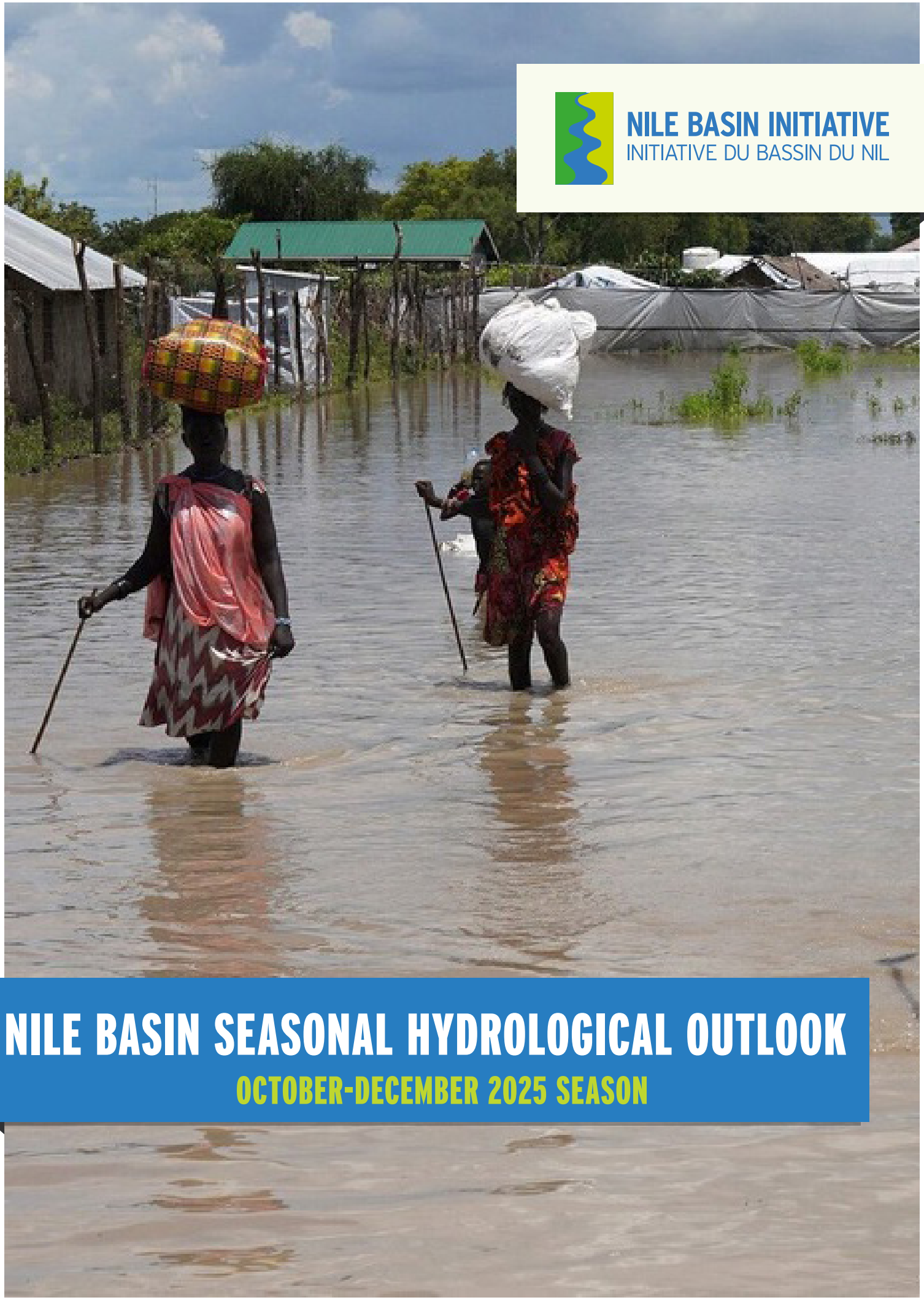


NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

NILE BASIN SEASONAL HYDROLOGICAL OUTLOOK

OCTOBER-DECEMBER 2025 SEASON

1. FORWARD

Dear Partners and Stakeholders,

It is with great pleasure that I present the Nile Basin Seasonal Hydrological Outlook and Advisory for the October–December (OND) 2025 Season. This report reflects the collective effort of the Nile Basin Initiative (NBI), its Regional Expert Working Group on Hydrology, and national and regional focal institutions across the eleven Nile Basin countries.

The Nile River Basin remains a vital lifeline for over 300 million people, underpinning food security, energy production, navigation, and economic development for the region. The OND season is particularly important for sustaining agricultural productivity in the equatorial regions, replenishing water resources, and providing critical inputs for hydropower and irrigation operations. Conversely, it also carries risks of hydrological extremes — including floods, droughts, and water quality challenges — that threaten lives and livelihoods if not managed proactively.

This advisory integrates the latest climate outlook from the ICPAC led 71st Greater Horn of Africa Climate Outlook Forum (GHACOF 71) with basin-wide hydrological monitoring and forecasting modelling and building plausible scenarios to provide a comprehensive picture of expected climate and weather, river levels and flows, lake levels, and water availability and probable implications. It highlights potential flood and drought risks, identifies vulnerable hotspots, and offers actionable recommendations and advisories for water managers, disaster risk agencies, energy and agriculture sectors, and communities across the basin.

We encourage all stakeholders to make use of this hydrological outlook, integrating its insights, recommendations and advisories into national planning processes to avert the risk of probable water related disaster. The NBI is committed to supporting Member States through provision of data, tools, and advisory services to enhance preparedness and response capacity. We encourage all stakeholders, governments agencies, basin communities, private sector actors, and development partners, to use this outlook to guide proactive planning, strengthen resilience, and transform climate and hydrological risks into opportunities for sustainable growth.

I would like to extend my utmost appreciation to all the partners and the Nile Basin Regional Expert Working Group (REWG) on Hydrology, who have worked diligently to prepare this Outlook and advisory. Your continued support and dedication are critical in building a resilient the Nile Basin.

Together, through cooperation and knowledge sharing, we can safeguard the Nile Basin's water resources for present and future generations.

Sincerely,

Dr. Florence Grace Adongo
Excutive Dirctor
Nile Basin Initiative

2. TABLE OF CONTENT

1. INTRODUCTION

The Nile River Basin, a vital lifeline for over 300 million people across eleven riparian countries—Burundi, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda—plays a critical role in supporting livelihoods, agriculture, energy, and economic development in the region. The Nile River is the longest river system in the world, with a length of about 6,650 kilometers with unparalleled social, historic and economic importance in the region for both upstream and downstream nations. The basin is formed by three principal rivers- the White Nile- the headstreams of which flow into Lakes Victoria, Kyoga and Albert, Baro-Akobo-Sobat, Bahr-el-Ghazal; the Blue Nile; and the Tekeze-Setit-Atbara which flow from the highlands of Ethiopia.

The basin's hydrology is highly sensitive to climatic variations, particularly changes in precipitation and evapotranspiration, which directly influence river flows, lake levels, and water availability and quality. The basin experiences three distinct rainy seasons. March-April-May (MAM) and October-November-December (OND) are long and short rainy seasons respectively in the Nile Equatorial Lake (NEL) region. June-September (JJAS) is the only rainy season characterizing the Eastern Nile regions. Therefore, OND is a key season in the basin, as it signals the onset of seasonal rains in the equatorial and central parts of the basin, and the onset of dry period in the highlands of Ethiopia with significant hydrological implications for river flows and lake levels for both upstream and downstream nations.

Therefore, in recognizing the importance of anticipatory action to manage water-related risks, the Nile Basin Initiative (NBI) presents the Seasonal Hydrological Outlook and Advisory for the OND 2025 season. This follows the release of the seasonal climate forecast by the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre (ICPAC) during the 71st Greater Horn of Africa Climate Outlook Forum (GHACOF 71), held on 25th - 26th August 2025 in Nairobi Kenya. Building on the ICPAC's climate projections, NBI's Regional Expert Working Group (REWG) on Hydrology convened on 28th - 29th August 2025 to assess the implications of the ICPAC released climate outlook on the Nile Basin's hydrology. Through expert analysis, model simulations, and stakeholder consultations, this advisory provides a comprehensive assessment of the anticipated hydrological conditions, including river flows, lake levels, and potential impacts on water resources, energy, agriculture and flood-prone areas.

The advisory informs the decision-makers and communities across the Nile Basin, enabling proactive adaptation and measures to mitigate risks, optimize water resources and enhance resilience during the OND 2025 season. By integrating climate forecasts with hydrological modeling, NBI seeks to support climate-smart planning and early action to safeguard lives, livelihoods and optimize operations for water supply, hydropower and irrigation. It also highlights disaster risk areas in the face of evolving climatic conditions and provides specific recommendations and advisories to guide Member States and relevant agencies in the planning and actions that enhance benefits, reduces the risk of hydrological disasters and builds resilience to hydrological extremes in the basin.

2. TOOLS AND SYSTEM

2.1. Nile Basin Regional Hydrological Monitoring System

The Nile Basin Regional Hydrological Monitoring System is a collaborative hydrological monitoring system consisting of stations and a data management system. It was established to enhance transboundary cooperation among Member States. It provides real-time hydrological data and information on river, lake, rainfall, and water quality variables for water resources planning and management including flood forecasting and early warning for data-driven decisions in the basin.(https://nilebasin.org/hydromet/about).

2.2. Nile Basin River Flow Forecasting System (NB-FEFFS)

The NB-RFFS provides river flow forecasts information at selected locations in the river network for the short-term and at seasonal time scale. The forecast supports operational decision making. The system uses the observed river and lakes levels from the Nile Basin Monitoring network as a reference for its forecasts.

2.3. Eastern Nile Flood Forecasting and Early Warning System

The Eastern Nile Flood Forecast and Early Warning System (EN-NEWS) is an integrated, real-time and 3-day flood forecasting and early warning at 55 locations. It provides forecasts and early warnings for riverine floods in key flood-prone areas in Lake Tana, Baro-Akobo-Sobat, Blue Nile, and Tekeze-Setit-Atbara (enffews.nilebasin.org).

2.4.Nile Basin Flash Flood Early Warning System

The Nile Basin Flash Flood Early Warning System (NB-FFEWS) is a web-based system that provides near real time and forecast information on the occurrence of flash flood to enhance preparedness and resilience of communities within the Nile basin. Early warning information supports Member States for effective flash flood early warnings in flash flood prone areas with 48 hours lead time through the existing national dissemination channels. (https://flashfloodalert.nilebasin.org/).

2.5. Nile Basin Drought Early Warning System

The Nile Basin Drought Early Warning System (Nile DEWS) developed by ENTRO to monitor and forecast meteorological drought, hydrological drought, and agricultural drought in the Nile basin over 84 sub-basins and at various grid scales to help mitigate the drought impact across the Nile basin. It produces a monthly drought forecast bulletin and Monitor Reports (https://dews.nilebasin.org).

2.6. East Africa Hazards Watch

The ICPAC Water Forecast Portal is a hydrological forecasting system that delivers key hydrological variables at locations of interest. The portal was developed by the ICPAC to enhance water resources management and disaster resilience in East Africa https://eahazardswatch.icpac.net/mapviewer).

2.7. WMO Global Hydrological Status and Outlook System (HydroSOS)

The HydroSOS initiative aims to strengthen country capacity across the hydrological value chain, to help produce standardized information on the current state of the water resources and provide outlooks at the sub-seasonal to seasonal scale.

3. PERFORMANCE OF MARCH-APRIL-MAY 2025

The June-July-August-September (JJAS) season holds significant hydrological importance in the Nile Basin, particularly for the Nile Equatorial Lakes and eastern parts of the basin, including Uganda, Kenya, Ethiopia, and South Sudan. This period typically marks the “long rains” season, especially in the East African highlands, which are critical headwaters for the Nile River system. The rainfall during JJAS contributes substantially to the flow of major tributaries of the Nile River such as the Blue Nile, Atbara-Tekeze, and Baro-Akobo-Sobat. This seasonal influx supports agriculture, replenishes water storage in lakes and reservoirs and maintains baseflows that are vital for downstream water availability.

3.1 Climate

The JJAS season climate outlook released on the 20th May 2025 at the 70th Greater Horn of Africa Climate Outlook (70th GHACOF) by ICPAC, indicated an increased likelihood of near normal to above-normal rainfall over much of the northern Greater Horn of Africa (GHA), including the highlands of Ethiopia, western Kenya, eastern Uganda, most parts South Sudan and some parts of Sudan. In particular, the regions of eastern Uganda, eastern South Sudan, and northwestern Sudan were predicted to experience above normal rainfall with a 55% likelihood of occurrence (Figure 1). The forecast also indicated drier than normal conditions expected over Rwanda, Burundi, western Uganda and north-western Tanzania..

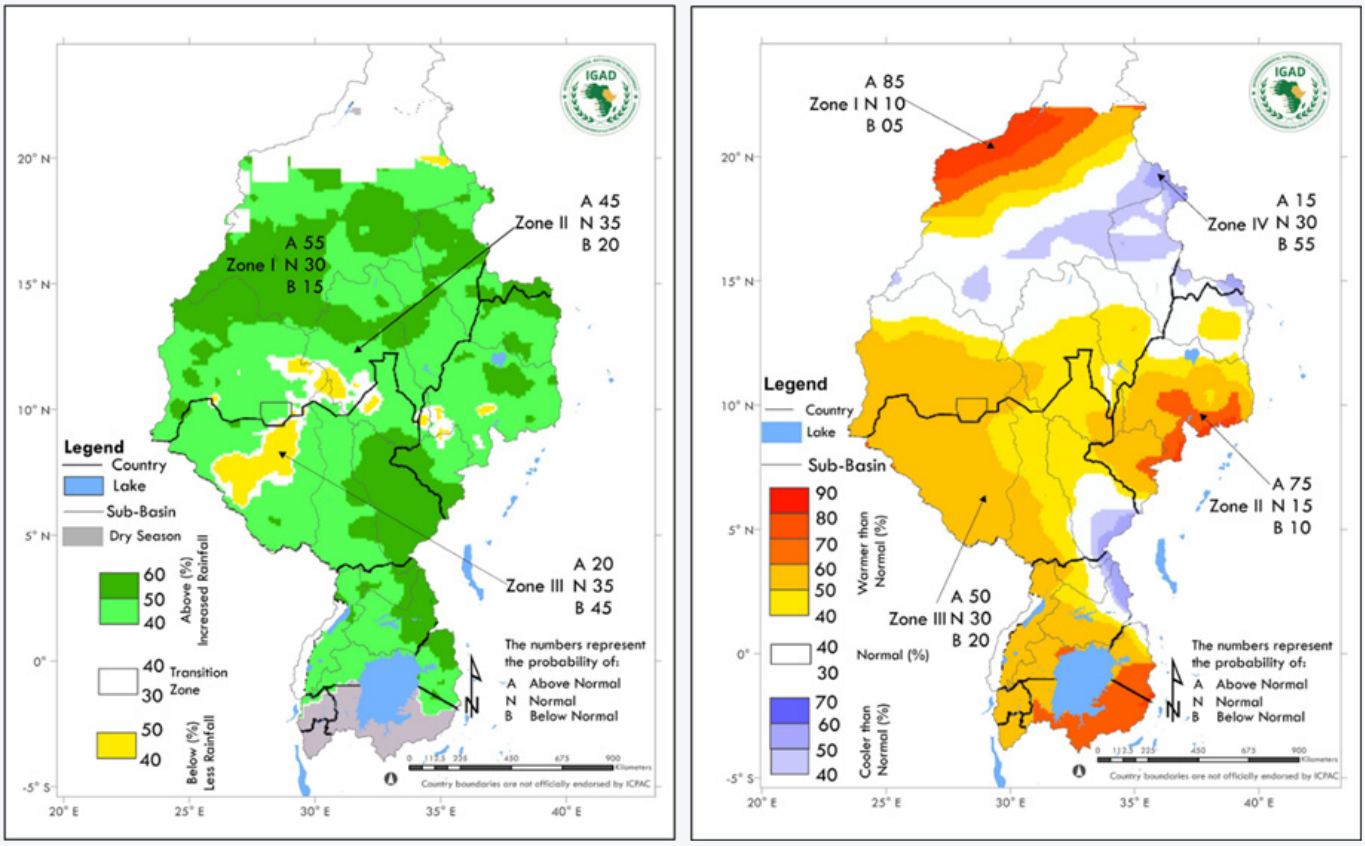


Figure 1: Nile Basin Climate conditions were expected in June-July-August-September (JJAS) 2025

Ground observations and other data sources confirmed some of the predictions in several areas with spatial and temporal variations. The spatial deviations of ground observations indicated increased anomaly in June especially in Eastern Nile regions in Ethiopian highlands and parts of Sudan, western Kenya, eastern South Sudan and Uganda (Figure 2)..

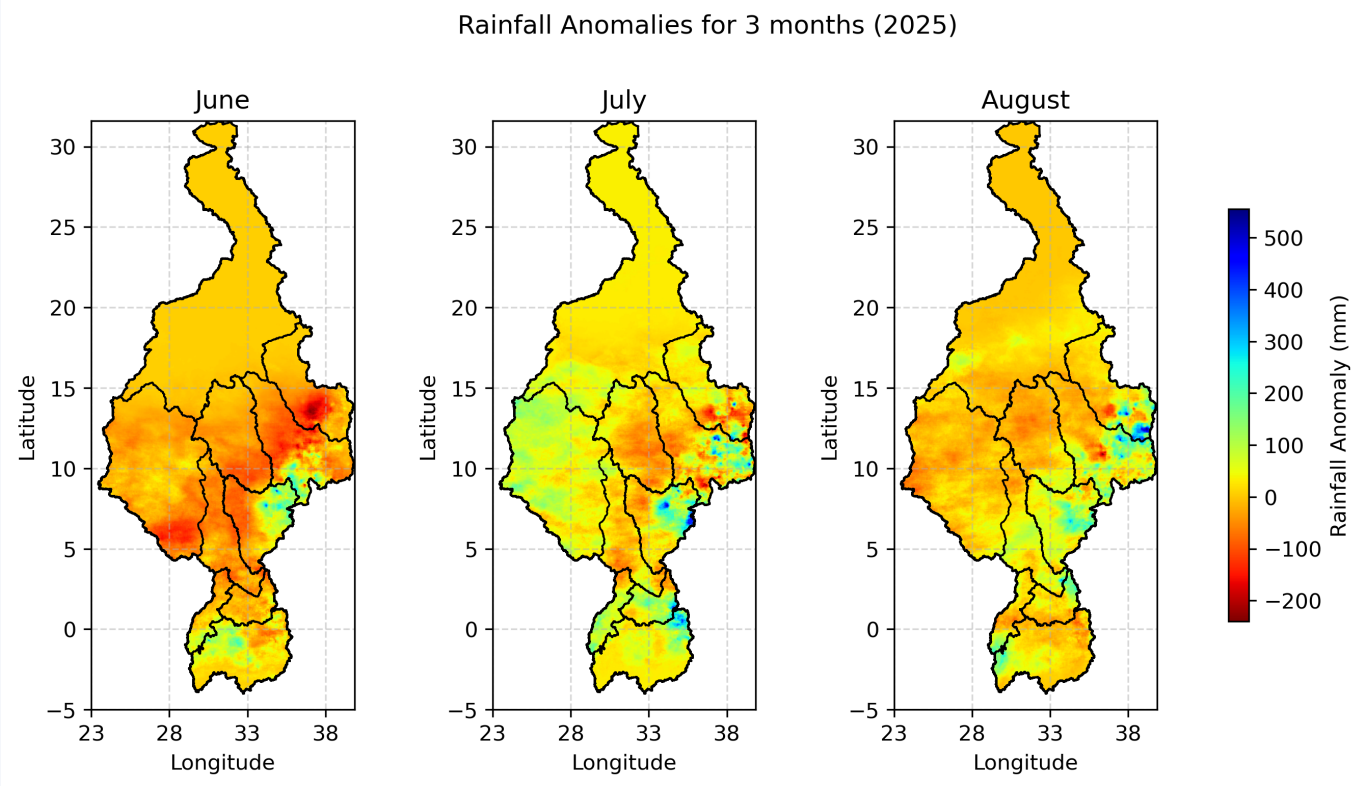


Figure 2: Nile Basin rainfall anomaly for June, July August 2025

3.2 Hydrology

The wetter-than-normal and drier than normal conditions predicted in most parts of the NEL and some parts of the EN region were expected to impact on the hydrology of the basin. Ground observations indicated declining river levels and flows were observed in most parts of the NEL region while most parts of the EN region registered increased levels and flow in rivers and lakes and reservoirs of above normal during the JJAS 2025 Season (Figure 3)

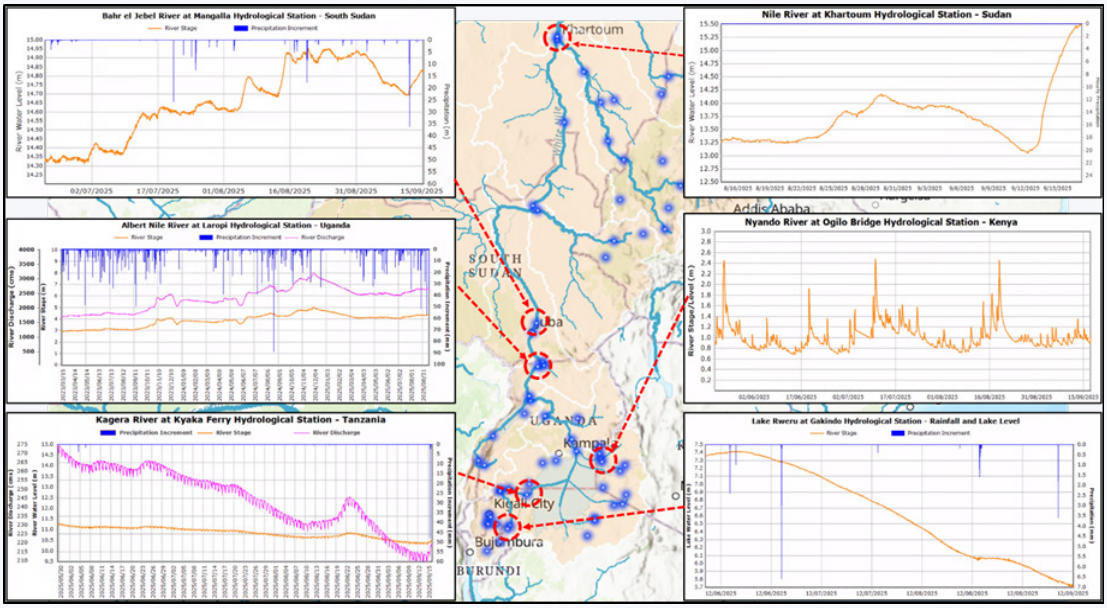


Figure 3: Observed River levels at various Regional Hydrological Monitoring Stations during the JJAS 2025 season.

Lake Victoria water levels remained on steady decline trends as predicted with the observed data falling in the 25th percentile -lower bounds of the JJAS forecast but higher than 2023 but lower than the 2024 levels in the similar period (Figure 4). However, the JJAS forecast overestimated the Lake Kyoga water levels with the observation falling within the band of uncertainty last quarter of JJAS (Figure 5).

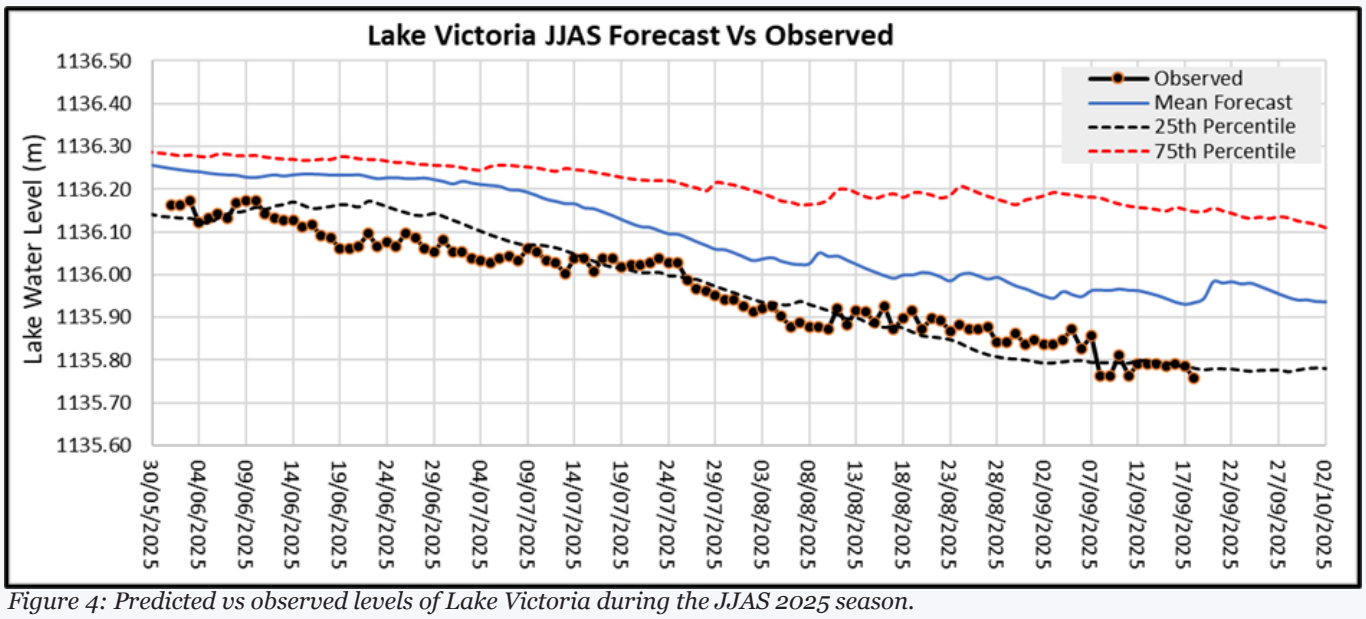


Figure 4: Predicted vs observed levels of Lake Victoria during the JJAS 2025 season.

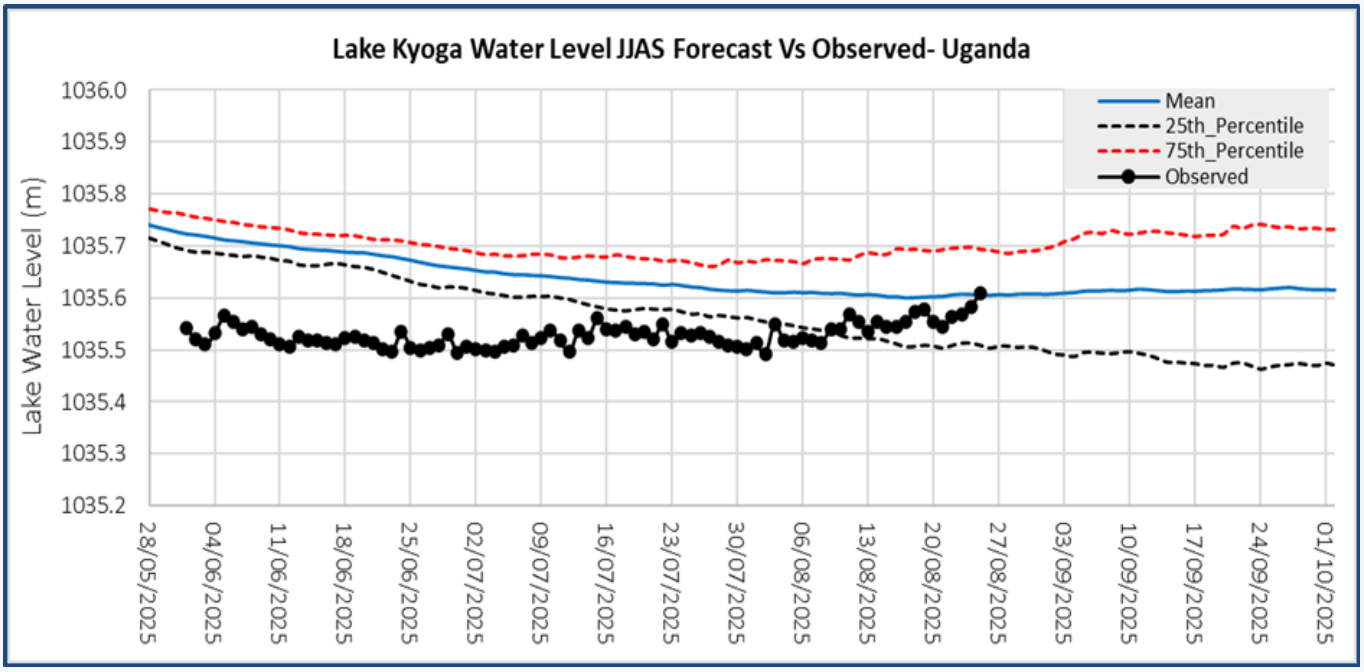


Figure 5: Predicted vs observed levels of Lake Kyoga during the JJAS 2025 season.

3.2.1 Observed Flood Occurrence MAM 2025

a) Flash Flood Occurrence

Leveraging on the NB FFEWS, flash flood was forecasted on 3rd June 2025, in the areas of Benchi Maji in Ethiopia where 50,654 and 53,523 people were identified at medium and high risk of flash floods respectively. On 29th June 2025, additional areas were flagged, including Arsi in Oromia, and Kaffa and Shaka with a combined population of 208,758 at medium risk. The areas of Nzara and Yambio in Western Equatoria, South Sudan, where no population was reported at risk. Across the affected regions, the flash flood risk levels ranged from medium to high, with Ethiopia showing the highest vulnerability during the month of June 2025 (Figure 6).

In July 2025, Ethiopia continued to experience widespread flash flooding across multiple regions including Gambela, Oromia – Arsi, Illubabor, Jimma, West Shewa, and West Wellega; Southern Nations, Nationalities and Peoples (SNNP) – Benchi Maji, Guraghe, and Shaka; and Western Tigray in the Tigray region. In total, 1,200,743 people were identified at medium risk, 833,292 at high risk, and 92,365 at very high risk of flash floods. Similarly in Sudan, flash flood risks were reported in Al Qadarif – Al Fushqa and Red Sea – Tokar, with 25,629 people at medium risk.In South Sudan, the Upper Nile region—specifically Baliet, Longochuk, Luakpiny/Nasir, and Maiwut—faced flash flood threats, with 30,073 people at medium risk and 49,699 at high risk. These figures reflect the continued vulnerability of populations across the region to seasonal flash flooding during the JJAS period.

In July 2025 flash flood forecast, several regions across East Africa were identified as being at risk. In Ethiopia, Amhara – North Gonder and Tigray – Western Tigray had a combined population of 2,305 at medium risk. In Sudan, North Kurdufan – Sowdari and Northern – Addabah were forecasted to have 581 people at medium risk. In Uganda, multiple districts including Bundibugyo – Bwamba, Kabarole – Bunyangabu, Kasese – Bukonjo, and Kasese – Busongora faced significant threats, with a total of 126,950 people at medium risk and 48,914 at high risk of flash flooding. These figures underscore the continued vulnerability of populations across Ethiopia, Sudan, and Uganda during the peak of the JJAS 2025 season.

On 17th August 2025, widespread flash flood risks were reported across Ethiopia, Kenya, Sudan, South Sudan, and Uganda, affecting millions of people. In Ethiopia, the regions of Amhara (South Gonder, West Gojam), Benshangul-Gumaz (Asosa), Gambela Peoples (Zone 1 and Zone 2), Oromia (Arsi, Bale, Borena, Illubabor, West Wellega), Southern Nations, Nationalities and Peoples (Gamo Gofa, Gedeo, Sidama, Wolayita), and Tigray (Central, Eastern, and Western Tigray) were forecasted to be at risk, with 5,231,668 people at medium risk, 2,374,412 at high risk, and 1,324,343 at very high risk.

In Sudan, affected areas included Blue Nile (Al Kurumik), Kassala (Hamashkorieb, Nahr Atbara), North Darfur (Mellit), Northern (Addabah, Merawi), Red Sea (Sinkat, Tokar), River Nile (Abu Hamad, Ad Damer, Atbara, Berber), South Upper Nile (Longochuk), and West Darfur (Al Geneina), with 194,684 people at medium risk, 101,728 at high risk, and 2,664 at very high risk.

In South Sudan, regions at risk included Eastern Equatoria (Budi, Lafon, Torit) and Upper Nile (Longochuk, Maban, Maiwut, Melut, Renk), with 33,192 people at medium risk, 857 at high risk, and 138 at very high risk.

In Uganda, multiple districts were affected, including Bugiri (Bukooli), Busia (Samia-Bugwe), Iganga (Bugweri, Luuka), Jinja (Butembe, Kagoma), Kapchorwa (Kongasis, Kween, Tingey), Kayunga (Ntenjeru), Kotido (Dodoth), Masaka (Bukomansimbi, Bukoto), Mayuge (Bunya), Mbale (Bubulo, Bungokho, Manjiya), Mpigi (Mawokota), Mukono (Buikwe, Mukono, Nakifuma), Sembabule (Mawogola), Sironko (Budadiri, Bulambuli, Mt. Elgon NP), Tororo (Kisoko, Tororo), and Wakiso (Busiiro), with 1,652,790 people at medium risk and 116,117 at high risk.

During June, July, and August 2025, Rwanda, Burundi, and Tanzania remained largely unaffected by flash floods, as they were in their dry season with minimal rainfall and negligible population exposure to flood risk.

The forecast highlights the extensive and multi-country impact of flash flooding during the peak of the JJAS 2025 season.

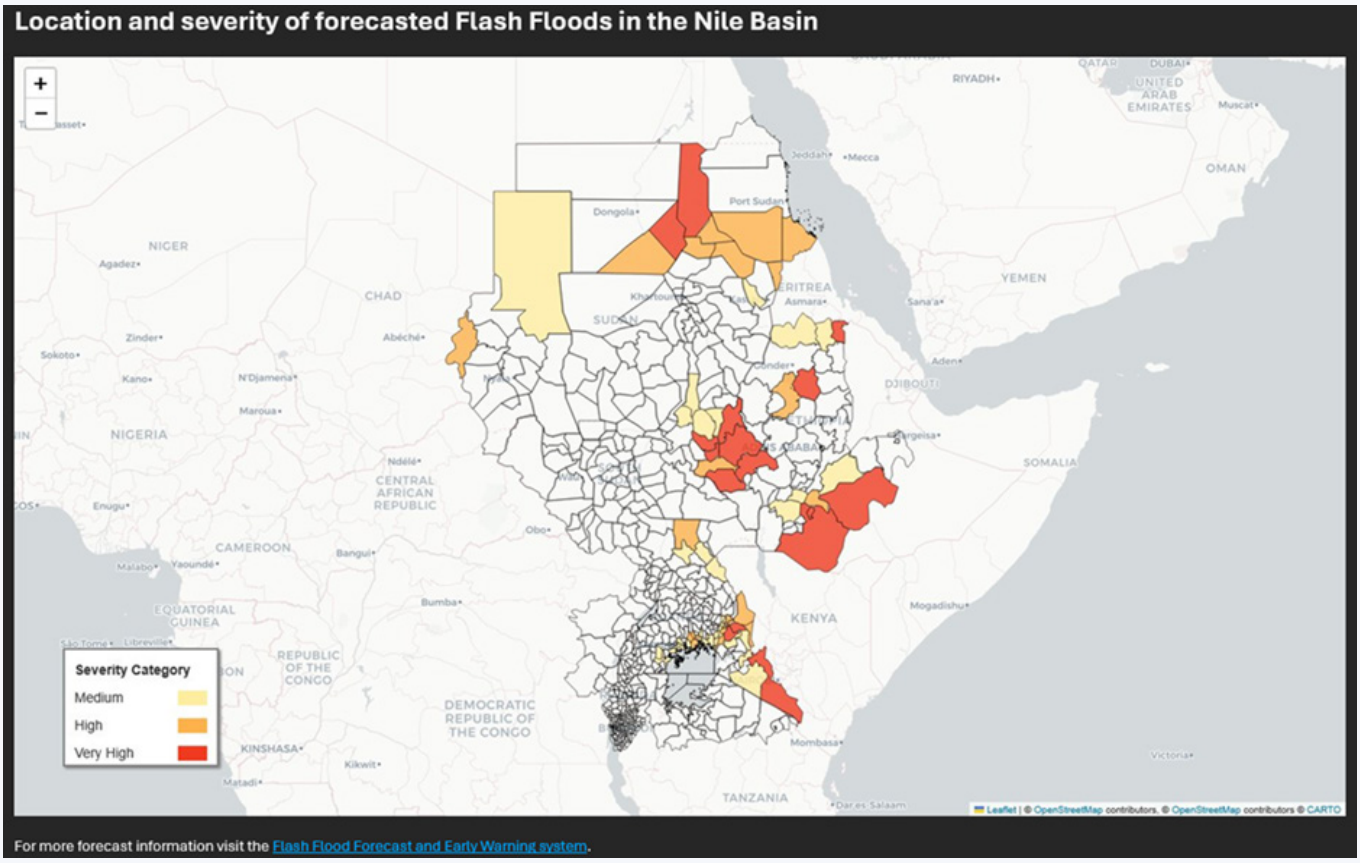


Figure 6: Example of forecasted flash flood events during the JJAS 2025 season. (Source: Nile Basin Flash Flood Early Warning System)

b)Riverine Flood Occurrence in the EN

The EN-FFEWS have not forecasted any overbank riverine flood in Tekeze-Atbara-Setit (TAS), Baro-Akobo-Sobat (BAS) and Blue Nile sub-basins as the rivers remained below the alert and flood levels (Figure 7). On the ground there was no observed overbank riverine flood in July and August 2025 with significant water level rise recorded in the Tekeze and Atbara rivers.

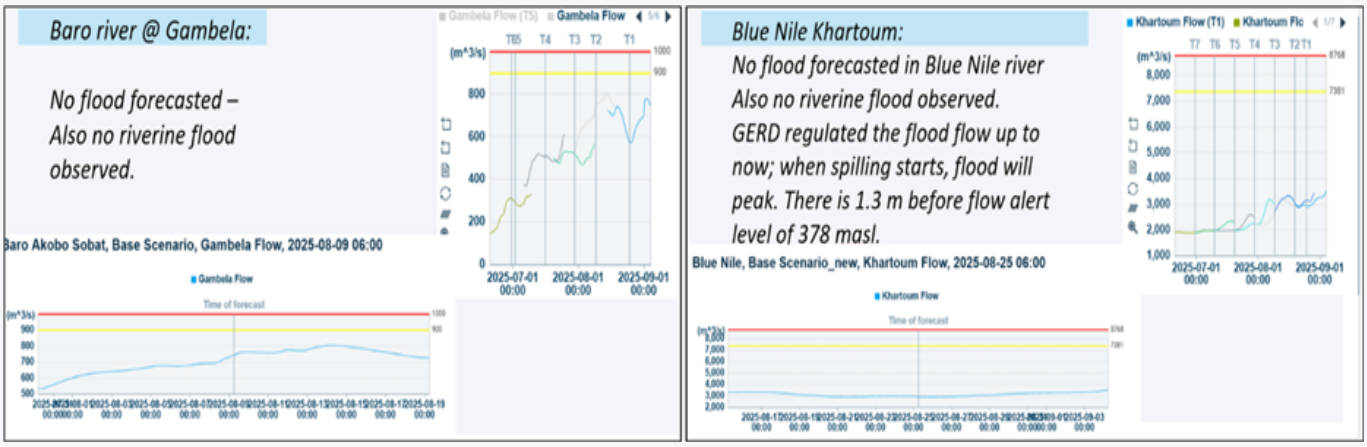


Figure 7: Baro River at Gambela and Blue Nile River at Khartoum remained below the flood alert and warning levels.

However, in the areas around Lake Tana and the sub-basin, Gumara river flooded croplands and houses at Tlifa due to the river breaching the bank and protection dikes. As a result, a warning was issued through EN-FFEWS. Detail summaries of the riverine flood status for BAS, TSA, Blue Nile & Lake Tana are provided below (Figure 8).

Figure 8: Gumara river (Lake Tana) at Telifa locality, breaching the bank and its protection, 25 Aug 2025, courtesy of EN-FFEWS WhatsApp Group).

4. OCTOBER-DECEMBER 2025 OUTLOOK

The OND season plays a critical role in both the Nile Equatorial Lakes (NEL) and the Eastern Nile (EN) region with varying hydrological significance across these two sub-basins. In the Eastern Nile region, particularly the Ethiopian Highlands, OND is the end of rainy season and the beginning of low rain season and a short rain season for the NEL region. This period supplies the significant flow to the Nile hence supports both irrigated and rain fed agriculture, hydropower production and water storage in the upstream of the Upper White Nile River.

4.1 Climate Outlook

According to the climate outlook released at the 71st Greater Horn of Africa Climate Outlook Forum (71st GHACOF), increased likelihood (60%) of above-normal rainfall is predicted in southwestern and northeastern Uganda and most parts of southern and northeastern South Sudan (Figure 5). Below normal rainfall with a likelihood chance between 40-60% is also predicted to be experienced in areas of most parts of the NEL regions southern, eastern central and western Uganda, southern western South Sudan, southeastern Ethiopia, most parts of Rwanda and Burundi and western Kenya. In addition, most parts of the basin are expected to experience warmer than normal conditions in the OND season.

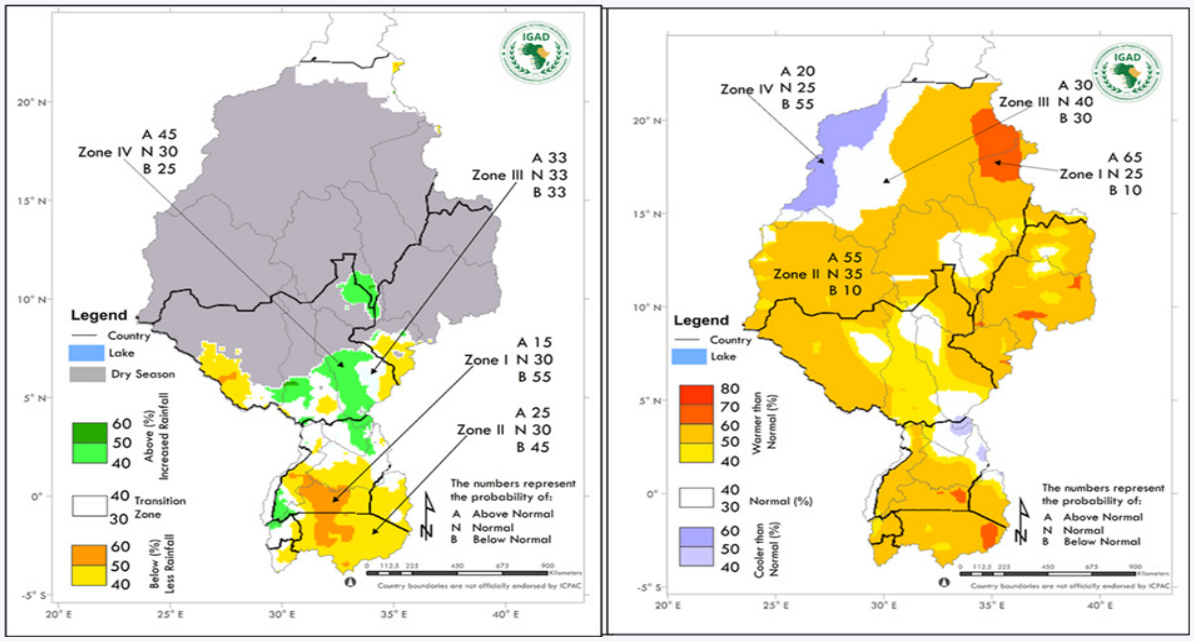


Figure 9: Nile Basin Climate Outlook- Rainfall and Temperature- for OND 2025 Season.

4.2 Hydrological Outlook

Nile River is highly sensitive to precipitation and evaporation changes, making its flow vulnerable to climate variability and changes. The river's water balance is significantly influenced by these meteorological factors, with arid zones like Egypt showing a marked decrease in runoff (up to 30%) for a 10% drop in precipitation. Conversely, increased evaporation reduces water supply, while fluctuations in rainfall and evaporation leading to both droughts and floods, posing significant challenges for water resource management in the region.

Therefore, the OND climate outlook has significant implications for river hydrology influencing various aspects of river levels and flows, lake levels, reservoir storage, water availability and ecosystem health. The projected changes in rainfall and temperature for OND season are expected to signifi-

cantly impact the basin hydrology with the immediate impacts to be registered on the river's levels and flows, lakes levels and reservoir storage.

4.2.1 Impacts on river flow and reservoir

The hydrological simulations of the projected climate outlook using mean and 25th and 75th percentile of the 51 ensemble members indicated minimal increasing trend from October with immediate declining trends in November to December, a reflection above normal rainfall predicted from the highlands of Ethiopia and the region (Figure 6). In contrast, the rivers of the EN regions are expected to be in a slowing trend with minimal variations throughout the OND period indicating consumptive storage. However, the outflow from Bara-Akobo-Sobat is projected to rise steadily from June and peak in the last week of September and early October above the long-term mean and lag the peak of 2022 and 2023 during the similar period (Figure 10).

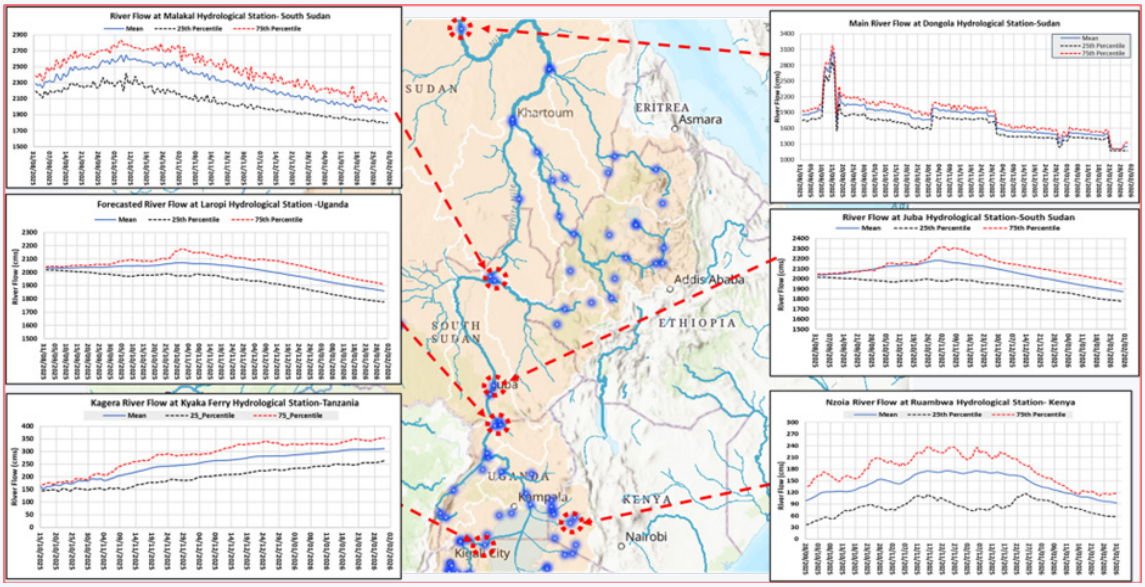


Figure 10: Forecast River flows for the NEL and EN region for OND 2025 Season

4.2.2 Impacts on the Lakes Levels and Reservoirs

The impact of river flows and rainfall on lakes and reservoir levels and discharge is a key component of the hydrological dynamics of the Nile River Basin. These variables play a crucial role in maintaining or altering the water balance in the lake and reservoirs, influencing its storage, outflows, and ecosystem.

Lake Victoria water levels are predicted to increase by about 27% above the long term mean while remaining below the 2024 record while Lake Tana, Lake Kyoga and Lake Albert are predicted to remain on the declining trend with significant variation registered for Lake Tana (Figure 11).

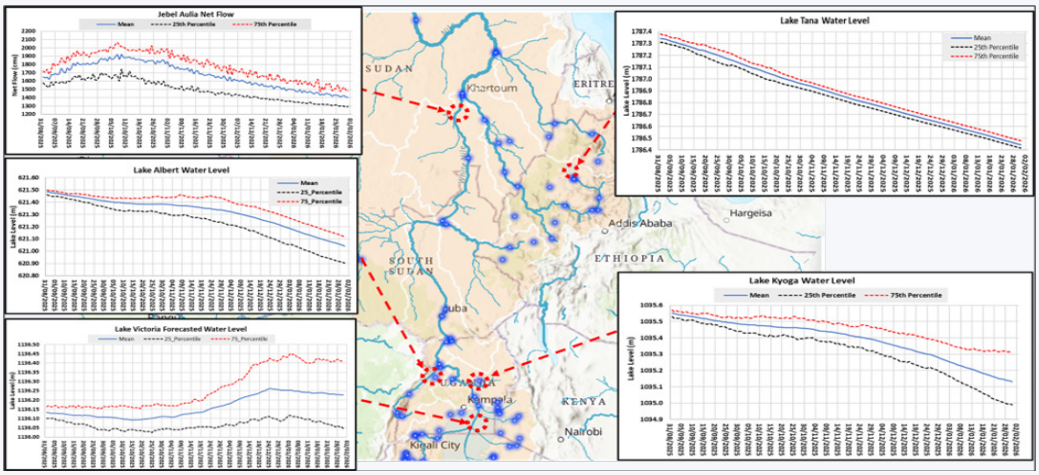


Figure 11: Forecast Lake levels for Lake Victoria, Lake Kyoga, Lake Tana and Lake Albert.

5. COUNTRY OUTLOOK AND IMPLICATIONS

This section provides a summary of current situations and implications of the projected climate and hydrological outlook in the Nile Basin Member States for the OND 2025 Seasonal.

5.1 Burundi

Burundi has a surface area of 27,834 km2 of which about 48% is within the Nile Basin hence constituting 0.4 percent of the basin drainage area (Figure 12). The annual rainfall varies between 850mm and 1,600 mm with an average mean rainfall of 1,100 mm. The low-land areas of Burundi are sometimes affected by floods during heavy rains. The flood prone areas include the shorelines of Lake Tanganyika, Rweru and Cyhoha and some parts of the small streams and rivers such as Ruvyironza, Rusizi and Ruvubu.

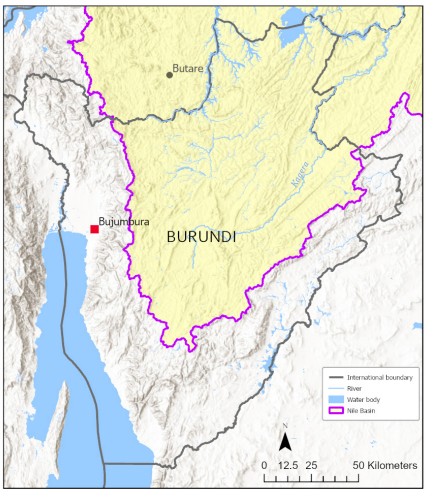


Figure 12: Map of Burundi with part of Nile Basin

5.1.1 Performance of the JJA 2025 Season and ImpactsIn

Burundi, the season from June to August is naturally dry and rivers and lake water levels in many parts of the country usually remain relatively low and on the decline due to no or low rainfall and enhanced evaporation hence the declining trends. Therefore, it was predicted in May 2025 that the rivers and lakes levels would decrease June to August 2025. This prediction was confirmed by ground observations and data as show on Ruvubu River characterizing the situation in most of the hydrological stations in the country (Figure 13) hence one of the driest season in a decade. However, from September rivers and lake levels start to increase marking due to the onset of September-December (SOND) rainfall season.

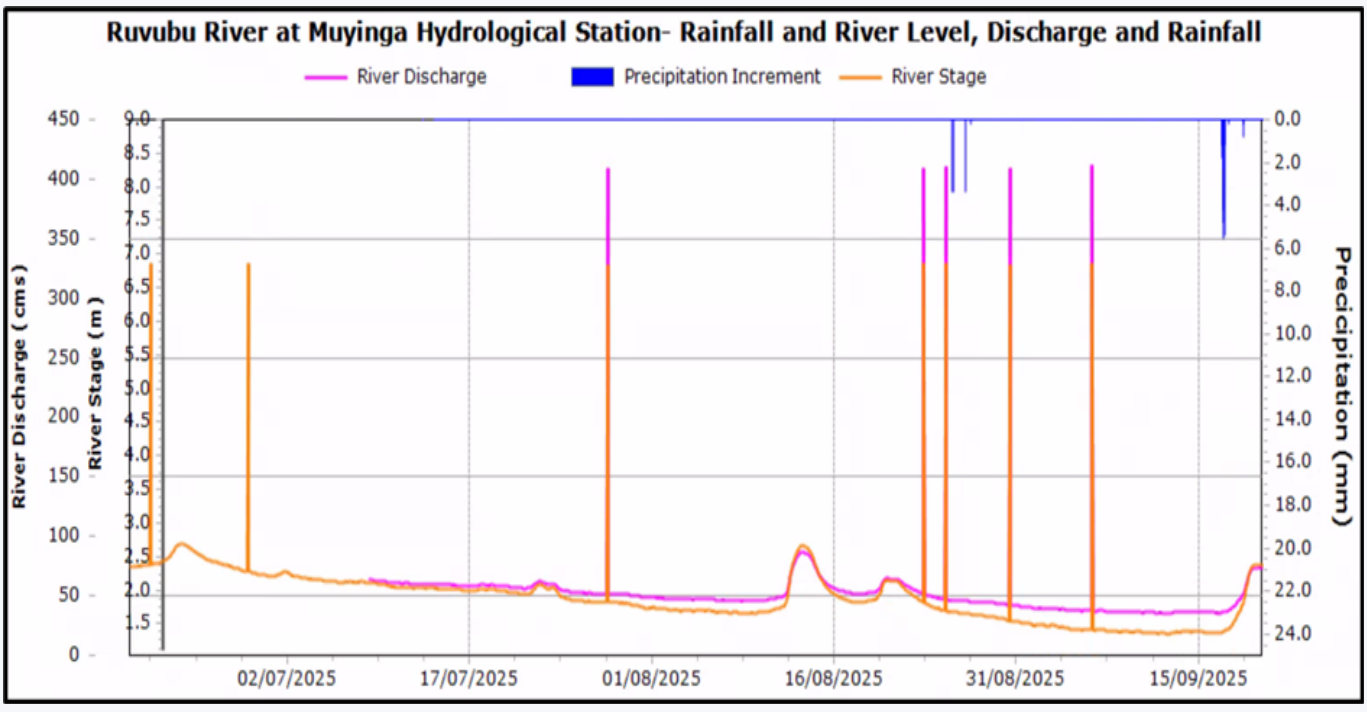


Figure 13: Ruvubu River water level and discharge recorded for the JJA 2025 Season

Impacts on agriculture, the season from June to September is a season for harvesting production and preparing for the OND season. Hydropower productions were low and water supply for domestic and irrigated agriculture was intermittent due to reduced river flows and water storages.

5.1.2 Climate and Hydrological Outlook for OND 2025 and Implications

Burundi generally experiences a tropical climate with two rainy seasons- the "long rains" (March-April-May) and the "short rains" (October-November-December). In the western regions (like Bujumbura and the surrounding areas), rainfall tends to be more evenly distributed, while the central and eastern parts may see less rainfall. The rainfall can vary, with occasionally dry spells during this period as well.

According to the climate seasonal forecast released by Institut Géographique du Burundi (IGEBU) for the period of September to December 2025 over Burundi indicated that near-climatological average rainfall is expected in the regions of Imbo, Mirwa, Mugamba, Bututsi, Buyenzi, as well as in the western parts of Kirimiro, Bweru and Buragane. Rainfall with a tendency to be deficient is expected in the natural regions of Moso, Buyogoma, as well as in the eastern parts of Bweru, Kirimiro and Buragane (Figure 14).

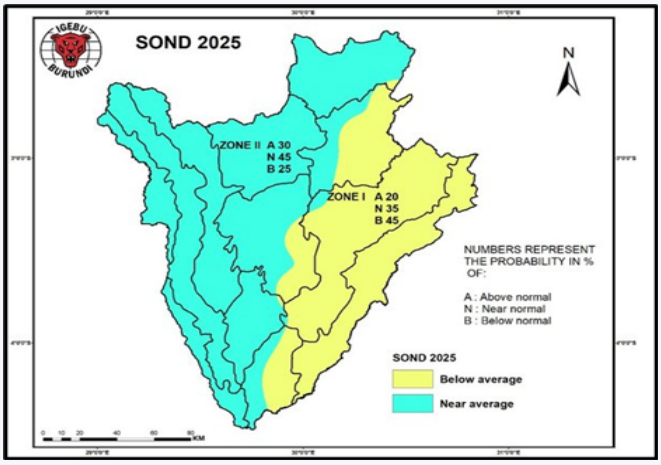


Figure 14: Seasonal rainfall forecast for Burundi (Source: IGEBU).

Hydrological implications of the projected changes on precipitation include increased river levels and flows especially in western regions, hence likelihood of flash and riverine flood occurrences remain high.

5.1.3 Recommendations and Advisories

The October to December season is an important season for Burundi because it precedes a dry season. The forecast for the OND season developed by ICPAC in collaboration with national experts shows that Burundi will have normal to below normal rainfall. This situation will be favourable for most crops but may cause flooding in high-risk areas. Following this situation, some recommendations and advisories are as follows:

1. Follow up an update monthly forecasts disseminated by Geographical Institute of Burundi (IGEBU).
2. Disseminate forecasts and alerts by all possible mechanisms including local and national radios, TVs, social media etc.) so that they can reach the end user
3. Continuous monitoring of rivers and lakes and adapt accordingly especially in flood prone areas and issue periodic updates
4. Farmers urged to continue to establish Soil erosion control structures like contour lines, ditches, hedgerows
5. Encouraged and promote water harvesting technologies (collect and store rainwater available for future uses) especially in drought prone areas projected to experienced depressed rainfall.

5.2 DR Congo

The Democratic Republic of the Congo is a country in Central Africa with a land surface area of 2.3 million km2. The Country is drained mainly by the Congo River. About 1% of the country drains to the Nile River Basin constituting about 0.7% of the Nile Basin area. The Nile Basin in DRC is predominantly found in the northeastern part of the country. The region experiences a tropical climate with distinct wet and dry seasons. The climate in the region is influenced by both the equatorial and tropical monsoon systems, and the hydrological patterns are driven by rainfall, temperature, and the runoff from the surrounding highlands.

Despite the small part of the country in the Nile Basin, the impact of the climate and hydrology is still considerable as it shares borders with five other NBI Member States (Burundi, Rwanda, South Sudan, Uganda, and Tanzania). The shared water resources of Lake Albert, Lake Edward and Semliki River between DR Congo and Uganda are vital for both countries and support the lives and livelihood of several communities. The Rutshuru and Rwindi River flow into Lake Eward while Semliki River flows out of Lake Edward into Lake Albert hence hold significance hydrological consideration for the Albert Nile.

5.2.1 Recommendations and Advisories

Ground monitoring and observations indicated that the rivers flows, and lake levels remained normal with minimal variation during the JJAS 2025 Season. Figure 15 shows variations of Lake Edward water levels at Katwe hydrological station in Uganda. The lake water level forecast issued in May 2025 for the JJAS remained above the observed lake water levels for Lake Albert in June and July while August and September observation falls within the 25th and 75th percentile band of predictions (Figure 16).

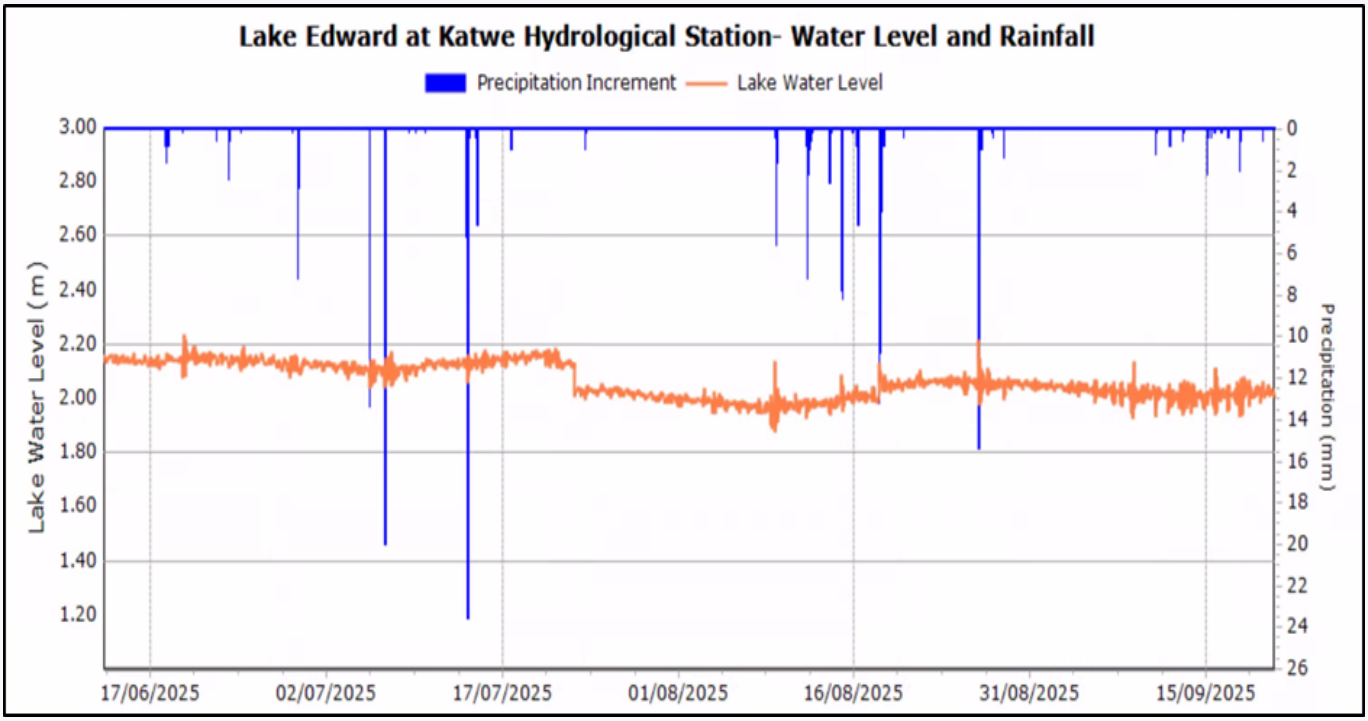


Figure 15: Observed water levels for Lake Edward at Katwe station for the JJAS 2025 period.

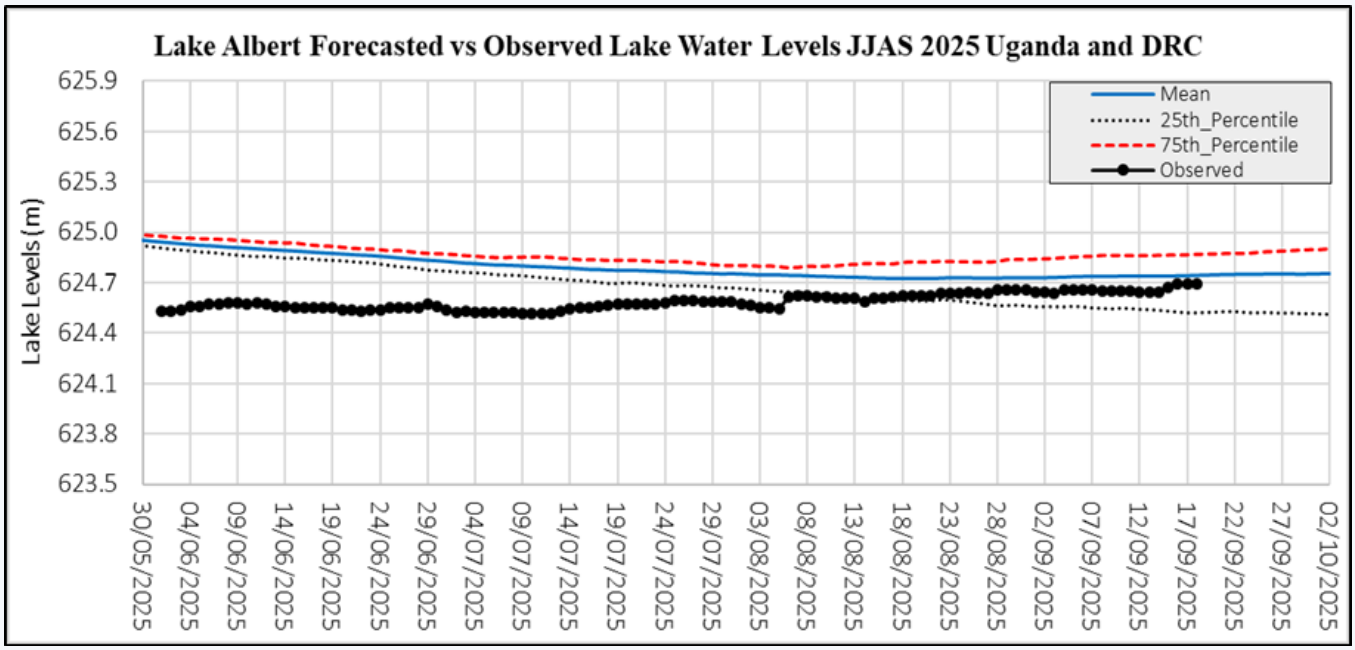


Figure 16: Lake Albert JJAS 2025 forecast lake water level compared to observed at Butiaba hydrological Station

5.2.2 Climate and Hydrological Outlook for OND 2025 and Implications

DR Congo Nile is projected to remain near normal-to- above normal rainfall in OND season hence variation in water level and river flow is expected impacting on lives and livelihood, water resources and agricultural sectors in that part of the basin.

The river systems are likely to see a steady increase in flow and water levels during this period, as the near-to- above normal rains contribute to runoff with the risk of flooding risks that could be higher in areas near the rivers due to elevated water levels. Therefore, flooding potential is expected to be higher during the peak rainfall months especially November due to the topography and the amount of rainfall in the region. Localized floods near riverbanks might be common, and disruptions to transportation and agricultural activities could occur.

The rain during this period will be essential for crop growth, particularly for maize, cassava, and beans, which are key crops in the region. However, excessive rainfall could lead to soil erosion and flooding, which may damage crops and infrastructure. Flooding could displace communities, especially in lowland areas near the Semliki, Rutshuru and Rwindi River, and disrupt daily life and travel. The increased river flow could benefit mini-hydropower generation in the area. While near to above normal rainfall is anticipated, significant amount of seasonal variability could affect water availability for the months following December (January and February), which could experience drier conditions.

5.2.3 Recommendations and Advisories

1. Flood Management plan: Flood risks could impact local communities, agriculture, and infrastructure, especially in floodplains near major rivers.

2. Continuous monitoring of the river systems, especially for the low-lying areas of the Semliki, Rutshuru and Rwindi Rivers, will be crucial for flood forecasting and early warning information.

3. Local authorities should inform communities about potential flood risks and prepare for possible evacuations.

4. Farmers may need to adjust planting schedules or take measures to prevent crop damage from floods, such as improving drainage systems.

5.3 Ethiopia

Ethiopia is a landlocked country located in the Horn of Africa region of East Africa with a land surface area of about 1.1 million Km2 of which about 33% is within the Nile Basin, constituting about 12% of the basin area. The Blue Nile known as Abbay, Baro Akobo, Mereb and Tekeze are the main tributaries of the Nile River (Figure 17). Abbay is the source of the Blue Nile. It accounts for 20% of Ethiopia's land area, for about 50% of its total average annual flows which emanate from the Ethiopian highlands.

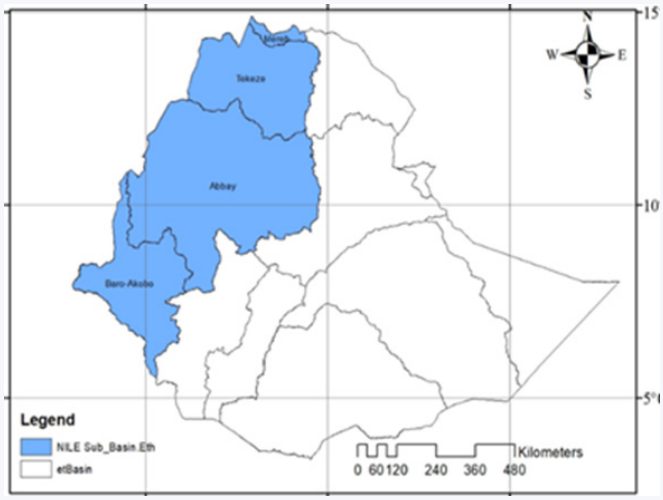


Figure 17:Map of Nile Basin in Ethiopia

The rivers of the Abbay basin contribute on average about 62 percent of Nile River flows. Together with the contribution of Baro Akobo and Tekeze rivers, Ethiopia accounts for at least 85% of the flows to the Nile River.

5.3.1 Performance of the JJAS 225 Seasonal and Impacts

In Ethiopia, the months of June, July, August, and September correspond to the Kiremt season, which is the main rainy season in much of the country. Usually, heavy rainfall dominates, especially in the highland and central regions (like Addis Ababa, Gondar, Bahir Dar, etc.) where June marks the beginning of the rains; precipitation gradually increases while July and August are characterised by peak rainy with frequent and heavy downpours and the rain tappers off by end of September. However, there significant variations in magnitude from year to year.

For the JJAS 2025 season, it was predicted that most parts of the region would experience near to above above-normal rainfall to enhance water availability in rivers, ponds, reservoirs, and groundwater recharge resulting to improvement of access to water for domestic supply, irrigation and stabilized hydropower generation. The southern Ethiopia predicted to experience drier than usual, and with western areas anticipated see delayed rains.

As predicted, the observations indicated that most rivers, lakes and reservoirs experienced high level flows and starges. Records and observations indicated above average performance during the JJAS period. The analysis on water balance for most reservoirs and dams aimed at understanding how much water is available and how it moves through the reservoir system, done by the Ministry of Water and Energy of Ethiopia for more than ten dams indicated above average during the JJAS.

Figure 18 and Figure 19 shows the water levels at Tekeze and Tana Belse dams predicted for above and near maximum water levels storage compared with observation hence indicating significance storage during the JJAS 2025 season. Also as predicted that some areas were expected to experience riverine and flash flood, about nine areas registered occurrence of floods with variation level of severity causing displacement of people and impacting lives and livelihood of the local communities (Figure 20). Othe rivers such as Gumara increasing to alert levels (Figure 21).

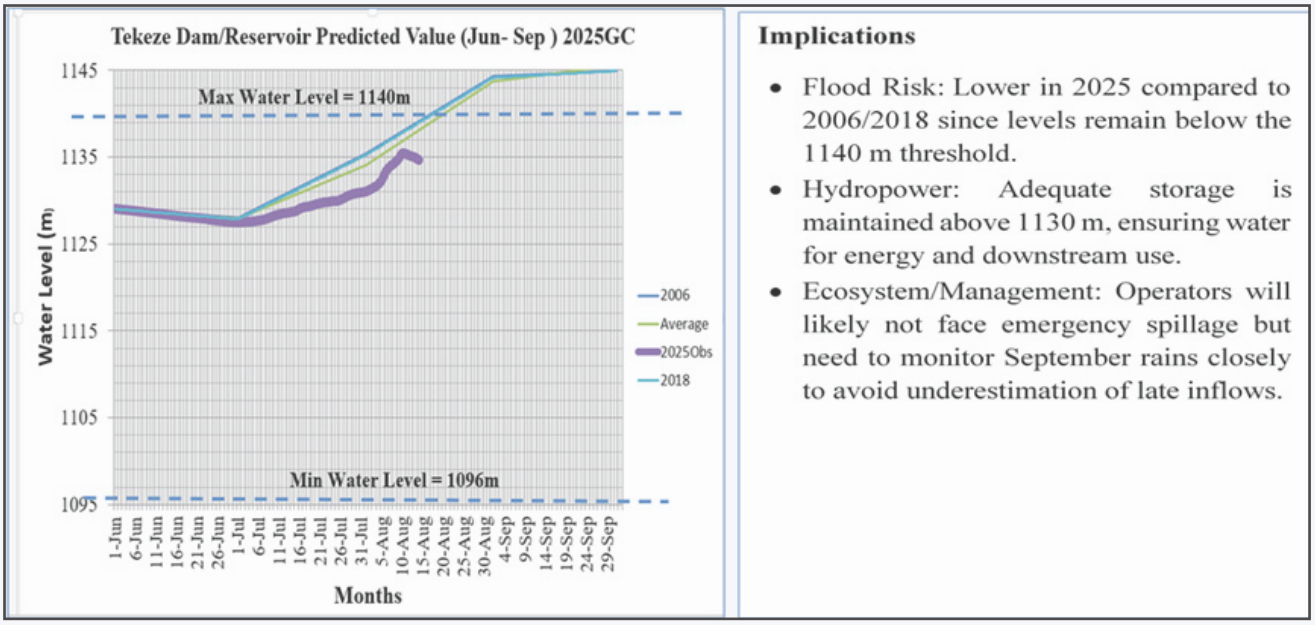


Figure 18: Tekeze dam water levels -June-September 2025 and Implications

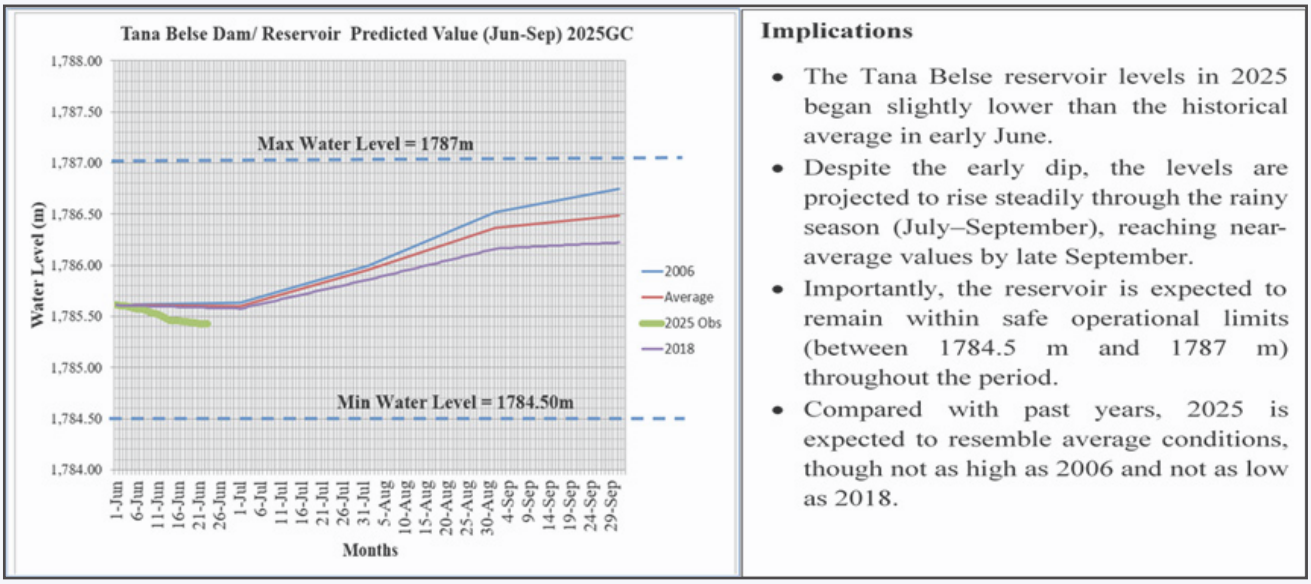


Figure 19: Figure 18: Tana Belse dam water levels -June-September 2025 and Implications

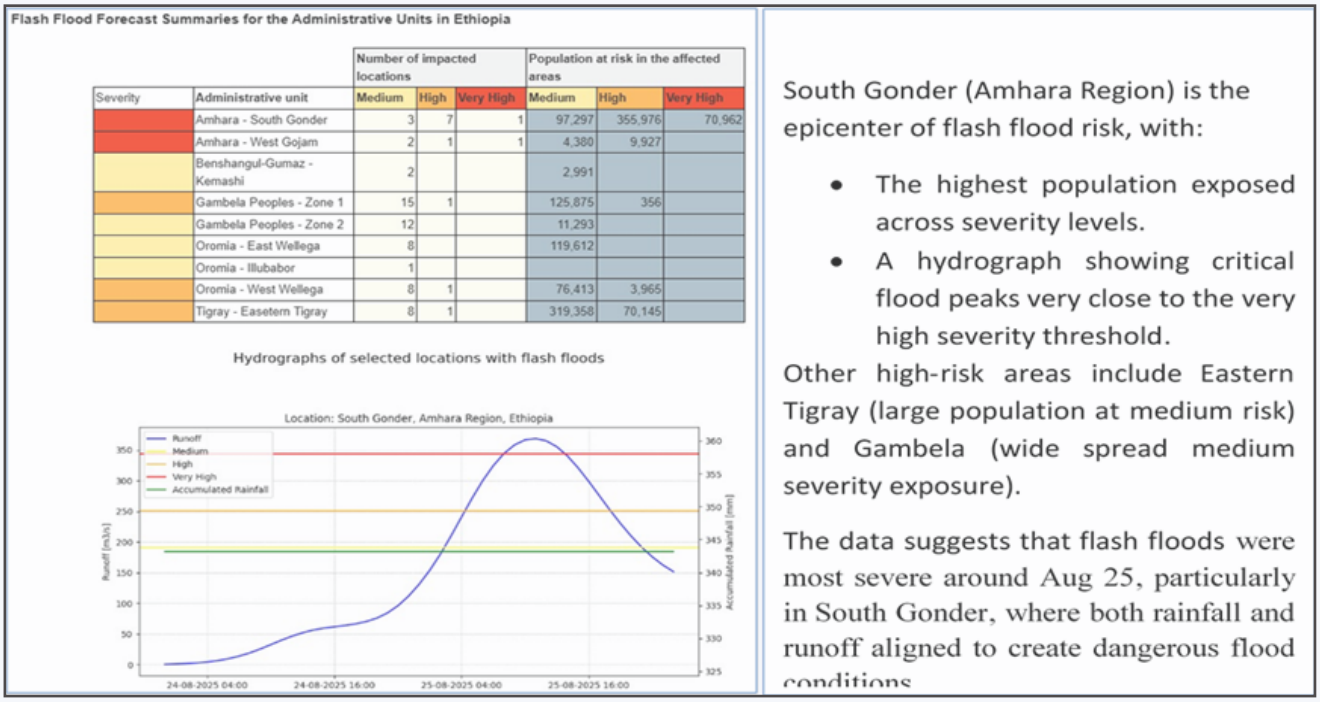
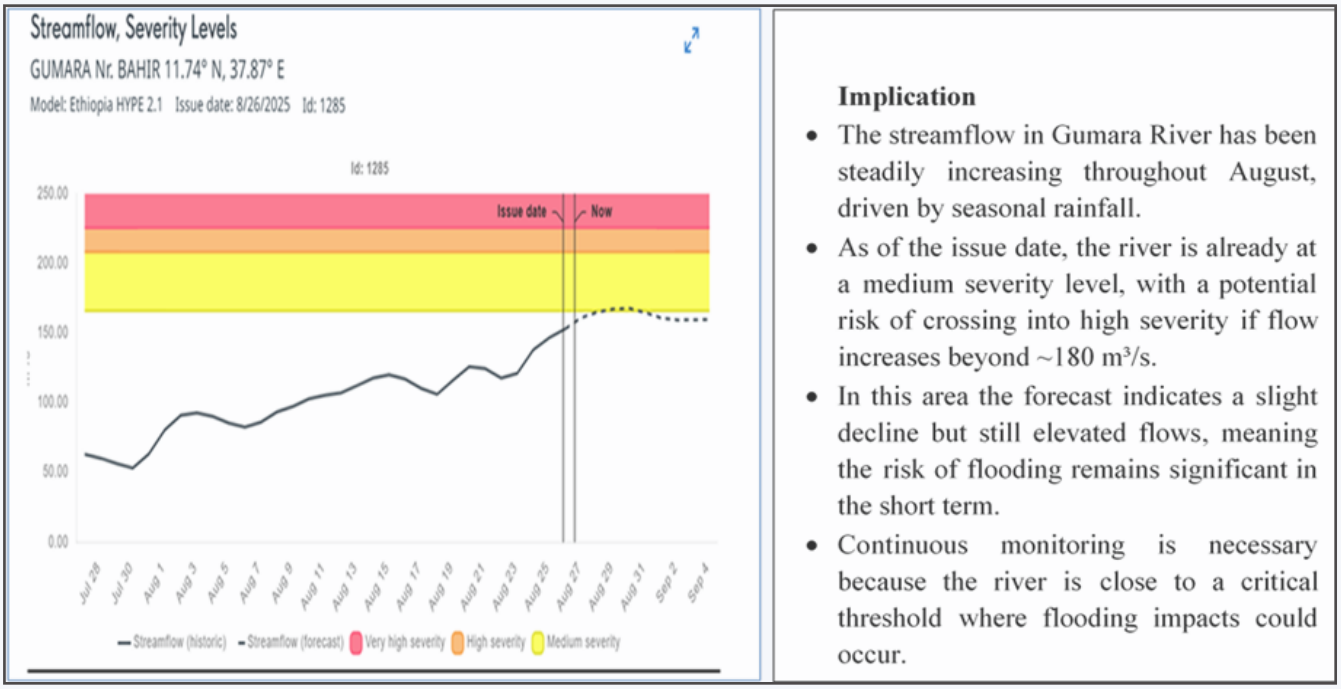


Figure 20: Flash flood predicted and occurrence in South Gonder in Amahara region Ethiopia



Implication

- The streamflow in Gumara River has been steadily increasing throughout August, driven by seasonal rainfall.
- As of the issue date, the river is already at a medium severity level, with a potential risk of crossing into high severity if flow increases beyond ~180 m³/s.
- In this area the forecast indicates a slight decline but still elevated flows, meaning the risk of flooding remains significant in the short term.
- Continuous monitoring is necessary because the river is close to a critical threshold where flooding impacts could occur.

Figure 21: Gumara River water level reaching alert levels end of August 2025 and implications

5.3.2 Climate and Hydrological Outlook for OND 2025 and Implications

According to the 71st GHACOF Climate Outlook seasonal forecast, the following basins fall under the dry seasonal category: Tekeze Basin, Abay Basin, A wash Basin, Denakil Basin, parts of the Omo-Gibe Basin, and the Rift Valley Lakes Basin. In contrast, the Wabi Shebele Basin, Genale Dawa Basin, and Ogaden Basin are expected to experience normal rainfall.

The water level of Lake Tana is predicted to continue the decline trend with a drop of about 1m from September to December with a negative net flow from November through December (Figure 22) due drawdown by evaporation and usage alongside other loses.

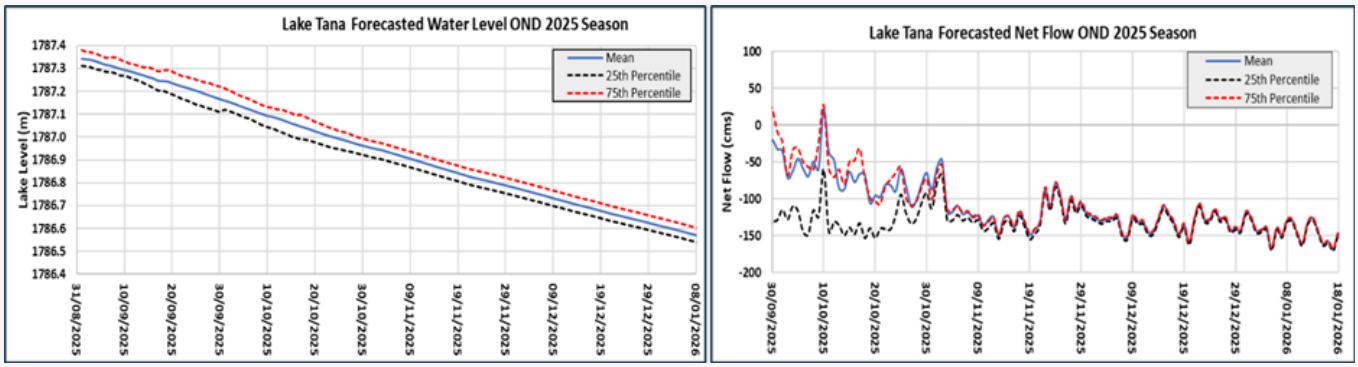


Figure 21: Gumara River water level reaching alert levels end of August 2025 and implications

Table 1 provides summary of outlook for the basin, implication and strategic response measures for above normal and normal conditions.

Table 1: Summary of OND Forecast, implications and key response

Basin	Forecast	Implication	Proposed Key Response measures
Tekeze, Abay, Awash, Denakil, parts of the Omo-Gibe, and the Rift Valley Lakes Basin	Below Normal	• Reduction in water supply • Challenges of water supply for domestic and livestock and irrigationReduction in hydropower production • Water contamination	• Sufficient water available until next rainy season • Water conservation measures • Awareness raising on water quality and water prone diseases • Provision of water treatment chemicals • Water conservation measures • Awareness raising on water quality and water-prone diseases • Potential for stable hydropower production
Wabi Shebele, Genale Dawa	Normal	• Sufficient water available until next rainy season • Potential for stable hydropower production	• Proper water management • Water conservation measures • Continue monitoring of the system

5.3.3 Recommendations and Advisories for Stakeholders in Ethiopia

1. Promote water conservation and efficient utilization to ensure the current storges would sustain adequate water supply for domestica, hydropower operations and irrigated agriculture to last during the dry period.
2. Follow up an update monthly and decadal forecasts disseminated
3. by Ethiopian Meteorological Institute (EMI).
4. Integration of climate data with hydrological models (e.g., HYPE) for river flow forecasting to provide more reliable information to the community.
5. Multi-channel advisories for the dissemination of flood early warnings and safety information like radio, SMS, community meetings, and water extension services
6. Provided timely advisories for irrigation managers, pastoral communities, and urban water utilities.
7. Working closely with Ethiopian Electric Power (EEP) for proper management of dams and reservoirs holding sufficient water for the next season and releasing surplus water.

5.4 Kenya

Kenya falls within the Lake Victoria basin in the Horn of Africa region of East Africa with a land surface area of about 583,370 km2. The Lake Victoria basin represents 8.5% of the basin drainage area in Kenya and about 1.5% in the Nile River Basin (Figure 22). The major rivers in Kenya draining into Lake Victoria are Nzoia, Mara, Nyando, Sondu-Miriu and Gucha-Migori. Lake Victoria serves as a primary source of food and income for many people living along its shores due to its vast fisheries, it provides vital transportation routes between various towns along the shoreline as well as Kenya and neighboring countries. The lake also plays a significant role in regulating the local climate, making it a crucial part of the Kenyan economy and ecosystem.

Figure 23: Map of Kenya in Nile basin

5.4.1 Performance of the JJAS 2025 Season and Impacts

The Kenya Meteorological Department (KMD) released climate outlook for June-July-August-September (JJAS) 2025 indicated a likelihood of above average rainfall in the Lake Victoria basin. It was observed that many parts of the Lake Victoria basin received normal to above normal rainfall in the months of June and July 2025. Although increased flows were recorded across rivers Nzoia, Yala, Nyando, Mara Sondu and Gucha-Migori none reached the flood alert levels (Figure 24).

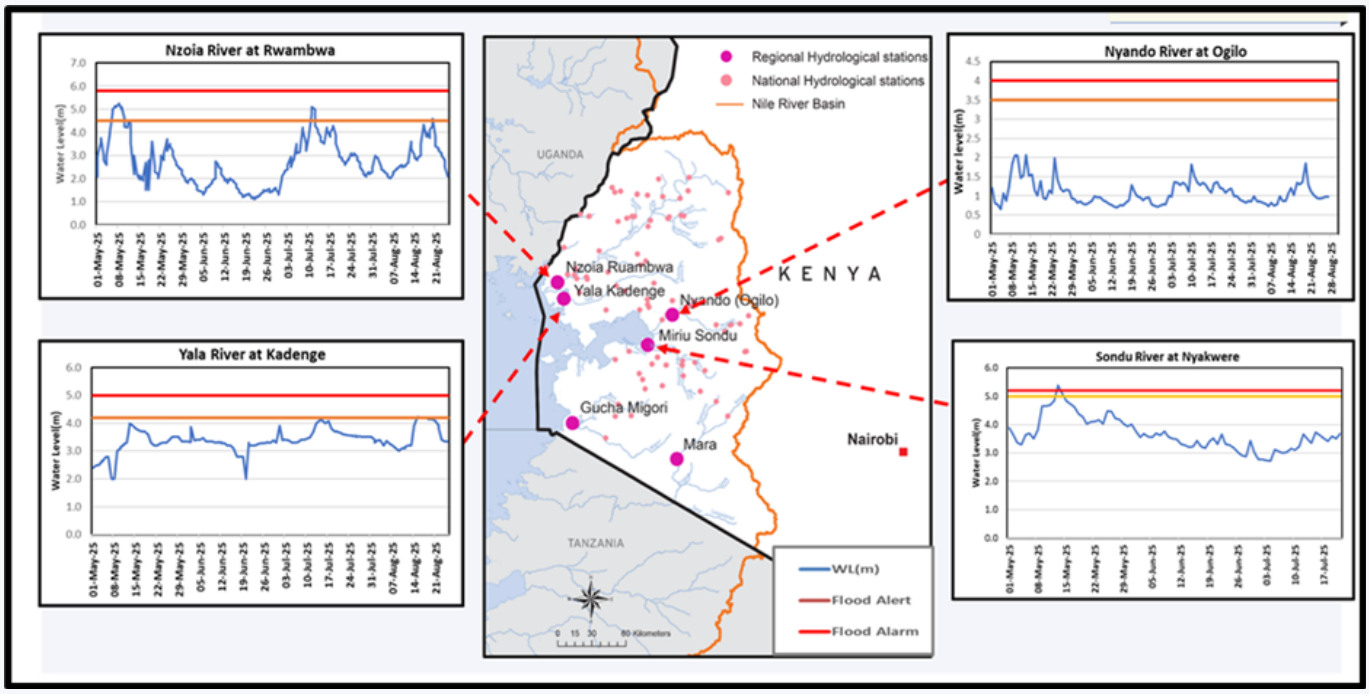


Figure 24: Observed River levels compared to flood levels in some major rivers in Lake Victoria Sub-basin.

Figure 25 compares the forecasted river flow for Nzoia at Rwambwa with the observed. There was consistency in the months of June and July between the model forecast and the observed river flow. However, the observed values were higher compared to the model value.

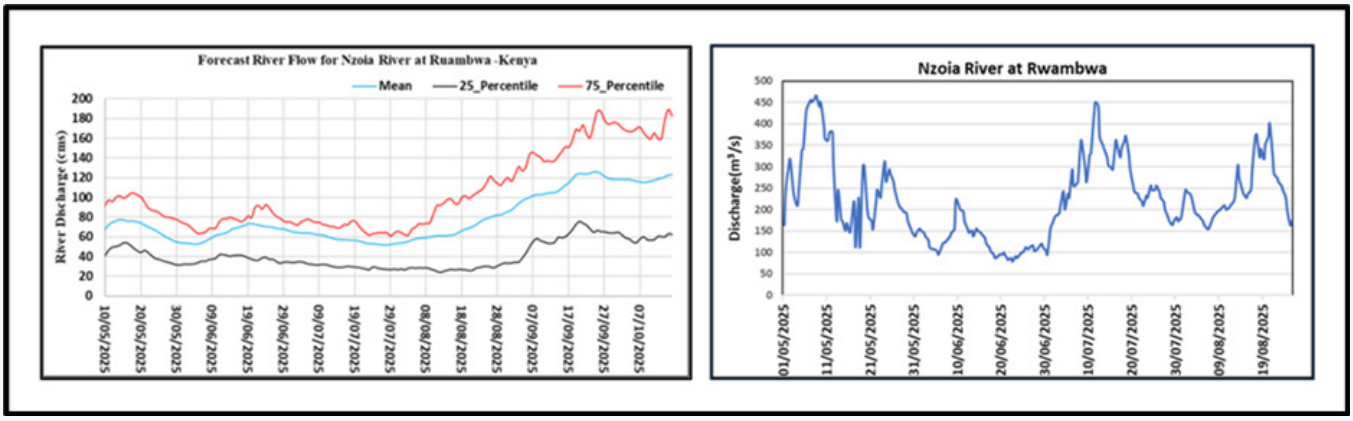


Figure 25: Comparison between model forecast and observed river flow at Nzoia at Rwambwa.

5.4.2 Climate and Hydrological Outlook for OND 2025 and Implications

The climate outlook for OND released by the Kenya Meteorological Department (KMD) for the OND 2025 season predicts near to slightly below normal rainfall in most parts of the Lake Victoria basin covering the areas of Siaya, Kisumu, Homa Bay, Migori and Southern parts of Busia with 25% above and 40% below normal probability (Figure 26). The expected rainfall is likely to be near to slightly below the long-term average amounts for the season except in northern parts of Busia where near to slightly above average rainfall is expected. However, the distribution of rainfall is likely to be poor to fair, with occasional storms expected. This contrasts with the rest of the western Kenya which is predicted to experience near to above normal rainfall.

A 25% probability of above normal rainfall, 40% normal, and 25% below normal is anticipated in the Nzoia, Yala, Nyando and Sondu River basins while Gucha-Migori and Mara River basins are likely to experience 35% near normal, 40% below normal and 25% above normal.

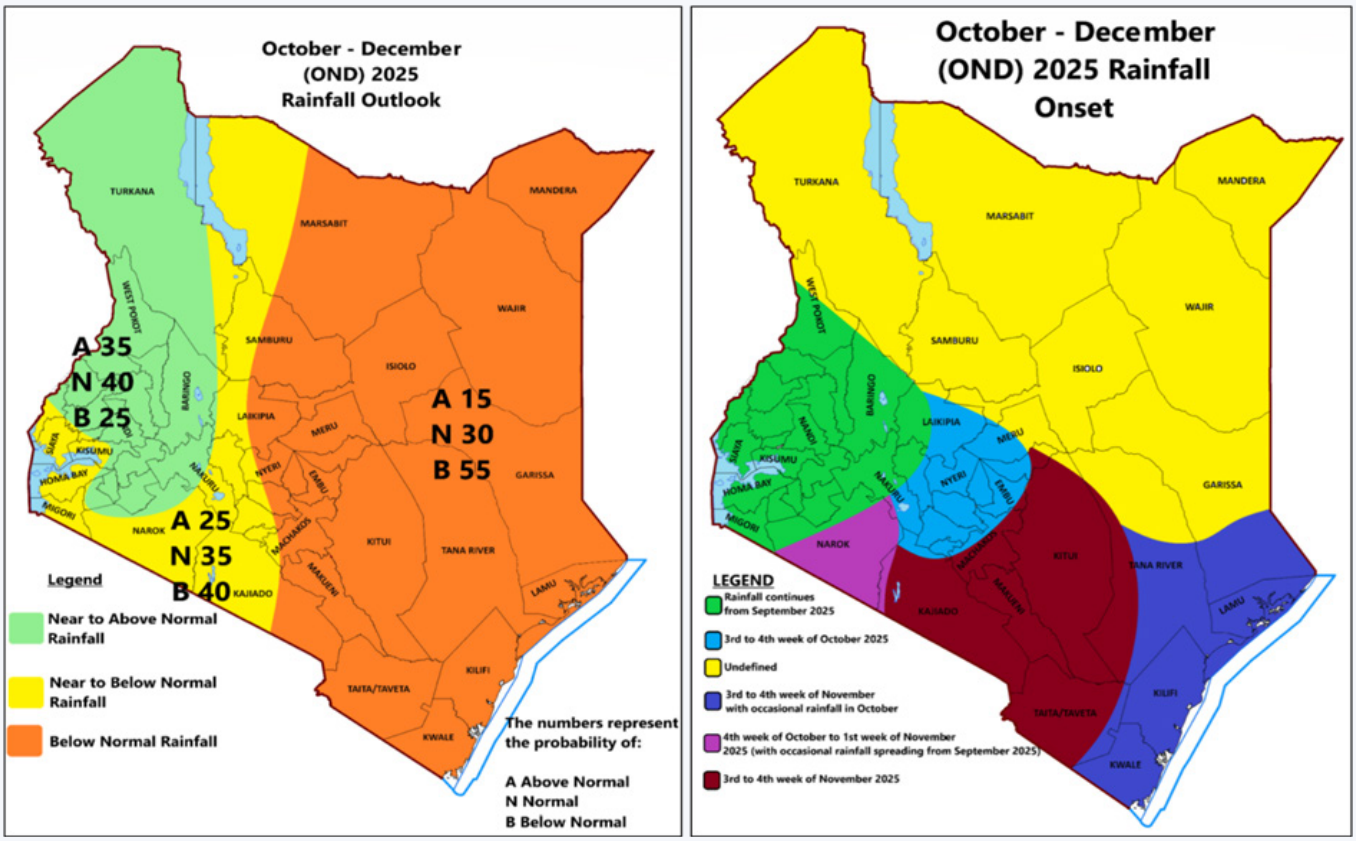


Figure 26: Rainfall Outlook and on-set for OND 2025 season

Consequently, it is expected that river Nzoia, Yala, Nyando and Sondu will maintain normal flows with a possibility of rising and overtopping the banks in the lower reaches with equal chances as described in the climate outlook. The areas likely to experience flooding during the season include lower Nyando downstream of Ahero town; shoreline streams such as Nyamasaria, Luanda and Ombeyi; Lower Sondu at Nyakwere; Lower Yala downstream of Kadenge market and the Yala Swamp; and Lower Nzoia around Ruambwa and Budalangi among others. Gucha-Migori and Mara River basins are likely to maintain normal to below normal river flows during the season.

Simulation and forecasting of Nzoia river flow at Ruambwa indicate a mean flow variation between 200m3/s in the 1st October and peaking about 300m3/s in the first week of December 2025 (Figure 27).

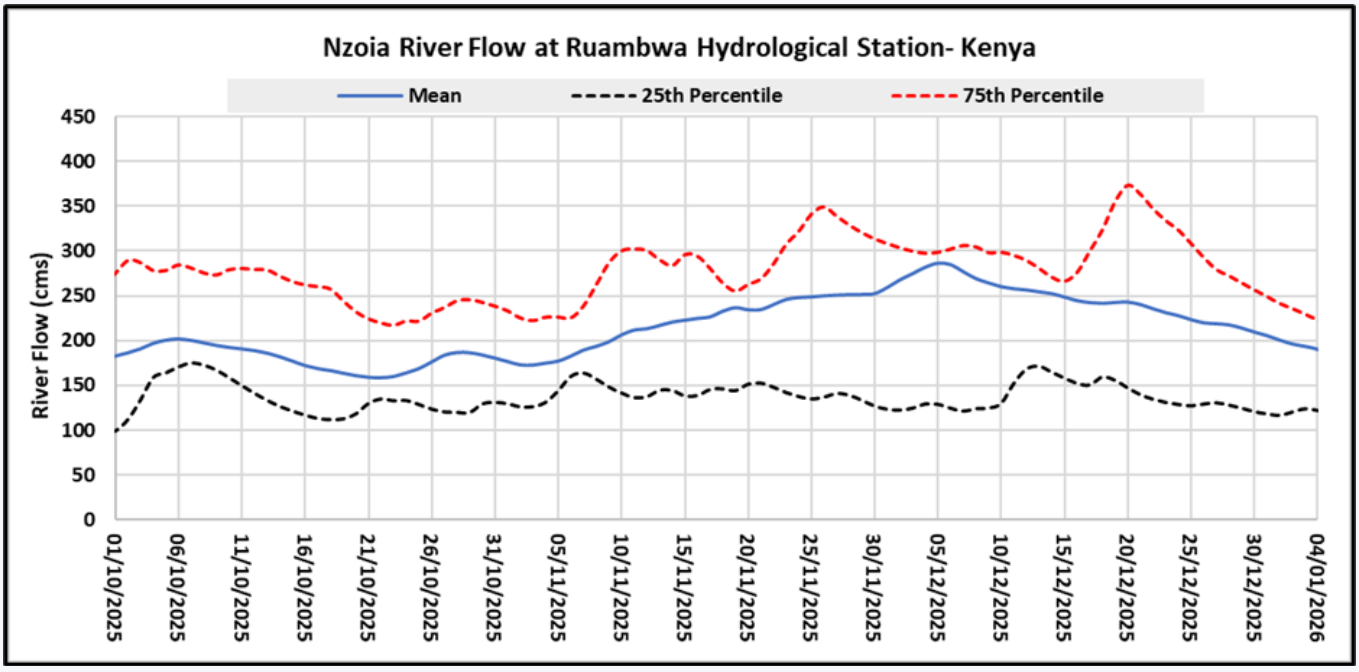


Figure 27: Nzoia River flow forecast at Ruambwa regional hydrological station for OND 2025 season.

5.4.3 Implications of OND 2025 seasonal outlook

Based on the forecast scenario of the Lake Victoria basin in Kenya, both positive and negative impacts are expected in Agriculture, Water Resources, Infrastructure and transport, Energy and Health sectors.

Water Resources Management Sector

Positive Impacts

For areas expected to receive near to above normal rainfall:

- Availability of water for all uses.
- Increased inflows into water reservoirs.
- Improved aquifer recharge.

Water Resources Management Sector

Positive Impacts

For areas expected to receive near to above normal rainfall:

- Availability of water for all uses.
- Increased inflows into water reservoirs.
- Improved aquifer recharge.

Negative Impacts

- Increased water use conflicts.
- Over abstraction of surface water leading to reserve flow violation and drying of water pans.
- Reduced shallow well and borehole yields; and reduced aquifer recharge in areas expected to receive below normal rainfall.
- Floods over the Nzoia, Yala, Nyando and Sondu river basins may lead to displacement of populations and destruction of infrastructure.

Agriculture and Livestock Sectors

Positive Impacts

- Availability of water for agricultural activities in areas expected to receive near to above normal rainfall leading to enhanced agricultural and livestock production.

Negative Impacts

- Some parts of Lake Victoria basin may experience soil erosion, nutrient leaching and degradation due to floods, negatively affecting crops and pasture growth.
- Reduced agricultural production in areas expected to receive depressed rainfall.

Negative Impacts

- Increased water use conflicts.
- Over abstraction of surface water leading to reserve flow violation and drying of water pans.
- Reduced shallow well and borehole yields; and reduced aquifer recharge in areas expected to receive below normal rainfall.
- Floods over the Nzoia, Yala, Nyando and Sondu river basins may lead to displacement of populations and destruction of infrastructure.

Agriculture and Livestock Sectors

Positive Impacts

- Availability of water for agricultural activities in areas expected to receive near to above normal rainfall leading to enhanced agricultural and livestock production.

Negative Impacts

- Some parts of Lake Victoria basin may experience soil erosion, nutrient leaching and degradation due to floods, negatively affecting crops and pasture growth.
- Reduced agricultural production in areas expected to receive depressed rainfall.

5.4.4 Recommendations and Advisories for Stakeholders in Kenya

1. Maintain and rehabilitate the hydrological monitoring network for continuous flow monitoring and updates.
2. Prompt dissemination of Flood Early Warning and Advisories to the vulnerable communities.
3. Implement Flood Disaster Response Plans at the respective County levels.
4. Unblock and desilt drainage structures before the onset of the rains especially in urban centres.
5. Enhance water quality monitoring for any health risk.
6. Enhance water use conflict management through the WRUAs and community barazas in basins where water is anticipated.

5.5 Rwanda

Rwanda is in the most upstream part of the Nile Basin with a land surface area of about 26,338 km2 with about 76% in the Nile River Basin representing 0.6% of the Nile Basin drainage area. The Rwandan's hydrographic system is split into two basins divided by the Congo-Nile ridge, with water systems to the west of the ridge flowing into the Congo Basin, whereas those to the east of the ridge discharge into the Nile Basin (Figure 28). The country is increasingly experiencing the impacts of climate change. Rainfall has become increasingly intense, and the variability is predicted to increase by 5% to 10%.

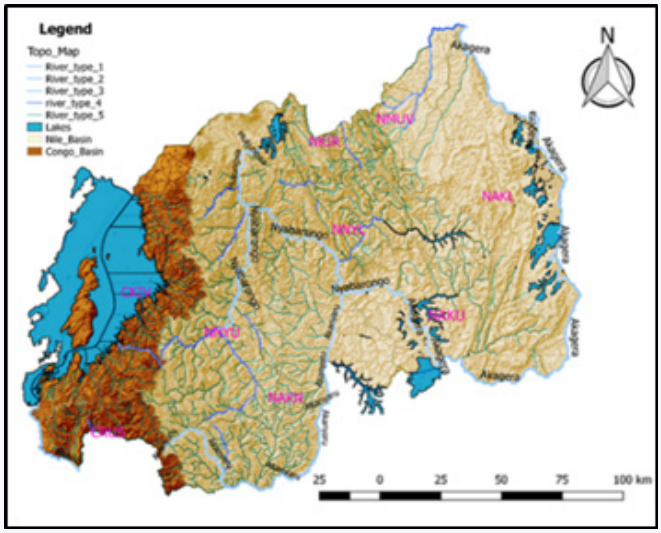


Figure 28: River drainage network in Rwanda

Changes in temperature and precipitation and their distributions are the key drivers of climate and weather-related disasters that negatively affect Rwandans. Historically, droughts, floods, and landslides have resulted in infrastructure damage, loss of lives, livelihood and property, and increased soil erosion and water pollution.

5.5.1 Performance of the JJAS 2025 Season and Impacts.

June-September is the main dry season in Rwanda. However, we received unexpected rainfall in some days of July and August 2025. As it was predicted in the hydrological outlook for JJAS 2025, reduction in river flows were observed during the season, and there were no recorded impacts of flood incidents. The negative impacts were recorded on domestic water supply and hydropower due to water resources shortage. The predictions on the decrease in water levels in rivers and lakes were confirmed with ground observation data at various monitoring stations across the country (Figure 29) with some rivers registering a drop of about 1.5 to 3m below the long term mean signified the worst dry spell in a decade.

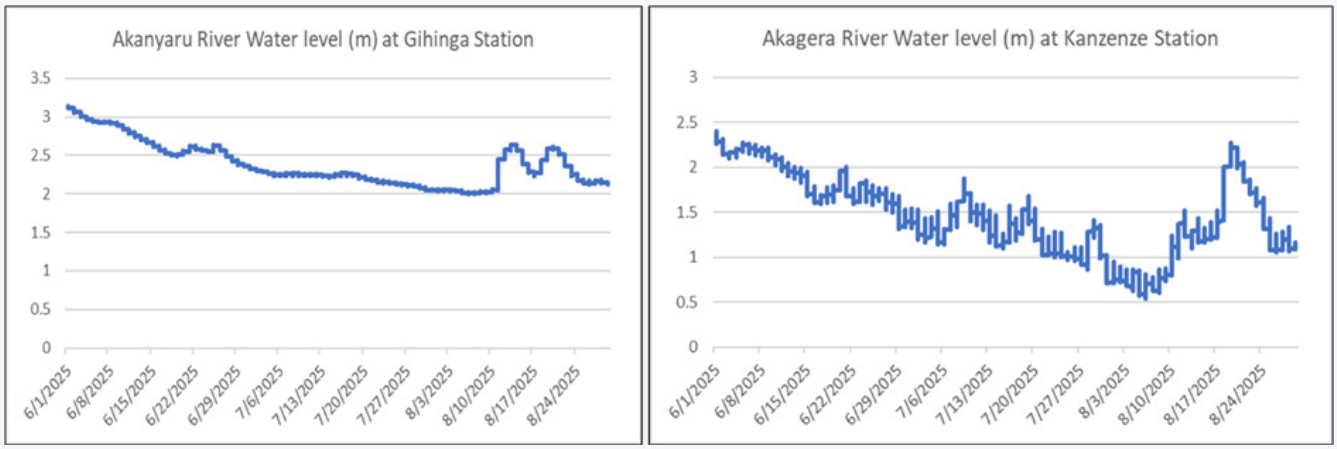


Figure 29: Recorded decline of water levels in Akanyaru and Akagera rivers at Gihinga and Kanzenze stations during JJAS 2025 season

The declining water resources availability was also characterised by the unprecedented drop in lake water levels and reservoirs were triggering water scarcity in most of the water supply scheme. The monitoring station on Lake Rewru at Gakindo and Lake Cyohoha at Shell registered 2.3m and 0.5m drop in water levels (Figure 30).

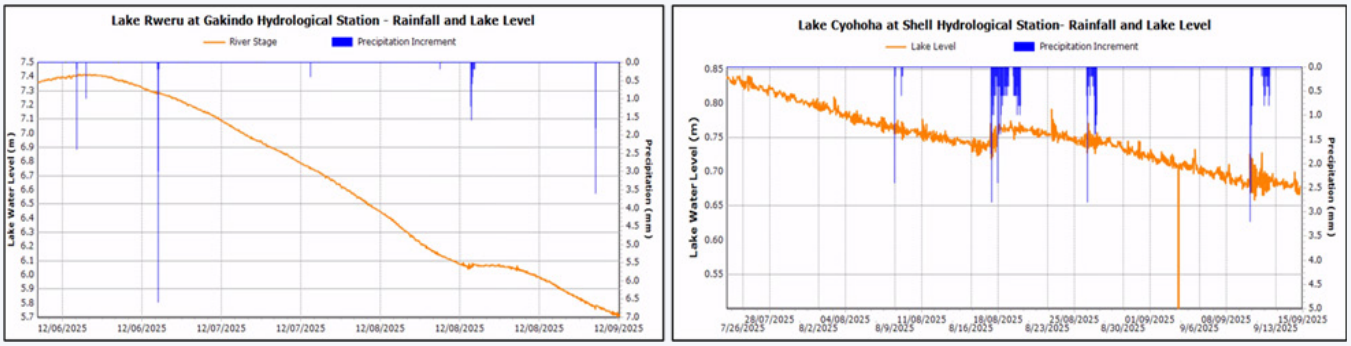


Figure 30: Declining trends of water levels in the lakes during JJAS 2025 season.

The Kanzenze Water Treatment Plant on the Akagera River- a Public-Private Partnership (PPP) by Kigali Water Limited, designed to supply 40,000 m³/day of treated water to the City of Kigali and Bugesera District had to reduce production due to dry production well as a result of reduced Nyabarongo and Akagera river levels during the period of June-August (Sources: https://en.igihe.com/news/article/minister-gasore-addresses-water-shortage-in-kigali). This severely impacted the operations of key water treatment facilities, including Kigali Water Ltd and the Nzove Water Treatment Plant forcing the government to deploy water rationing strategies.

5.5.2 JJAS 2025 Season Outlook and Implications

SOND is considered a short rainy season in Rwanda. The seasonal forecast for September to December (SOND) 2025 published by the Rwanda Meteorology Agency (Meteo-Rwanda) indicated likelihood of normal rainfall conditions, which is within the range of average recorded rainfall of similar period for 30 years (Figure 31). However, the ICPAC Climate Outlook for October-December 2025 indicates that Rwanda is one of the countries which will experience near normal to above normal rainfall in the western and northern part of Rwanda. Consequently, river flows and water level are expected to increase which may lead to riverine and flash floods as well as an increased sedimentation in rivers, lakes and dams, especially in the Northern part of the country with tempera and spatial variations within region.

However, the Eastern part of Rwanda is predicted to receive less rainfall, which may reduce river flows and limit recovery of lakes and reservoir storages hence affect rainfed agriculture and livestock water use, water supply schemes and hydropower operations. Reduced flow of Akagera that contributes about 40% to Rusumo hydropower might affect operations at the hydropower station.

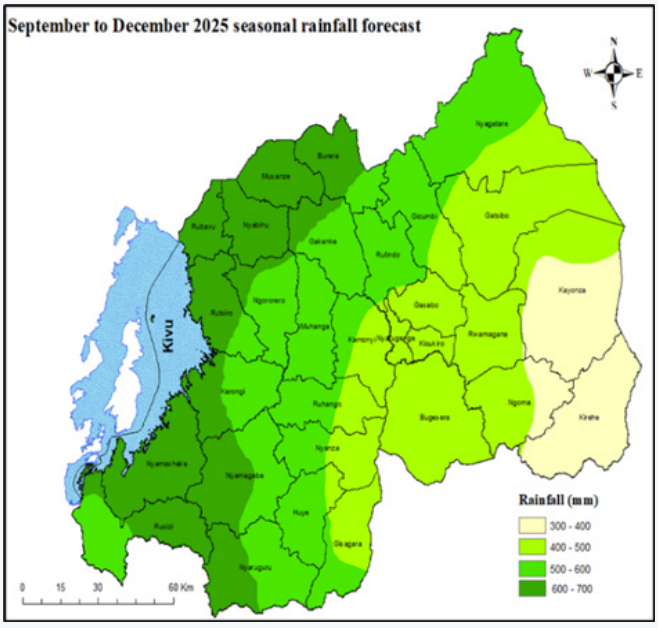


Figure 31: September to December 2025 seasonal rainfall forecast

5.5.3 Recommendations and Advisories

Rwanda is expected to experience flash floods in various flood hotspots, especially in the North-West part of the country, due to heavy rain. Contrary, the Eastern part of the country is expected to receive less rainfall that may result in water shortage. Therefore, the following recommendations are proposed to reduce the risk:

1. The Ministry in charge of Emergency Management (MINEMA) should activate disaster

response strategies in flood-prone areas of North-Western parts of the country.

2. Rwanda Water Resources Board (RWB) should continue monitoring real time stations and forecasting river flows for improved early warning information to the vulnerable communities.
3. Ensure that urban drainages are cleared before and during the rainy season to provide quick and safe evacuation of peak runoff from the impervious areas in the urban centres in the western part of the country.
4. Increase awareness of flood preparedness and mitigation measures in the communities living around flood hotspots.
5. Hydropower stations that directly depend on the river runoff rivers are encouraged to take advantage of the increased river flows to enhance more energy security.
6. Heavy rain will trigger an increased river sedimentations which may interrupt the water treatment plants (WTP) operations i.e. Nzove WTP and Gihira WTPs hence affecting the recovery from the recent water scarcity registered in June-August season.
7. To ensure water storage and efficient water use in Eastern Province for supplementary irrigation and livestock watering.
8. Rusumo hydropower plant and irrigation management should adopt efficient planning and water use approach to cope with low flows expected from Akagera river due to near to below normal rainfall predicted with about 60% likelihood chance in the eastern part of Rwanda.

5.6 South Sudan

South Sudan is in the mid-stream part of the Nile Basin covering an area of about 644,329 km2 with about 98% in the Nile River Basin representing 20% of the basin drainage area. The country drainage system consists of four basins namely, White Nile, Bahr El Jebel, Sobat and Bahr El Ghazal (Figure 32). The Sudd wetland, located within Bahr-El Jebel and Bahr El Ghazel basins, is a regionally important hydrological feature in addition to the Machar Marshes in Sobat Sub basin. The country received annual rainfall of 500mm to 1800mm.

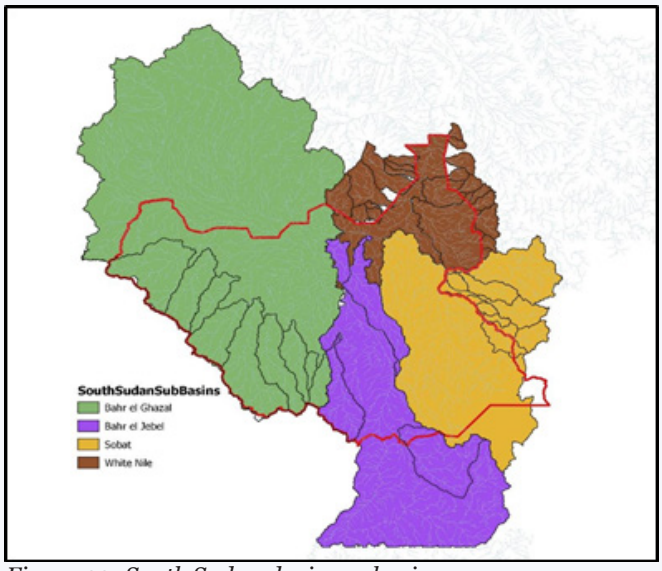


Figure 32: South Sudan drainage basins

Most rivers in South Sudan are transboundary in nature- shared with neighbouring countries of Uganda, Sudan, Ethiopia and Kenya. These rivers are monitored by an eighth hydrometric station of which seven are either manual and/or automatic and one is manual. Five hydrological stations were upgraded into regional stations under the NBI-Hydromet Project. Additionally, twenty (20) flood emergency gauge stations have been established under the Regional Climate Resilience Program, South Sudan to enhance the monitoring and generation of flood early warning information during the 2024 flood season.

5.6.1 Performance of the JJAS 2025 Season and Impacts

The June-September period represents the climatological core of South Sudan's rainy season, encom-

passing its four major river basins. This season was marked by substantial hydrological activity, driven by both intense local rainfall and delayed upstream inflows. Although rainfall-induced responses were prominent during June and July, peak water levels were expected to be recorded in November, primarily due to cumulative contributions from upstream catchments. At Juba and Mangala hydrological stations, water levels rise by 0.25m above the same period in 2024, reflecting the impact of heavy rainfall within the local catchment (Figure 33). Additionally, water levels on all monitoring stations on the Nile have consistently been recording flood alert levels in the last week of August 2025.

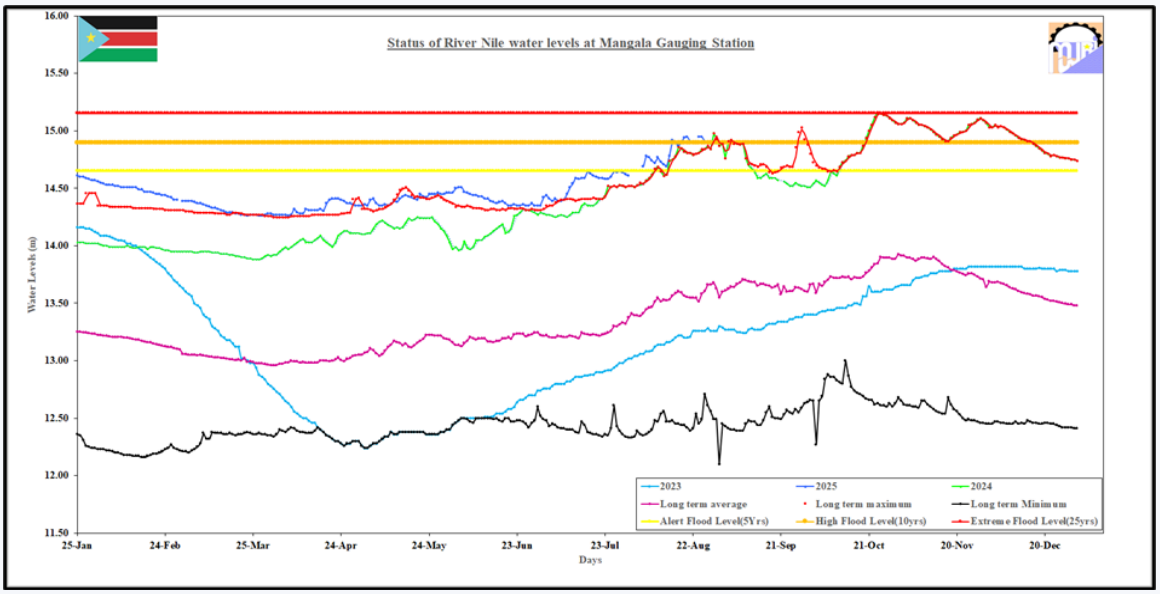


Figure 33: Nile River water levels at Mangala hydrological station

Simultaneously, the Sobat River system recorded elevated flows at Anakdiar Station, resulting from sustained inflows originating in the Ethiopian highlands and Gambela region of Baro Akobo-Sobat sub-basin. These upstream contributions significantly increased discharge into the White Nile, leading to notable water level rises at Malakal Station, a key downstream monitoring point. Recent an observation from several monitoring stations along the Jur River in the Bahr el Ghazal basin reveal a persistent daily increment in river stage, with water levels rising by several centimetres per day. The high-water levels the White Nile River impeded inflow of Bahr el Gahzel hence the back water effect causing local flooding in areas of Tondiak with tail water creating havoc around Bentiu as observed in August and September 2025.

Several urban centres particularly Juba, Torit and Bentiu experienced localized flash flooding, triggered by high-intensity rainfall and inadequate drainage infrastructure. Figure (Figure 34) shows disrupted movement of local people in Torit as the only foot bridge got submerged on 10th August 2025 and flooding in Malakal on 25th August 2025.

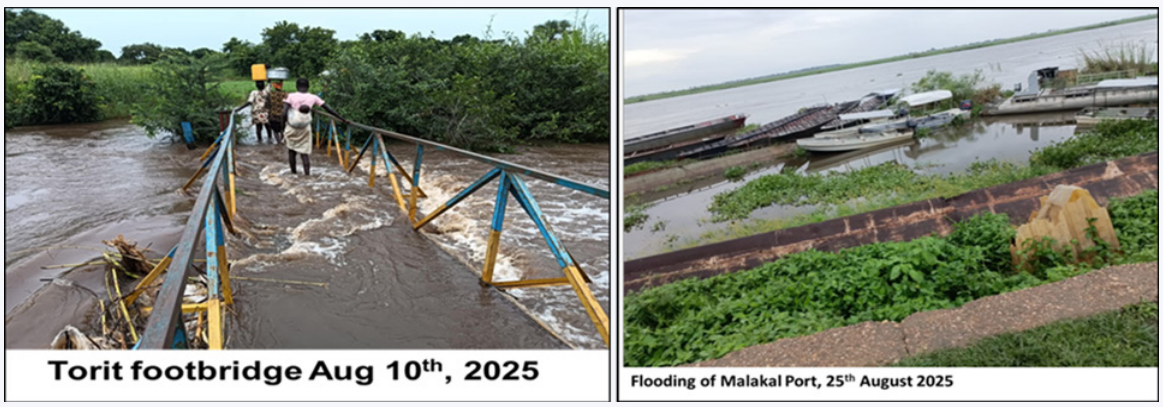


Figure 34:Footbridge overtopping in Torit and flooding in Malakal

Several villages, farmland, grazing lands and urban areas are being flooded in Panyijar county of Unity State. Lives and livelihoods of school children, elderly, women, youths are being greatly impacted during the season. The rising river water levels have also affected river port activities especially in Malakal of Upper Nile State. Reports and data from UN Office for the Coordination of Humanitarian Affairs (OCHA) and World Food Programm (WFP) indicated that about 135,000 people have been displaced and about 379,000 people have been affected as of 17th September 2025 (Figure 35).

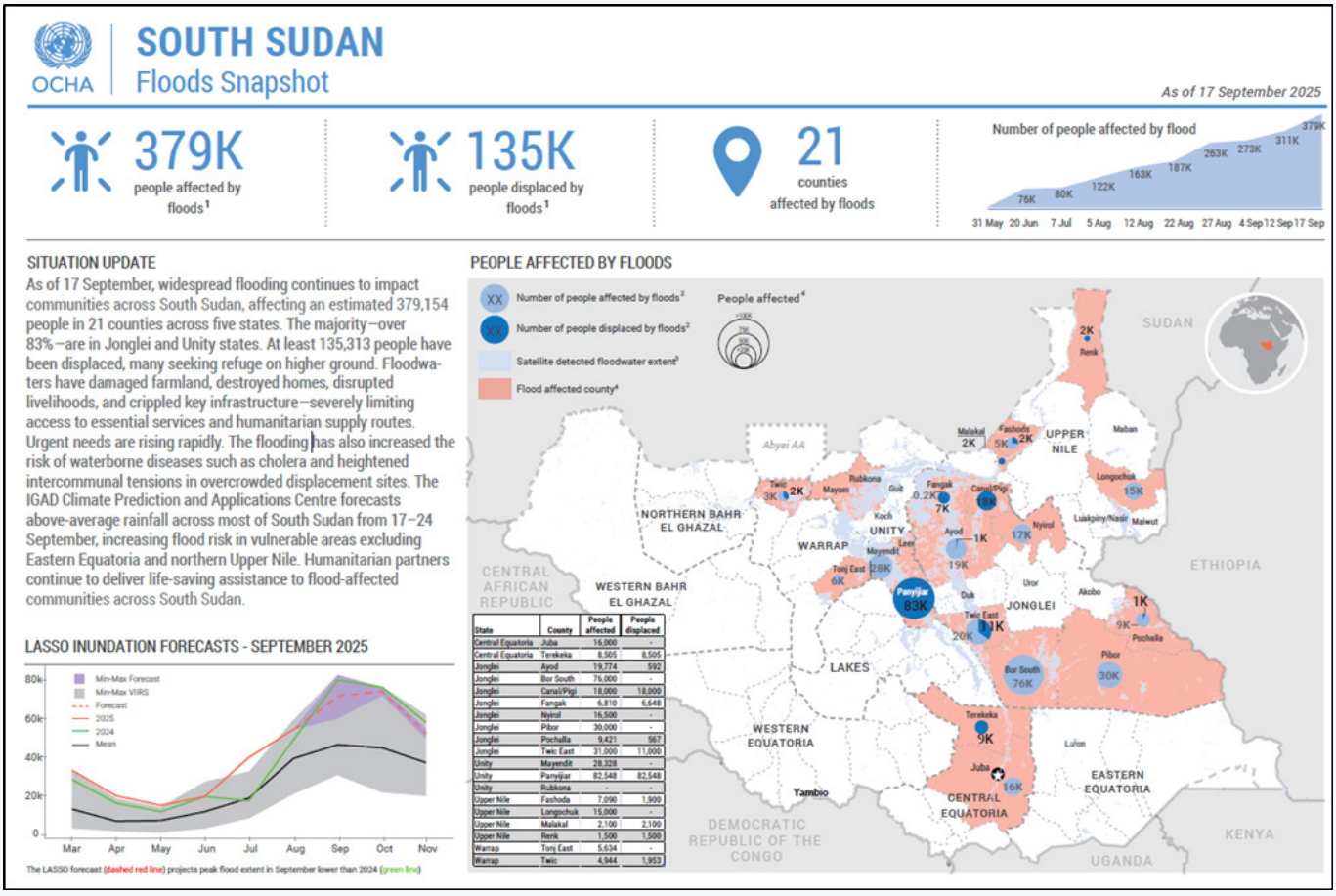


Figure 35: Flood Snapshot indicating the humanitarian crisis due to flooding in South Sudan during the JJAS 2025 season (Source: OCHA 2025).

Several actions have been undertaken by the government to address the unfolding humanitarian crisis occasioned by unprecedented flooding in South Sudan. These actions include;

i. Implementation of the recommendation of JJAS Outlook which involved the distribution of daily rivers water levels updates undertaken by the Ministry of Water Resources and Irrigation (MWRI) has been sharing daily river water level updates (Figure 36) to all flood stakeholders through emails, official Facebook and WhatsApp group pages. The update gives a summarised rivers status monitoring comparing the current and previous readings. This way flood stakeholders will have a better view of how flooding has been evolving throughout the season.

ii. Activation of Flood Preparedness and Response Plan -The government of South Sudan activated Flood Preparedness and Response Plan 2025. Here a Flood Taskforce committee has been formed comprising government line ministries, humanitarian organisations, UN agencies, community-based organizations,

academia and research institutions. This Task Force meets regularly every two weeks to discuss preparedness and response strategies.

iii. Coordinate action and response among the multi-stakeholders for the humanitarian aid to reach the affected and displaced communities within the flood affected areas.

The Republic of South Sudan

Ministry of Water Resources and Irrigation

Juba

Daily Water Levels updates

DATE: August 29, 2025

S/No	Name of Station	River	Current Water levels(m)	Previous Water levels(m)	Flood Threshold			Flood Category	Remarks
					ALERT (5Yrs)	HIGH (10Yrs)	EXTREME (25Yrs)		
1	Nimule	Bahr-el-Jebel	13.33	13.34				Normal	decreasing
2	Juba	Bahr-el-Jebel	13.12	13.14	13.00	13.60	14.20	Alert	decreasing
3	Mangala	Bahr-el-Jebel	14.91	14.91	14.65	14.90	15.15	High	Constant
4	Bor	Bahr-el-Jebel	14.07	14.06				Alert	Increasing
5	Malakal	White Nile	14.20	14.18				Alert	Increasing
6	Wau	Jur River	11.71	11.72				Normal	decreasing
7	Anakdiar	Sobat	4.92	4.91				Alert	Increasing
8	Payii in Yirol	Payii	13.16	13.17				Normal	decreasing
9	Nyamlel	Lol	1.68	1.65				Normal	Increasing

General Remarks:

- *Alert levels have been reached at most station along the Nile including Juba, Mangala, Bor and Malakal Station respectively. Mild to moderate floods are likely to occur at and downstream of these locations*
- *Most river monitoring stations are consistently showing higher water levels*

Contact:

Eng. Koboji Charles Yakata (Director for Hydrology)

Email: loyakata934@gmail.com

Figure 36: Early warning and update in formation on the status of rivers and water levels from key monitoring stations

5.6.2 Climate and Hydrological Outlook for OND 2025 and Implications

The OND 2025 is the end of the main season in most basins in South Sudan. The ICPAC Climate Outlook for October-December 2025 forecast indicates a probability of below-normal rainfall, normal, and above-normal conditions in the southern part of the country. While for the most part of the country it is the dry season. The temperature forecast indicates a probability of above-normal temperatures, to normal, and below-normal. This points to a high likelihood of warmer-than-average conditions across the country. Current river status shows high and rising water levels till mid-November then commences declining trend (Figure 37 and Figure 38) hence prolonging the current flooding and humanitarian crisis evolving in South Sudan.

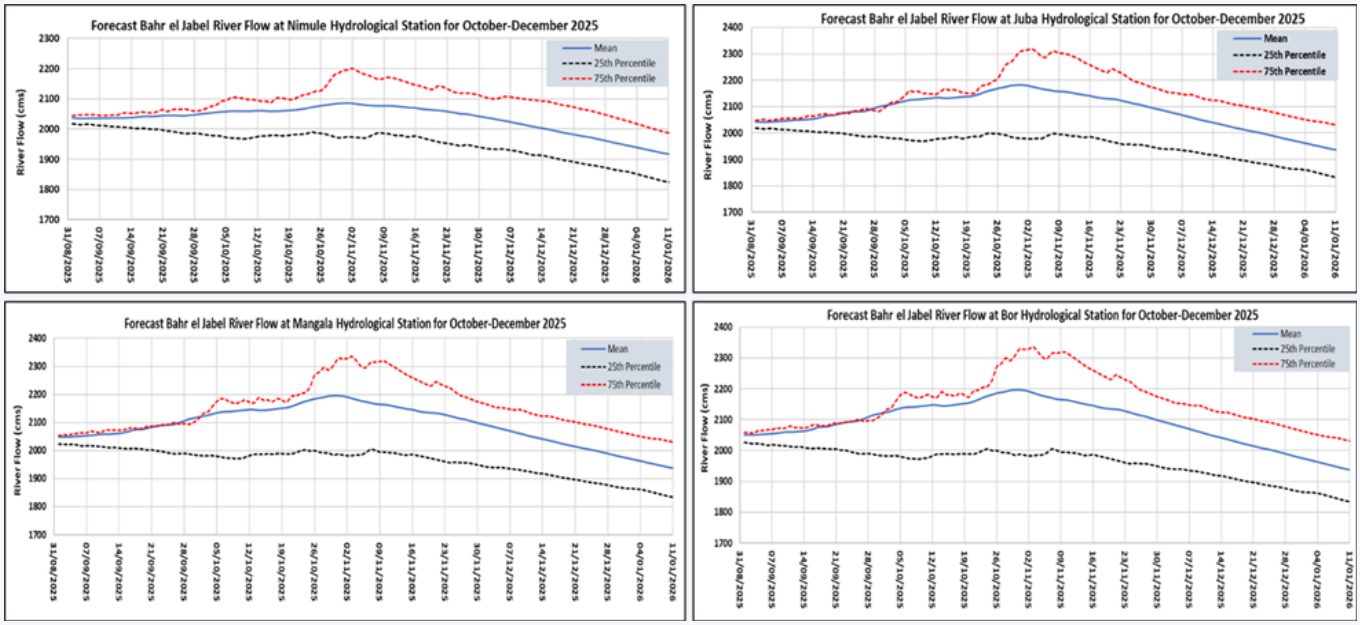


Figure 37: Forecast Bahr el Jebel River flow at Nimule, Juba, Mangala and Bor hydrological stations for October-December 2025 season.

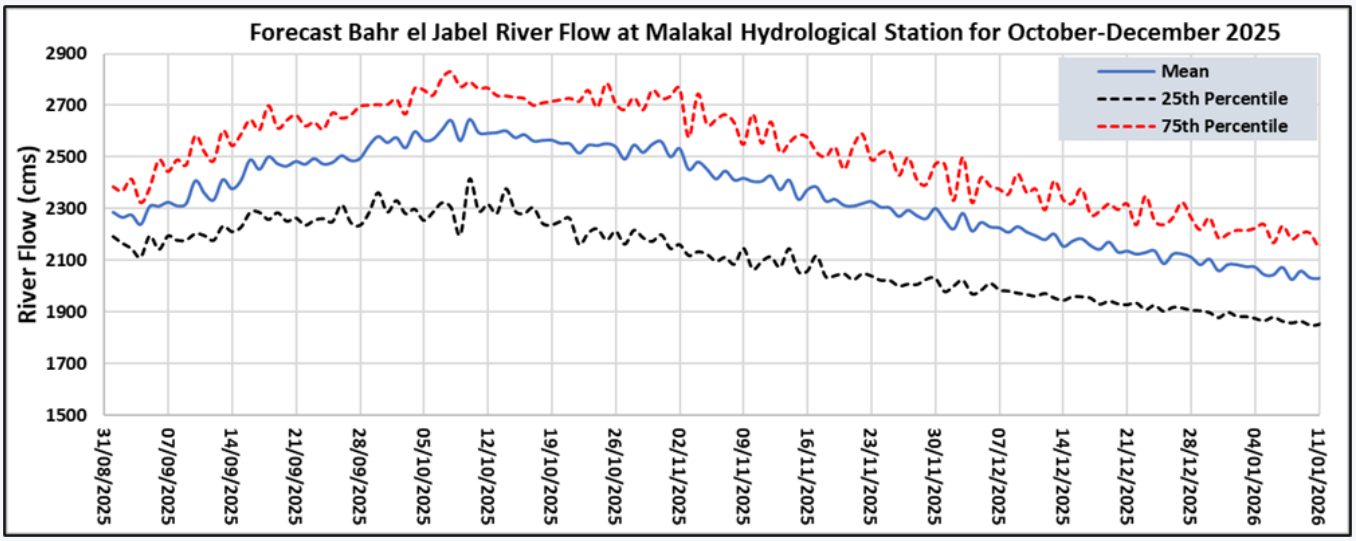


Figure 38: Forecast White Nile River flow at Malakal hydrological station for October-December 2025 season

Analysis of the OND2025 reveals the following implications on the hydrology of different basins in South Sudan and proposed key response plans are detailed in the table below.

Basin	Forecast	Implication	Proposed Key Response measures
Bahr-el-Jebel, Bahr-el-Ghazal, Sobat and White Nile	Below Normal, Near Normal and Above Normal	• Above normal water levels will sustain high stream flows • Occurrence of flash floods • Potential riverine flooding risk • Increased sedimentation in rivers and lakes • Floating 'islands' might clog outlets of water treatment plants especially in Juba and Bor • Possibility of increased incidences of drowning • Deterioration of water quality • Flood water can bring in enough fish and improve on catch	• Communication & coordination with the Disaster response team for early warning • Activation of preparedness and response plan • Improve drainage systems. • Reinforce dykes and construct new ones • Continue monitoring water levels & adopt accordingly • Raise awareness for people not to cross flooded roads & to vacate flood-prone areas • Training on life skills • Continuous water quality monitoring & provision of test kitsRegularly clean intake screens

5.6.3 Recommendations and Advisories

1. Intensify the real-time monitoring at key stations and automate data and information reporting and dissemination.
2. Utilize culturally appropriate visual aids and local languages to enhance the clarity and accessibility of warning messages and advisories.
3. Implement coordinated awareness campaigns focused on hygiene, safe water practices, and disease prevention at flood prone locations.
4. Disseminating the flood warnings through radio broadcasts, SMS alerts, and community leaders, with special focus on cattle camps, island dwellers, and riverine settlements.
5. Prioritize drainage rehabilitation and dyke maintenance in high-risk flood zones such as Bentiu, Bor, and surrounding lowlands.
6. Coordination with all focal agencies to prepositions of emergency and relief supplies such as medical supplies, water purification tablets to the most affected and isolated communities.
7. Anticipate elevated turbidity from mid-September due to inflow, proactively plan for increased chemical consumption to maintain treatment efficacy.
8. Encourages transboundary data sharing and information.

5.7 Sudan

Sudan covers about 1.9 million square kilometres. The Nile Basin, expanding approximately 1.4 million square kilometres within Sudan, accounts for nearly 73% of the country's land area and 44% of the entire Nile Basin drainage area. This region includes the Blue Nile, White Nile, and Atbara River. The Blue Nile and White Nile merge at Khartoum, forming the Nile River, which flows for 1,755 kilometres into the High Aswan Dam in Egypt. The Nile network in Sudan is marked by seasonal variations and significant contributions from tributaries, particularly the Sobat, Dinder, and Rahad rivers with the hydrology characterized by high seasonality where the bulk of the flow occurs in the period July to October (Figure 37).

The Nile serves as Sudan's agricultural lifeline, supplying vital irrigation water for crops such as cotton, wheat, and sorghum. Irrigated agriculture along the Nile is more dependable and profitable compared to rainfed agriculture, which is becoming increasingly unreliable due to climate change. Hydropower, generated by several dams including the Merowe Dam, is a major source of electricity, with the Nile's flow being essential for consistent power generation. Additionally, the Nile replenishes groundwater aquifers, such as the Nubian Sandstone Aquifer. Moreover, the Nile serves as a vital transportation artery, enabling the movement of goods and people. Its navigable stretches between Khartoum and Juba are crucial for trade and connectivity.

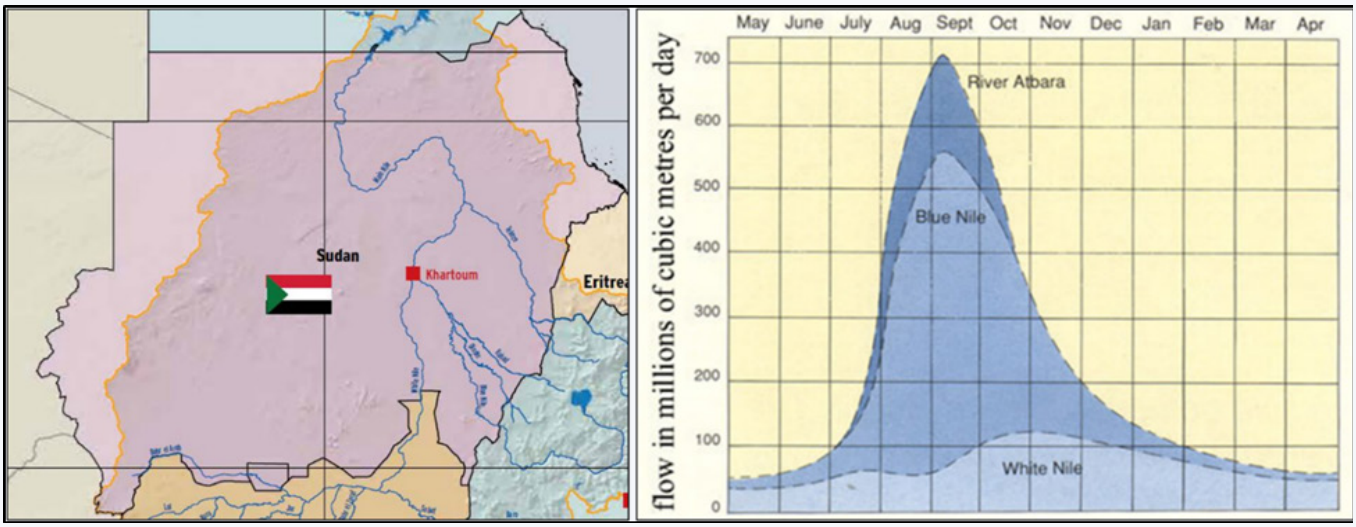


Figure 39: Map of Nile River network and the Nile River flow regime in Sudan

5.7.1 Performance of JJAS 2025 Season and Impacts

Sudan is one of the most downstream countries that drain the Nile system, receiving Nile water from abroad. Since the main source of the Nile flood is the Blue Nile and Atbara rivers, the JJAS seasonal forecast over western part of Ethiopian highlands is very important for riverine flood in Sudan, on the other hand the forecast over Sudan is essential for flash flood in Sudan. ICPAC and SMA (Sudan Meteorological Authority) forecasts for the Season (JJAS) indicate above normal-to-normal rainfall over much of the highlands of Ethiopia and most parts of Sudan (Figure 38).

The Nile Basin Hydrological Outlook for the earlier season (JJAS 2025) showed above normal rainfall in much of central Sudan and upper catchments, which tends to increase river flows, particularly for the Blue Nile and its tributaries.

Ground observations on Blue Nile at Deim, Setit (Tekeze) at Hamdayiet, Main Nile at Dongola, Dinder at Giwasi, Atabara at Asirra and Rahad River at Hawata all recorded increased water levels and discharge above the longe term mean (Figure

41). It was also observed that enhanced releases at GERD commissioned on 9th September 2025 registered at Diem and TK5 registered Hamdayiet

Measurements at some hydrological stations showed above normal water levels and discharge as indicated by seasonal JJAS forecast. However, Blue Nile is fully controlled by filling and commissioning of GERD, Setit river as well, affected by TK5 operation.

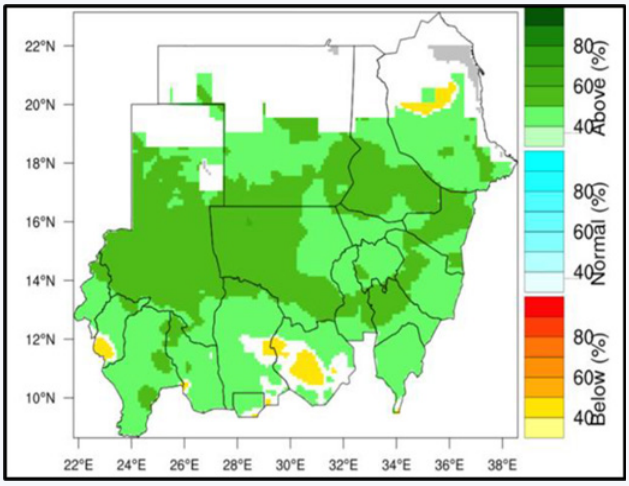


Figure 40: JJAS rainfall forecast map (JJAS 2025) from SMA (Source: SMA)

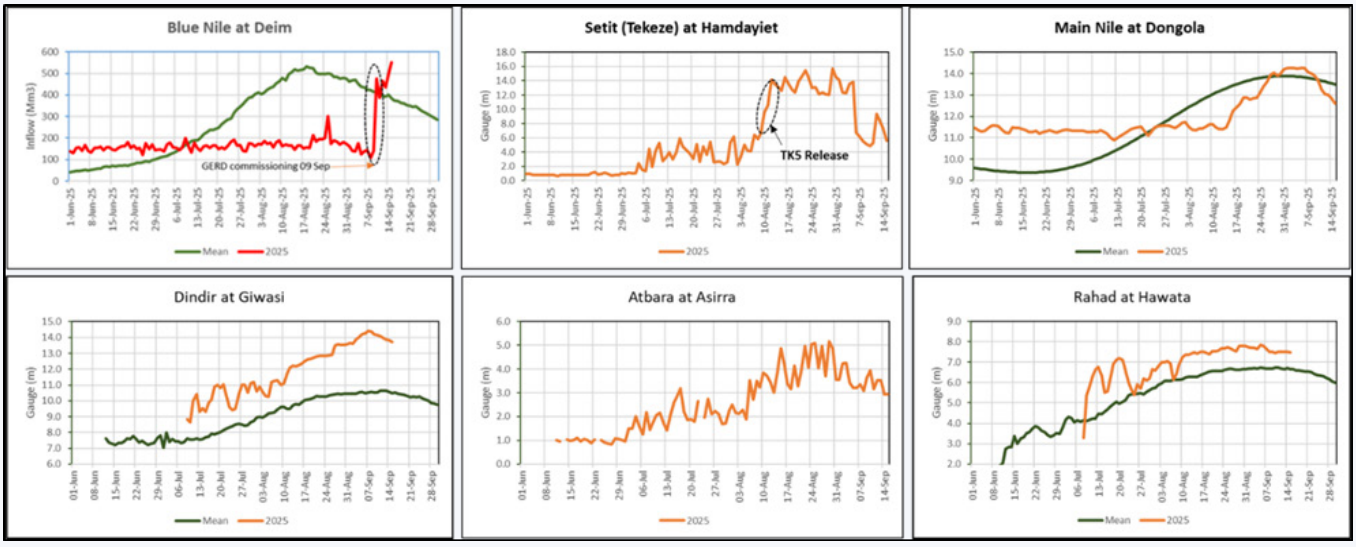


Figure 41: Observed River water levels and discharge across key monitoring station during the JJAS 2025 in Sudan

Observation at downstream of Khartoum at Sendi and Halafaya Bridge stations registered similar signal in the reduction trend with steady increase from 20th June 2025 in response to increased instream flow from upstream and local rainfall (Figure 42).

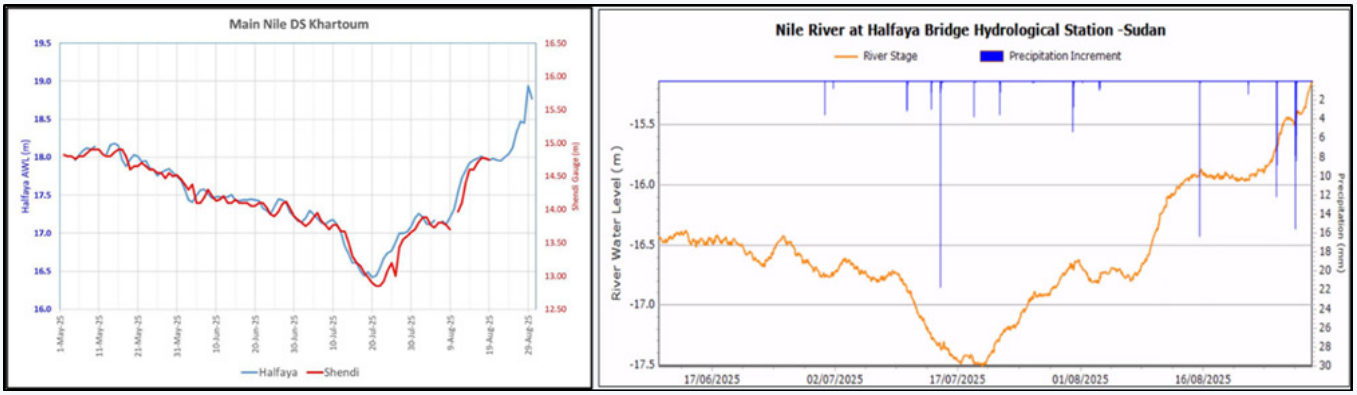


Figure 42: Observed water levels downstream of Khartoum and Halfaya Bridge hydrological stations during the JJAS 2025.

5.7.2 JClimate and Hydrological Outlook for OND 2025 and Implications

Although OND is not the main rainy season in Sudan, there are signs of mixed characterisation with some central, southern and western parts are likely to experience more rainfall or wetter conditions in some seasons; some eastern, northern, central areas may experience deficits. For example, a weekly forecast noted heavy rainfall expected in Darfur (southern/western margins) but predicted drier or reduced rainfall in eastern and central parts.

Forecast of the Main Nile River flow through modelling provided poor result in September due to initialization, however the trend and prediction converge with known trend and both the 2010-2019 and 2020-2024 long term mean indicating significant reduced river flow expected from mid-October through December 2025 (Figure 43).

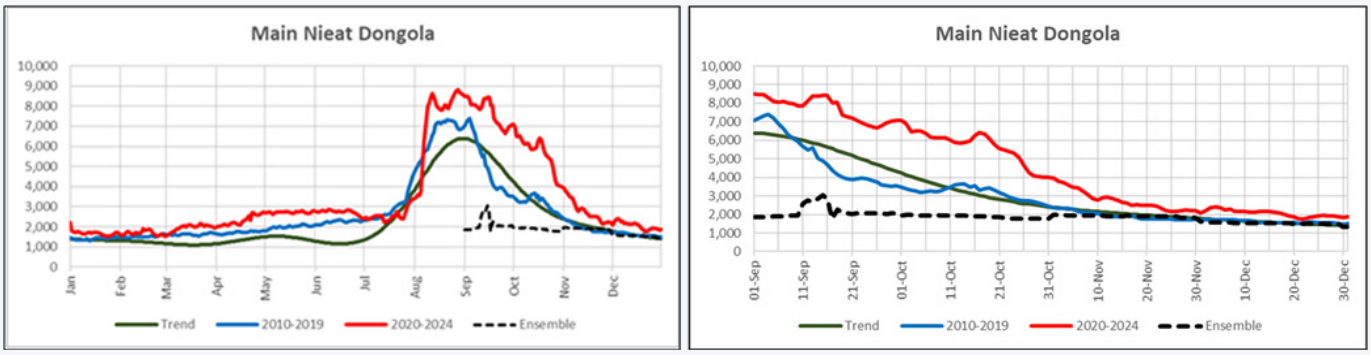


Figure 43: Main Nile River flow trend and forecast at Dongola hydrological station.

Given the above climate and predicted flow scenarios, the Table 2 below provides plausible conditions in different parts of Sudan in OND 2025 period.

Table 2: climate outlook and implication for OND 2025 season in Sudan

Region	Likely Rainfall Trend	Temperature Trend	Hydrological Consequences
Southern / South central Sudan (e.g. parts of Blue Nile, Sennar, etc.)	Rainfall possibly near average or slightly above in some places (from residual moisture, upstream catchment contributions)	Warm to very warm; high heat stress especially during dry spells	Rivers and reservoirs may see moderate to good flows; improved soil moisture for cropping; risk of localized flooding if intense storms occur
Western Sudan / Darfur, Kordofan	Mixed: western fringes could get some heavier rainfall; interior parts more uncertain; possible deficits in eastern zones	Warm, possibly very hot in dry spells; heatwaves likely	Potential water stress for rainfed agriculture; possible challenges for range / grazing areas; risk of flash floods in hilly or flood prone localities; supply constraints in surface water sources
Central Sudan and Northern Sudan	Likely below average or low rainfall; very limited precipitation (northern is largely dry anyway)	Very high temperatures; strong heat stress; high evapotranspiration	Low soil moisture; minimal rainfall recharge; potential strain on water supplies for domestic / pastoralists; river flows mainly dependent on upstream (Blue Nile etc.) contributions; possibly reduced flows during driest months; higher risk of drought like conditions in marginal farming zones

Given those likely conditions, the following implications arise across sectors:

i. Agriculture & Food Security- Reduced or erratic rainfall in central, northern, and eastern Sudan may lead to crop failures, particularly for rainfed crops. Planting delays, poor germination, or need for re planting may occur. Pastoralist communities likely to face stress from reduced pasture growth, diminished surface water points, and competition for scarce water. Heat stress on livestock may increase mortality or reduce productivity. In areas with near normal rainfall, there is some opportunity for better crop performance; but uneven distribution (storms vs. dry spells) may still create damage or uncertainty.

ii. Water Resources & Hydrology -Rivers like the Blue Nile will see flows influenced by upstream rainfall (especially in Ethiopia) more than local rainfall in northern Sudan; but reduced rainfall locally could reduce contributions from smaller tributaries. Reservoirs and small dams may not fill adequately in parts, affecting irrigation, hydroelectric potential, and water supply. Water demand (for domestic, agriculture, livestock) will likely increase with higher temperatures and evaporation, stressing supplies. Risk of flood from sudden heavy precipitation or upstream surges remains, especially in flood plain zones: e.g. Blue Nile, Atbara, or ephemeral streams in Darfur / Kordofan.

iii. Health, Livelihoods, Human Security -Heat related health risks will increase (heat stress, dehydration, possibly greater burden of heat related disease). Reduced rainfall and water availability can raise risks of waterborne diseases if people use unsafe water sources. Food insecurity likely to worsen in areas already vulnerable, especially displaced populations, pastoralists, and those depending on rainfed agriculture. Conflict and displacement may exacerbate conditions in regions where resources are strained.

iv. Hydropower and Energy -Hydropower generation (for example from dams relying on Nile flows) may be impacted if river inflows are reduced during drier months. If OND rainfall under performs and upstream contributions are low, downstream hydropower schemes may face lower output or require water release trade offs.

5.7.3 Recommendations and Advisories

1. Improve preparedness and resilience in Sudan, as the downstream country, the regional monitoring network and exchange of transboundary data and information should be enhanced and data exchange with upstream countries must be strengthened.

2. Strengthen monitoring and early warning systems for rainfall, river flows, flood risk, and drought stress.

3. Prepare contingency plans for a longer dry spells including early season moisture conservation, drought tolerant crops, planning for supplemental irrigation where possible.

4. Water conservation in agriculture, better water harvesting techniques, and efficient use of the limited and available water resources for productive use.

5. Support pastoralists with economic incentives that facilitates quick access to water points, fodder reserves, perhaps livestock movement plans throughout the dry period.

6. Infrastructure investments for resilient supply (water, energy) and repairing systems likely to be stressed by extreme events.

5.8 Tanzania

Tanzania lies in the upstream part of the Nile Basin, covering approximately 945,100 km², of which about 12% falls within the Nile River Basin. This area represents around 2.7% of the entire Nile Basin drainage area. The Lake Victoria Basin within Tanzania supports a population of about 6 million people and is divided into five catchments: Kagera, Mara, Simiyu, Magogo-Moame, and Isanga (see Figure 43). The main rivers in these catchments include the Kagera, Simiyu, Mbarageti, Grumeti, Duma, Mara, Ngono, Magogo-Moame, Isanga, and Mori.

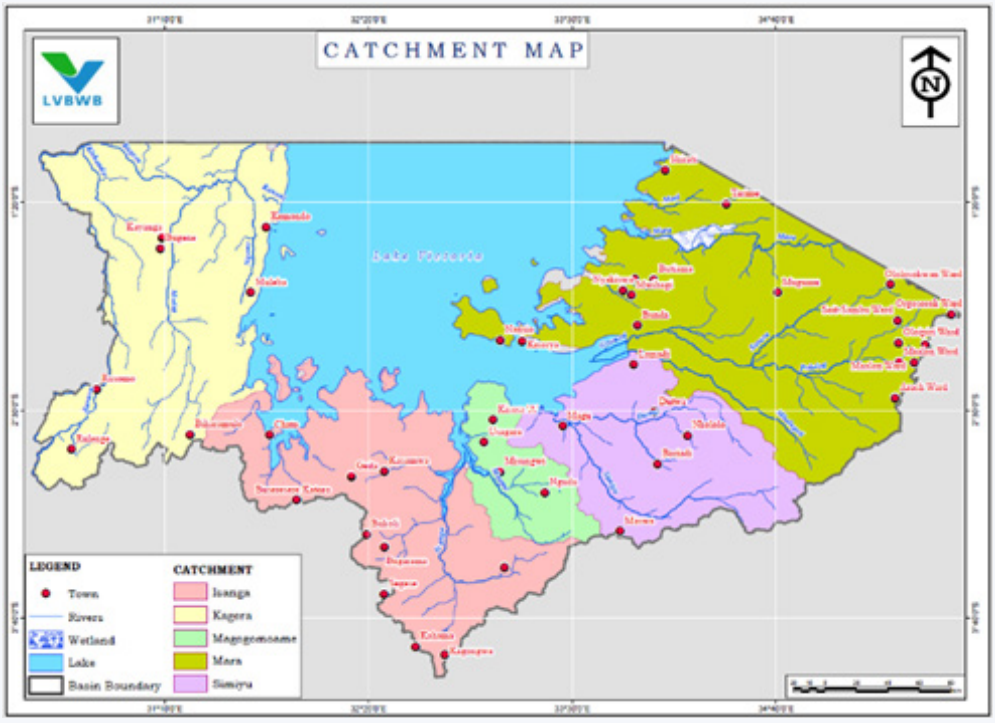


Figure 44: Five catchments of Lake Victoria Basin Water Board in the Nile Basin- Tanzania

5.8.1 Performance of JJAS 2025 Season

During the June to August (JJA) 2025 season, the Lake Victoria Basin (LVB), as well as the entire country, experienced dry conditions as predicted and indicated by the 70th GHACOF and the Tanzania Meteorological Authority (TMA). Observations showed accurate and reliable performance overall, except in June, where the forecasted rainfall slightly differed from the actual performance (Figure 43)..

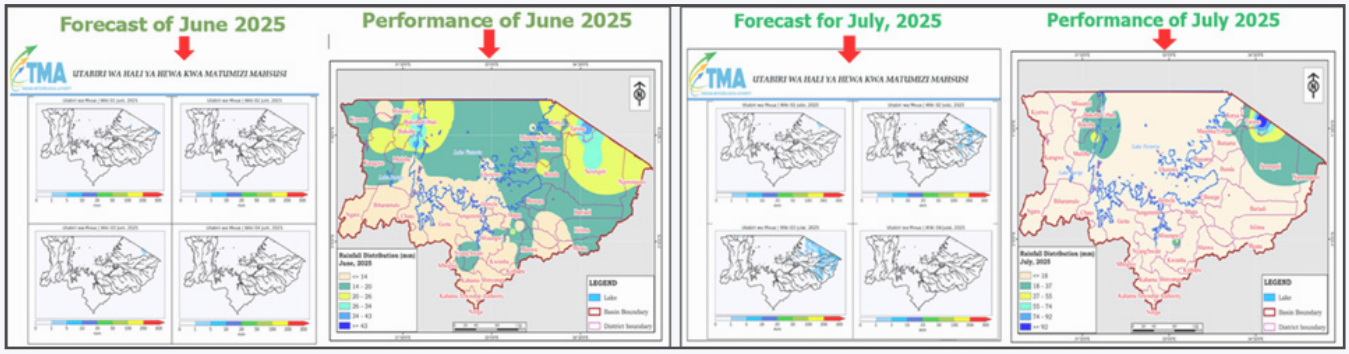


Figure 45: TMA climate outlook for Lake Victoria Basin in the JJAS 2025 (Source: TMA 2025)

Information from both regional and national monitoring stations during JJAS 2025 indicated a decline in water levels in Lake Victoria compared to JJAS 2024. However, the lake levels remained higher than the long-term average (LTA). For the inflows, particularly in the Kagera River where major projects are being implemented (Rusumo Hydropower and the Kagera Sugar Plantation),

the forecasted inflows for JJAS were below the observed inflows (Figure 44).

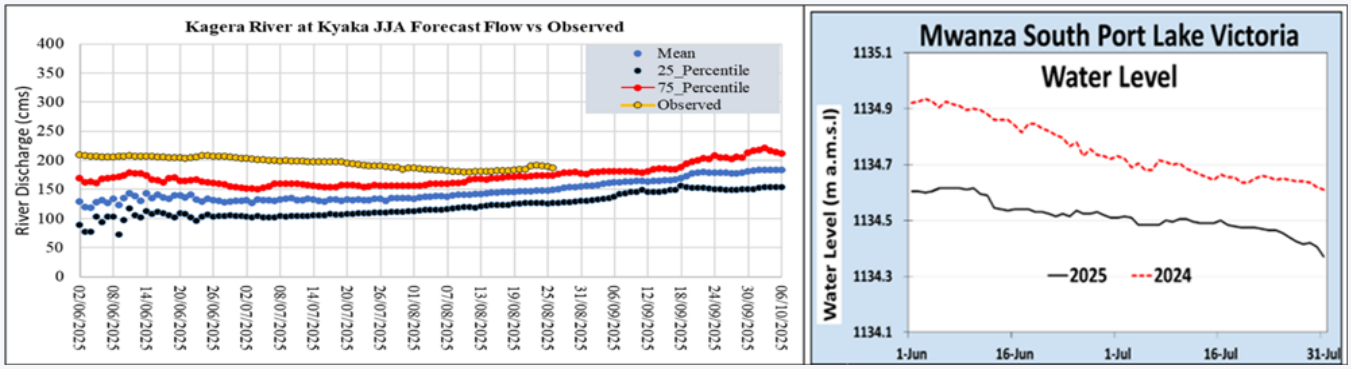


Figure 46: Observed vs forecasted on Kagera River at Kyaka Ferry station and Lake Water Levels at Mwanza station.

5.8.2 Climate and Hydrological Outlook for OND 2025 and Implications

According to the Tanzania Meteorological Authority (TMA) forecasts average to below average rainfall across much of the country during OND 2025. Specifically for Lake Victoria Basin regions (Kagera, Geita, Mwanza, Mara, Simiyu and Shinyanga, the TMA expects the rains to begin in early and mid October, though there may be long dry spells and uneven distribution of rainfall. The ICPAC climate outlook for the Greater Horn of Africa expects below normal rains over most parts of the region during OND 2025, including parts of Tanzania, with warmer than usual temperatures. Overall rainfall amounts likely to be below or near average, with a risk of deficits giving a slip to a more intense dry spell from January through February. Rainfall distribution likely to be uneven—some pockets may get heavier rains, but many areas may see intermittent dry periods. December may see somewhat "improved" rainfall in some areas

October: With mostly drier conditions in many areas, river flows will likely decline or remain below average, except in the Lake Victoria Basin in the northern part of the county where flows in rivers may be near to above normal flow due to localized wetter conditions. November: As rains increase, river flows will improve compared to October but still remain below normal long-term averages in most basins. December: Continued rainfall will support sustained flows, but since total rainfall is still below normal, flows will generally be below average across most rivers.

Most rivers in the Lake Victoria Basin (Mara, Simiyu, Ruvuvu, Kagera, Gurumeti, etc) are predicted to experience near to slightly above normal flow conditions. Figure 45 provide forecast for Kagera River indicating variations and rise from about 200 m3/s in September to about 350m3/s in December 2025.

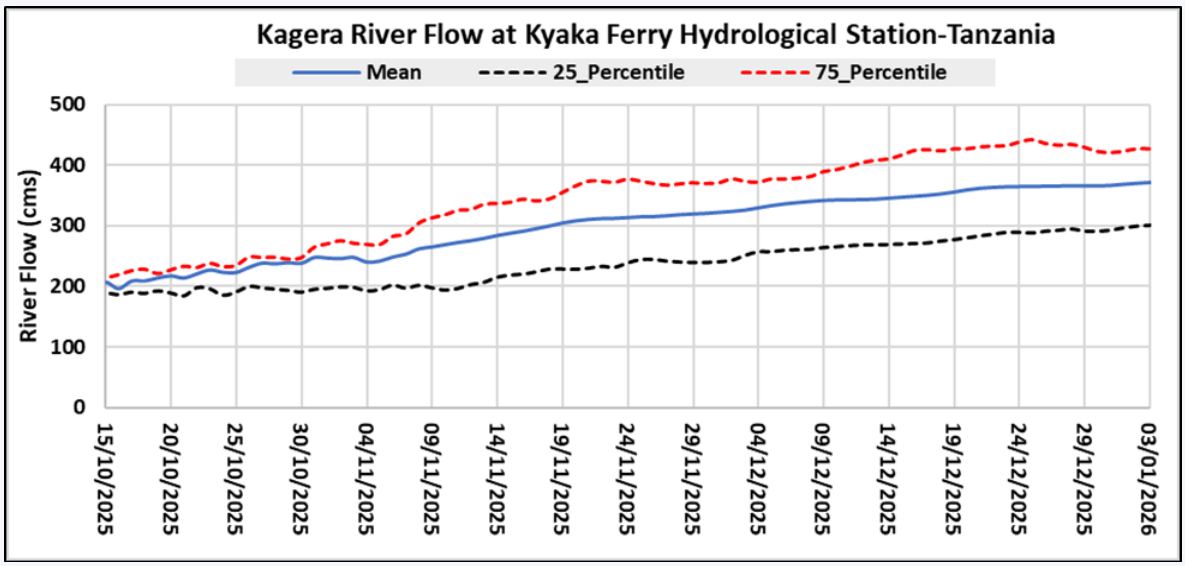


Figure 47: River flow Forecast for Kagera at Kyaka Ferry Hydrological Station for October-December 2025 Season.

The implication of the Kagera river forecast guarantees Russum Power station designed for 360 m3/s river discharge (120 m3/s for each of the 3 Kaplan turbines) adequate supply of water to the turbine with optimal delivery head to December. Downstream irrigation schemes also stand to benefit from this projected river flows ensuring adequate supply during the October – December season.

5.8.3 Recommendations and advisory

Given the above, here are some suggestions for what policymakers, communities, and sectors might consider doing to reduce risk and capitalize on opportunities:

1. Closely monitor river flows and reservoir levels to detect early signs of drought or flooding for early warning information to enhance preparedness and community resilience.
2. Regulate dam operations to store water during the near to above normal for sustenance during the January-February dry spells while ensuring safe releases during the excess storage.
3. Advise hydropower operators on balancing inflows and releases to avoid flooding downstream. This to include operators such as Rusumo Power Company to provide timely alert to the downstream communities in flood-prone areas of lower reaches of Kagera River to prepare for possible enhanced release and evacuation of flood wave through the spillway.
4. Strengthen early warning dissemination channels (radio, SMS, local leaders)
5. Raise awareness on the risk of waterborne and Mosquito diseases due to flooding.
6. Promote water harvesting (e.g. small ponds, tanks) especially in rural areas to buffer dry spells.
7. Manage soil moisture via mulching, conservation agriculture to retain water.
8. Maintain / repair drainage infrastructure to reduce flood risk from sudden heavy rains.
9. Fisheries authorities should plan for changes in lake levels, plan for insecure landing sites, and monitor water quality.

5.9 Uganda

Uganda, a landlocked country in Eastern Africa, lies almost entirely within the Nile Basin, with 98% of its 235,880 km² territory contributing about 7.4% of the basin's drainage area. Its hydrology is dominated by a network of rivers, lakes, wetlands, and aquifers, with Lake Victoria as the principal source of the White Nile River (Figure 48). The Victoria Nile links Uganda's major lakes Victoria, Kyoga, and Albert, forming a natural regulation system that buffers seasonal variability and sustains flows downstream. The country's equatorial climate with bimodal rainfall supports relatively stable runoff, while tributaries, wetlands, and groundwater maintain base flows and ecological balance. Uganda's water system underpins hydropower, irrigation, and navigation, making it central to Nile Basin water security and cooperation.

Figure 48: Map of drainage area in Uganda

5.9.1 Performance of JJAS 2025 Season and Impacts

Northern and Northeastern regions of the country received normal to above normal rains with

slightly a late onset and the southern, Central, part of Eastern regions, Lake Victoria basin, receiving normal to above rainfall (Figure 49). This spatial variation of rainfall distribution resulted to the increase of water levels of Lake Kyoga by 0.47 m but 0.27m below the maximum water level recorded in 2024. and a decline of Lake Victoria water levels by 0.5m from June to September. The enhanced rains in the East caused the water levels in Lakes Kyoga and Albert to rise and the Victoria basin received less rainfall. However, for both lakes the observed water levels were below their maximums recorded (Figure 50).

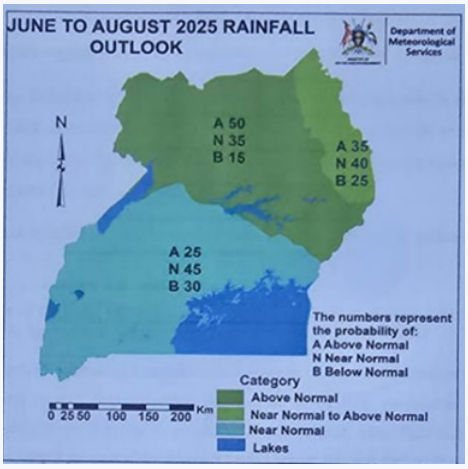


Figure 49: Uganda JJAS 2025 Rainfall Outlook

Prediction of lake water levels was much accurate for Lake Victoria than lake Kyoga (Figure 51).

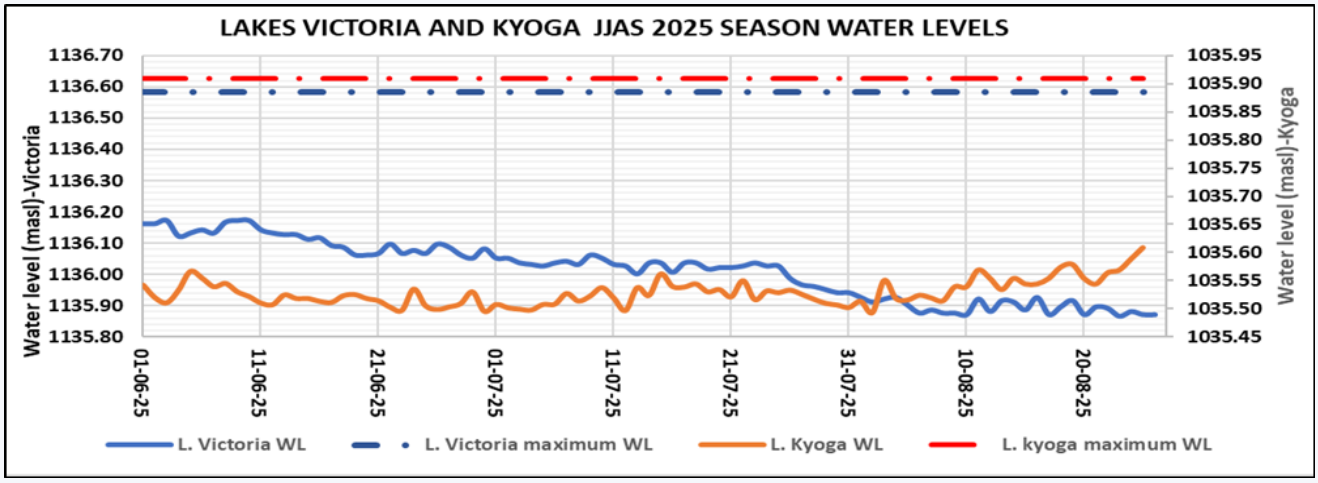


Figure 50: Lake Victora and Lake Kyoga observed water levels compared to the forecast for JJAS 2025

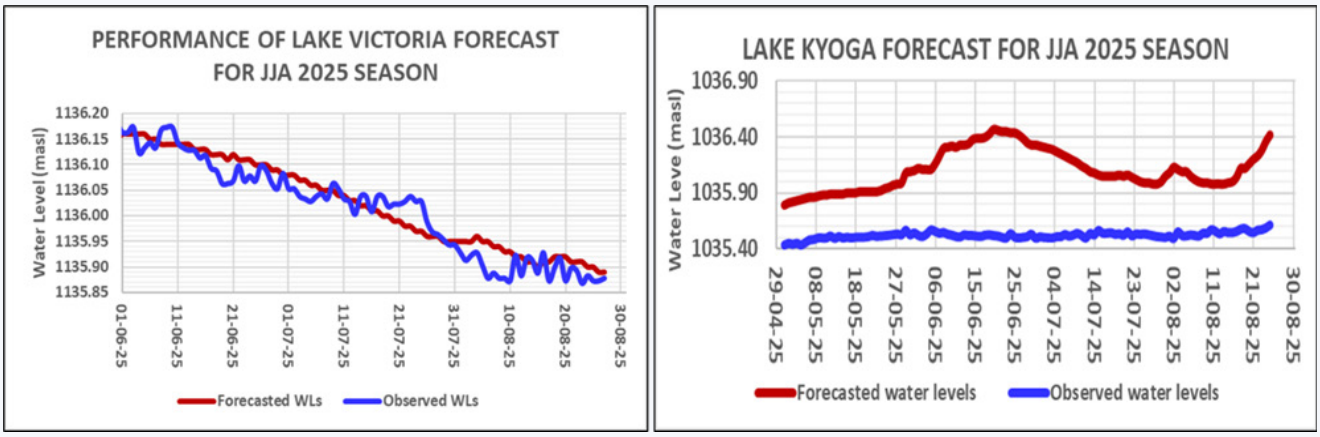


Figure 51: Observed vs forecasted lake water levels for Lake Victoria and Lake Kyoga during JJAS 2025 Season.

5.9.2 Climate and Hydrological Outlook for OND 2025 and Implications

It is forecasted that for the North-Eastern and South-Western and central f the country to receive normal to above normal rainfall and Central to Northern regions having a probability of 33% to receive normal to above normal rainfall (ICPAC's climate outlook forecast for OND 2025 season). Hydrologically, during this season, the water levels of major lakes will remain high due to the forecast. The Department of Meteorological Services (DMS) also confirmed the ICPAC predictions with more wetter conditions near normal rainfall across Southwestern Uganda and similarly for the Rwen-

zori region for September-December 2025 (Figure 52). As this shows steady conditions, communities in flood-prone areas should remain vigilant as rains in the Rwenzori mountains may lead to increased river flow causing riverine floods.

Figure 53 shows the OND forecasted lake water levels and net-flow for Lakes Victoria and Kyoga, indicating an increasing trend from 1135.90masl to 1136.03masl for Lake Victoria as for Kyoga, levels will continue to increase up to mid-October, then a receding trend up to the end of season. All the lakes show positive net-flow for the period of OND 2025.

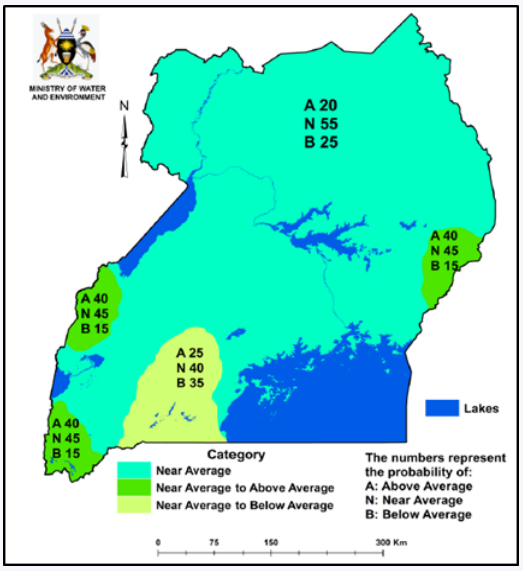


Figure 52: Uganda rainfall outlook for September – December 2025 Season (Source-DMS Uganda)

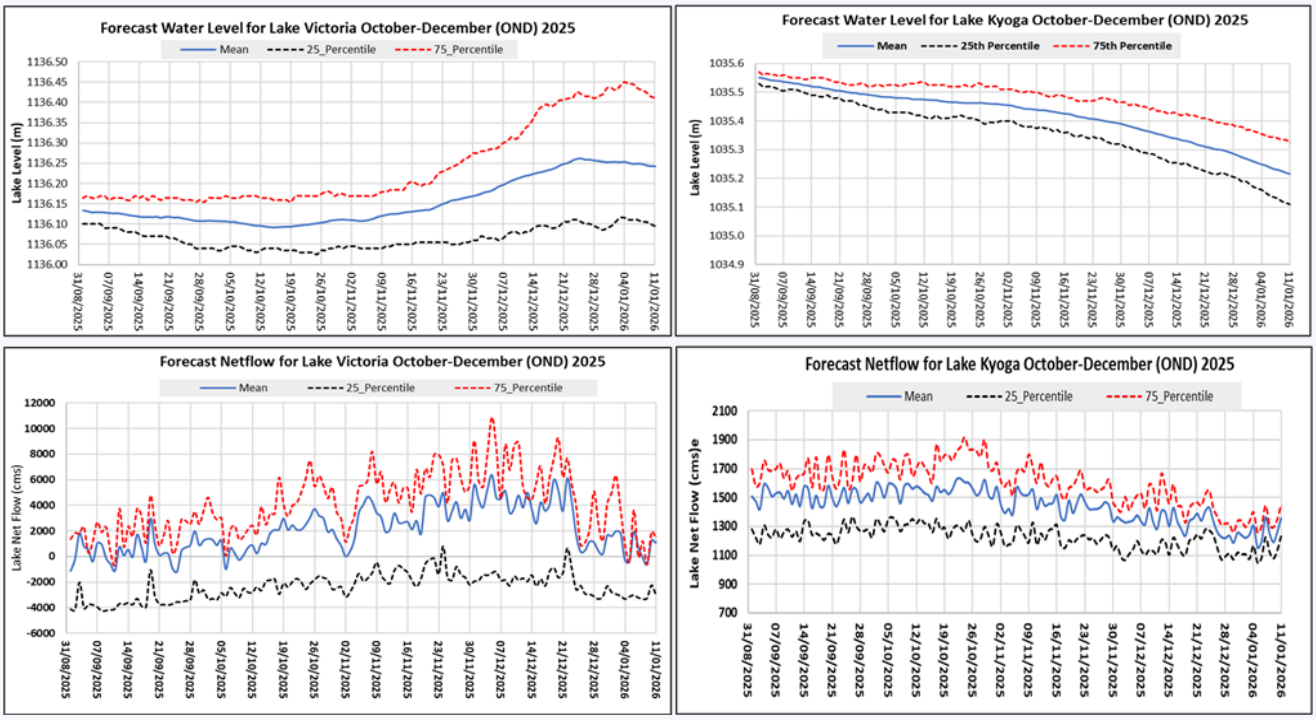


Figure 53: Forecast Lake levels and net-flow for Lake Victoria and Lake Kyoga for OND 2025 season.

5.9.3 Recommendation and Advisory

1. Continued monitoring of water levels to manage the outflow from the lake and floods.
2. Water user committees encouraged to ensure proper maintenance, as well as hygiene and sanitation, around water sources.
3. Monitoring and removal of floating islands in Lake Victoria and Kyoga.
4. Leverage on the established channels to share notifications to downstream country of South Sudan.
5. Improved dissemination of the forecasted information to the communities and stakeholders in the form of bulletins, community baraza.

6.0 BASIN WIDE IMPLICATION AND ADVISORY

6.1 Increased likelihood of above normal rainfall

The climate outlook for the October–December 2025 period indicates above-normal rainfall across several regions within the Nile Basin. This pattern is expected to enhance water availability but also raises concerns about potential flooding and related risks. In addition, The benefits and opportunities that come with above normal rainfall such enhanced water availability and food production might cancel out with the negative impact if not well planned and managed. The above projections could lead to increased riverine flooding as well as flash flood and landslide occurrence, particularly in low-lying and flood-and landslide prone areas. Agricultural Disruption due to excessive rainfall may damage crops, delay planting, and lead to soil erosion and create food insecurity in the affected areas. The heavy rains might overwhelm drainage systems, urban flooding leading to infrastructure damage and displacement of people. In addition, chances of standing water enhance the spread of waterborne diseases and increase mosquito breeding, leading to a rise in malaria and other vector-borne diseases.

6.1.1 Recommendation and Advisory

Therefore, the following five recommendations and advisories are issued to guide strategic response and interventions in the projected areas to be impacted.South Sudan -Southern and eastern part of the country including Pibor, Nasir, Sobat, Dorein and Bongak regions within Baro Akobo Sobat Sub-Basin which are likely to experience above-normal rainfall, increasing the risk of flooding, especially in low-lying areas.

1. Disseminating the flood warnings through radio broadcasts, SMS alerts, and community leaders, with special focus on cattle camps, island dwellers, and riverine settlements.
2. Continuous monitoring of rivers, lakes and reservoirs that currently have high water level and with a forecast of enhanced October-December rainfall and deploy adaptive management strategy.
3. Upstream Member States are encouraged to share status hydrological information on high river levels flows or extreme rainfall with their downstream Member States to enhance planning and preparedness hence averting potential flood disasters (Uganda - South Sudan, Ethiopia -Sudan, and Ethiopia-South Sudan).
4. Repair any dyke and levee meant for flood protection and clear drainage especially in urban areas before the OND rainy season commences.
5. Encourage rainwater harvesting and storage during for the dry season
6. Communication & coordination with the Disaster response team for early warning for any potential disaster risk.
7. Be on the lookout for evacuation and movement orders issued by the local authority and comply immediately.
8. Seek medical help if exposed to floodwater and experiencing symptoms like fever or wounds. Discard any food or water that contacts floods. Test well water if applicable.

6.2 Increased Likelihood of below normal Conditions

Based on the seasonal climate forecasts for the October–December 2025 period, some regions within the Nile Basin are expected to experience below-normal rainfall.

6.2.1 Recommendations and Advisories

1. Promote use of water harvesting technologies and efficient utilization of the available water for sustenance throughout the dry season.
2. Adopt water-saving practices such as use drip irrigation or precision watering systems to minimize water waste, planting drought-resistant crop varieties or adjust planting schedules to align with expected moisture availability and soil mulching for optimal moisture retention and reduction of evaporation.
3. Review and implement drought management plans which include establish or update drought contingency plans, including water rationing and public awareness campaigns,
4. Enhance infrastructure resilience including early investment in water storage systems, such as tanks, water pans. reservoirs or groundwater recharge projects, to buffer against shortages.
5. Expected water supply advisories in some local authorities may issue advisories for reduced water availability, urging residents to conserve water or prepare for restrictions including water rationing and rotational supply especially in urban centres.

7.0 ACKNOWLEDGMENT

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Group Photo for Nile Basin Regional Expert Working Group on Hydrology –at the 6th Seasonal Hydrological Outlook and Advisory Nairobi Kenya.

ONE RIVER ONE PEOPLE ONE VISION

NILE BASIN INITIATIVE
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