutions with functional rainwater harvesting facilities.
    - Definition: Measures the presence of rainwater harvesting facilities that actually contain and provide water.

- Rationale: Water harvesting reflects climate change adaptation and mitigation. The more rainwater harvesting facilities constructed in education institutions, the more rainwater harvested, both for institutional and agricultural use.
- Numerator: Number of functional rainwater harvesting facilities constructed in education institutions.

9. INDICATOR M1: Percentage of government institutions with functional water facilities during drought.
   - Definition: Tracks the proportion of government institutions with water supply during prolonged dry spells. The institutions targeted for this indicator include LGs, Health Facilities and Schools, since they are some of the biggest LG 'landlords.'
   - Rationale: The purpose of this indicator is to track water availability during drought periods among government institutions.
   - Numerator: Number of government institutions with functional water facilities during drought periods
   - Denominator: Total number of government institutions.
10. INDICATOR M2: Percentage of institutions implementing Climate Change mitigation and adaptation activities.
11. INDICATOR A3: Percentage of domestic water sources that comply with national standards.
    - Definition: The domestic water sources will be subjected to the Uganda national water standard to assess the degree of conformity to the standard. This indicator tracks percentage of domestic water sources that comply with national standards.

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Impacts on WASH infrastructure and services

WASH infrastructure in Uganda primarily consists of deep boreholes, shallow wells, protected springs, and piped water supply. According to the Sector Performance Report 2020, the main technology options used for water supply improvements in rural areas include deep boreholes (44.7%), shallow wells (23.1%), and protected springs (20.8%). Others include tap stands or kiosks of piped schemes and rainwater harvesting tanks (11.3%). As of June 2020, national safe water coverage in rural areas was estimated at 68%, declining from 69% in June 2019. This was attributed to low reporting of new water sources by districts (47%), effects of the COVID-19 pandemic, and the manual data capture and entry system at the district and national government levels. In urban areas, the population using an improved drinking water source reduced from 79% in June 2019 to 70.5% in June 2020. Access to safely managed water (available on premises) remained at 57.11% in urban areas. The highest level of water service is provided by piped water supply. Safely managed drinking water is defined as the percentage of population using safely managed drinking water services located on premises, and there is a target of 100% by 2030.

According to the annual Health Sector Performance Report (2019/20), 78% of the population had access to sanitation facilities compared to 77% reported in FY2018/19. Overall, the population with access to basic hygiene (practicing handwashing with soap) was 41.9%.

The main impacts on WASH services from climate change are:

- **Prolonged droughts and lowering water table:** Significant impacts on handpumps.
- **Prolonged rains and flooding:** Impact shallow wells and springs that are typically located in low lying areas and sanitation facilities. Prolonged excessive rains lead to flooding and submerging water point sources that are normally located in low lying areas, mainly shallow wells and protected springs. Flooding of water sources not only cuts water points off from users, but also leaves them contaminated long after the flooding ends.
- **Declining lake levels:** Impacts piped systems. Water supply systems drawing from surface water are threatened by prolonged dry seasons that lower the water levels. This affects the quality of service and leads to intermittent water supply and related rationing by piped water supply authorities and entities to overcome reduced quantities.
- **Increasing costs per capita:** Due to required adaptation activities. To overcome challenges posed to the water and sanitation infrastructure; there is always need or practice of adoption high-cost technologies that have proven to be more resilient to such impacts as flooding. This results in high capital investment cost of service delivery which, in turn,

increases the WASH cost per capita in areas prone to extreme weather conditions posed by climate change. In response, there has been a policy shift by the government banning construction of shallow wells and protected springs and encouraging deep boreholes and piped water systems.

- **Constrained operation and maintenance (O&M):** Due to impacts on water quality and infrastructure condition. Advanced WASH technologies not only attract high capital investment but also high capital and routine O&M costs. Following flooding events, components of water systems (point and piped systems) are often washed away and lost. As a result, O&M costs increase due to repeated repairs or one-time major repairs. Also, the variations in O&M costs cascade to variations in tariff and subsidies.

Box 2: Mbarara Water Supply (River Rwizi) [2]

Location	River Rwizi
Reported Problems	In the catchment of the River Rwizi the agricultural practices are unsustainable and there are siltation problems, wetland encroachment, and wetland reclamation. One result is low flows in the river, which affects downstream town abstractions.
Reported Causes of the Problems	Falling water levels in the River Rwizi have been attributed to: • Wetland drainage/conversion due to agricultural encroachment (crop and livestock farming). • Possible decline in rainfall in the catchment over the last 10 years. • Settlement and commercial/industrial structures in the water courses. • River-bed sand extraction and poor farming practices leading to soil erosion, siltation, and water quality problems. • Impact of the pilot irrigation for banana plantations. • Increasing use of herbicides, pesticides, and fertilizers.

Country program activities: mitigation and adaptation

Water for People in Uganda[3] implements climate change mitigation and adaptation strategies. Climate change mitigation activities aim to slow the rate of climate change by reducing greenhouse gases. These include:

- **Wetland restoration:** Supporting the District Natural Resources Office, line departments, and sub-county leadership to relocate activities that degrade wetlands and allow wetlands to re-generate and serve their natural functions.
- **Catchment and sub-catchment management plans:** Supporting development by the Ministry of Water and Environment (MWE) and Albert Water Management Zone (WMZ).
- **Transition from diesel to solar pumped piped water supply systems**: Working with MWE to install solar panels on piped water supply systems that were formerly powered by diesel. This helps reduce the CO_2 emissions arising from fossil fuel use.
- **Fecal sludge treatment and reuse:** Making fuel briquettes from fecal sludge in partnership with Kampala Capital City Authority (KCCA) and National Water and Sewerage Company (NWSC). The promotion and scale of fecal sludge briquettes reduces the usage of fuel in form of charcoal and firewood which are tree depleting. KCCA and Water For People are also promoting pit emptying of non-sewered sanitation facilities in the city suburbs. The fecal sludge is discharged in NWSC treatment plants by private sector service providers.
- **Tree planting:** Working with the District Education Office teams, school head teachers, and other partners to support tree planting in schools.

[2] Uganda Ministry of Water and Environment (2013). Framework and Guidelines for Water Source Protection. Volume 1: Framework for Water Source Protection.
[3] IRC focuses work in Kabarole District (and the recently formed Bunyangabu District). This case mainly reflects on Water For People activities.

Climate change adaptation activities adjust to actual or expected future climate vulnerabilities. These include:

- **Wetland restoration and catchment and sub-catchment management plans:** Improving the quality of water sources and limiting treatment needs.
- **Water safety planning:** Building capacity of extension staff to conduct water safety planning. Conducting sanitary surveys around water supply systems to identify all possible sources of contaminants for water users to implement preventive measures for remediation. Actions include digging run-off diversion channels, ensuring there are no pit latrines upstream of water sources within a minimum distance, and ensuring there are no cracks within water aprons that allow seepage of stagnant water back into the handpump tanks. The risk of water source contamination is heightened whenever there is flooding from excessive rains. The flooding mainly affects low-cost water technology water sources, such as protected springs and shallow wells.
- **Community Led Total Sanitation:** Triggering activities and home improvement campaigns in communities to ensure that households use proper sanitation and handwashing with soap practices. The goal is to eradicate open defecation and reduce fecal contamination of water supply sources when there is flooding and run-off due to periodic excessive rains. It protects communities and prevents consequent water-borne and sanitation related diseases.
- **Training the private sector:** Training members of the Kamwenge Water Maintenance Association in the construction, management, and repair of rainwater harvesting systems. They support public institutions and households to construct and maintain rainwater tanks to harvest and store water during excessive rains to have water available during the dry seasons.
- **Groundwater monitoring:** Building capacity of the WMZ in the groundwater monitoring using CT divers.
- **Source protection guidelines:** Advocating for and supporting the District Water and Sanitation Coordination Committee to implement water source protection guidelines to ensure that existing and potential threats to water quantity and quality are identified and that plans are in place and implemented by relevant stakeholders. Communities, sub-counties, and district local governments have addressed threats such as degraded wetlands and planting of water draining tree species in close vicinity to water sources. They enforced cutting the tree species and restoration of wetlands in the catchment area of piped water supply systems in Biguli Sub-county in Kamwenge.
- **WRM data collection:** Supporting partner district governments to collect data on climate change and WRM indicators, such as whether water source quantity and quality meet government standards. Sharing this data enables relevant authorities to mainstream appropriate response actions, such as implementation of water source protection guidelines.
- **Adapted water and sanitation technologies:** Developing pumped piped water supply systems that are less prone to contamination due to climate change related flooding. To cope with point sources that have dried up, water distribution lines and networks across the sub-county bring water to those affected. To take advantage of extreme seasonal variations and conditions, Water For People promotes rainwater harvesting to ensure that institutions harvest water during heavy rains for use during the dry season. Additionally, deep boreholes are drilled in accordance with MWE abstraction limits, and approved companies with abstraction permits are engaged for deep well drilling. This process acts as a check to avoid over-abstraction of the groundwater aquifers.

Key challenges

Challenges faced when implementing WRM and climate mitigation and adaptation strategies include:

- Water For People partners with low-resource rural and urban communities who are more natural resource dependent and less equipped to cope with challenges posed by climate change such as water shortages, flooding, and droughts that affect agricultural yields. Poverty levels often affect communities' abilities to practice sustainable wetland management practices, rendering restoration efforts slow or even impossible in some cases. Enabling stakeholders to engage in climate change adaptation and natural resources conservation is best achieved through offering alternative livelihood mechanisms. However, this is often expensive and not a supported component of donor-driven WASH projects.
- There is inadequate scientific data on climate and natural resources change and depletion trends, including insufficient data on different weather parameters, such as rainfall and temperature change over time, both at the national and program area levels. This makes it difficult to attribute impacts to climate change such as decreasing ground and surface water which, in turn, makes it difficult to advocate for climate change adaptation specific planning. There is a need to scientifically differentiate the climate change induced impacts from those that are human activity induced.
- While climate change is mentioned in the DDP as required by the National Climate Change Policy, there are no visible deliberate efforts at the district level to enforce and ensure that every department integrates climate change reduction or adaptation strategies in all sector programs. Departments are not held accountable for climate change indicators, even when it is a requirement. The Climate Change Department based in the MWE at the national level could be decentralized, as the case has been for the Directorates of WRM. Advocacy is required to ensure there is a climate change focal person or technical officer at the regional offices for water and sanitation of MWE, just like regional offices have Engineers, Public Health Specialists, and Community Development Specialists to provide technical support to clusters of districts.
- WRM work is transboundary in nature, cutting across districts, sub-counties, and parishes. As such, planning and execution is quite complex, considering both upstream and downstream interventions. Integrated WRM interventions are usually quite costly to implement.