NATIONAL WATER ACCOUNTS DEVELOPMENT: TRACKING UGANDA'S PROGRESS AMIDST CLIMATE CHANGE

POLICY BRIEF BY

MAKERERE UNIVERSITY

CENTRE OF EXCELLENCE FOR AFRICA CLIMATE-SENSITIVE MACROECONOMIC MODELLING (CEACM)

Key messages

- Uganda's water accounts have moved from pilot compilation to a recurring statistical product, creating a platform for linking physical water flows to economic planning, climate-risk management and natural-capital policy.

- The accounts show volatility in recent water abstraction and consumption indicators, while agriculture remains the dominant user; this makes climate-sensitive water productivity central to food security and macroeconomic resilience.

- The climate outlook shows rising temperatures, variable rainfall with such shocks already imposing income losses on the already vulnerable households.

- The water–economy nexus extends well beyond agriculture and hydropower. Fisheries, tourism, wetlands, public health, urban services and ecosystem-based livelihoods all depend on water quantity, quality, timing and ecosystem integrity.

- Evidence of climatic-change effects is now strong enough to justify deeper incorporation of the natural capital accounting in macroeconomic policy and planning.

- Robust accounting should deepen the connection between physical flows with monetary accounts, ecosystem accounts, fisheries resource accounts, biodiversity and tourism accounts, and climate-risk modelling to guide investment prioritization and resilience planning.

1 Introduction and background

Uganda's water accounts are part of the environmental-economic accounts produced by the Uganda Bureau of Statistics (UBOS). They follow the System of Environmental-Economic Accounting (SEEA) and SEEA-Water, extending the traditional System of National Accounts by linking physical water information to economic activity. Their publication history now shows continuity where the initial pilot covering 2015–2018 was followed by later accounts covering 2017–2020, 2021–2022, and subsequent annual releases for 2023 and 2024. This indicates that water accounting has moved beyond a one-off pilot and has become mainstreamed into the national statistical system. This development is important because Uganda is a water-dependent economy. Agriculture is predominantly rain-fed, energy generation is strongly linked to hydropower, fisheries depend on lake and river systems, tourism relies on water-linked landscapes and biodiversity, and urban systems depend on reliable water supply and sanitation. Water resource accounting therefore provides an evidence base for economic planning, climate-risk management, resource allocation and sustainability-oriented decision-making.

2 Policy question and objectives

How far has Uganda progressed in developing a credible, policy-relevant and economically useful system of water resource accounting, and how can the accounts better support climate-resilient, sector-sensitive development?

Objectives

This brief:

- assesses progress from piloting to sustained water accounting;
- summarizes the compilation methods;
- analyses the trends in abstraction, consumption, water-use efficiency and sectoral dependence;
- expands the discussion of climate-change on water resources by including fisheries, tourism and cross-cutting ecosystem services; and
- sets out policy recommendations for improving the policy relevance of Uganda's water accounts.

3 Methodology and Accounting Framework

- The water accounts are compiled using the central SEEA framework and SEEA-Water. In practice, the accounts show how water moves from the environment to the economy, how it is distributed and used by the different economic sectors, and how part of it returns to the environment. The physical supply-and-use tables capture flows from the environment, own abstraction, water distribution, intermediate consumption, reuse and return flows, and flows to the rest of the world.
- The accounts integrate data from UBOS surveys, ministries, departments and agencies, water authorities, the National Water and Sewerage Corporation, meteorological data and industry-level information. Direct data gaps remain a constraint, necessitating the use of estimates or modelling to fill the missing gaps. Because the 2024 accounts included methodological refinements and source-data updates, transparent metadata and revisions protocols are essential for interpreting trends. Table 1 highlights the structure of the accounting framework, including the rationale for the core components.

- **Table 1: Composite structure of the water accounts**

Accounting component	Detailed description	Rationale
Framework	SEEA and SEEA-Water	Allows environmental and economic data to be analyzed in one statistical structure.
Core tables	Water-data input, physical supply and physical use tables	These are the documented building blocks of compilation.
Measured flows	Abstraction, distribution, use, return flows, flows to environment	They define the accounting logic needed for sector and efficiency analysis.
Data sources	UBOS surveys, MDAs, NWSC, meteorological and industry data	Cross-agency integration is essential for national water accounting.
Gap filling	Estimation or modelling where direct data are absent	Supports continuity but requires transparent metadata and revision control.
Economic extension	Physical plus monetary accounting concepts	Important for pricing, cost recovery, investment appraisal and macroeconomic interpretation.

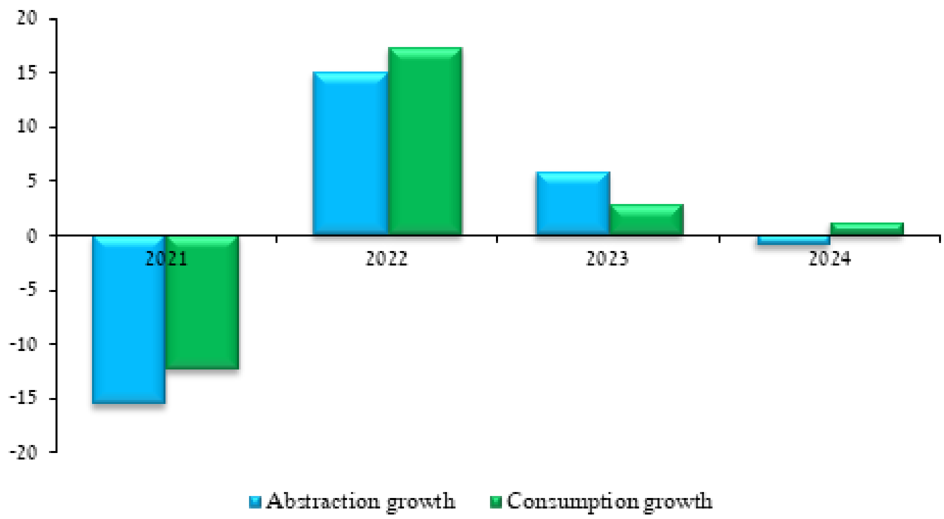
Source: United Nations Statistics Division

The next methodological frontier is fuller monetary and ecosystem extension. Physical accounts should be linked more directly to monetary supply-and-use tables, water-related asset accounts, fisheries resource accounts, biodiversity and tourism accounts, and ecosystem service accounts for wetlands and catchments.

4 Key findings from recent water-account trends

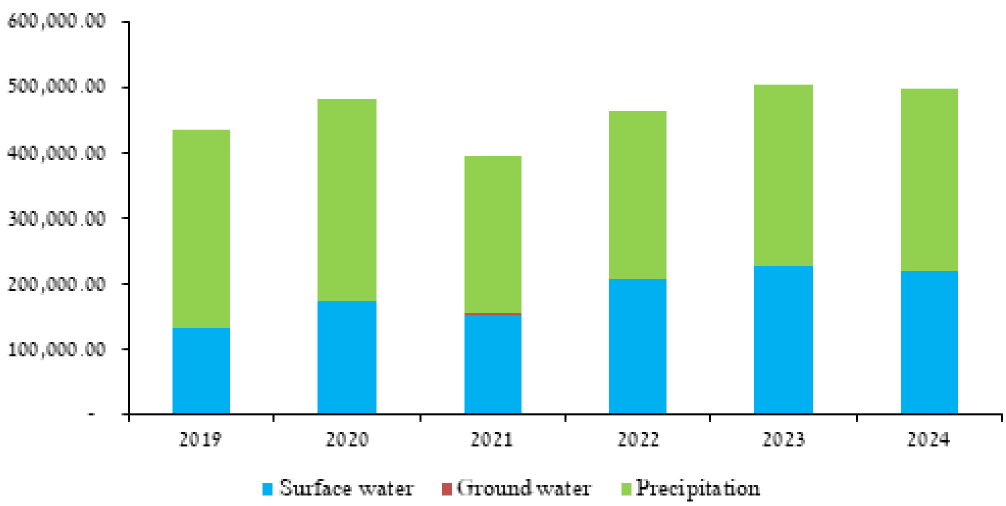
Recent annual growth rates in water abstraction and consumption show large swings rather than smooth trends. The sharp contraction in 2021 was followed by strong growth in 2022, more moderate growth in 2023 and a slight decline in abstraction in 2024 while consumption still rose. Water-use efficiency rose strongly between 2021 and 2022, fell in 2023 and reduced further in 2024. Agriculture continued to dominate total abstraction and use through 2023. A situational analysis based on Uganda Bureau of Statistics Water Resources Accounting data shows that estimated water abstraction declined by 0.8% to 499,039 million cubic metres, from 503,235 million cubic metres in 2023. This reduction was accompanied by a 1.0% drop in water supply, from 465,622 million cubic metres in 2023 to 460,978 million cubic metres in 2024. Total water consumption decreased by 0.8% from 503,131 million cubic metres in 2023 to 498,935 million cubic metres in 2024.

Figure 1: Annual exploitation growth rate, 2021 -2024 (%)



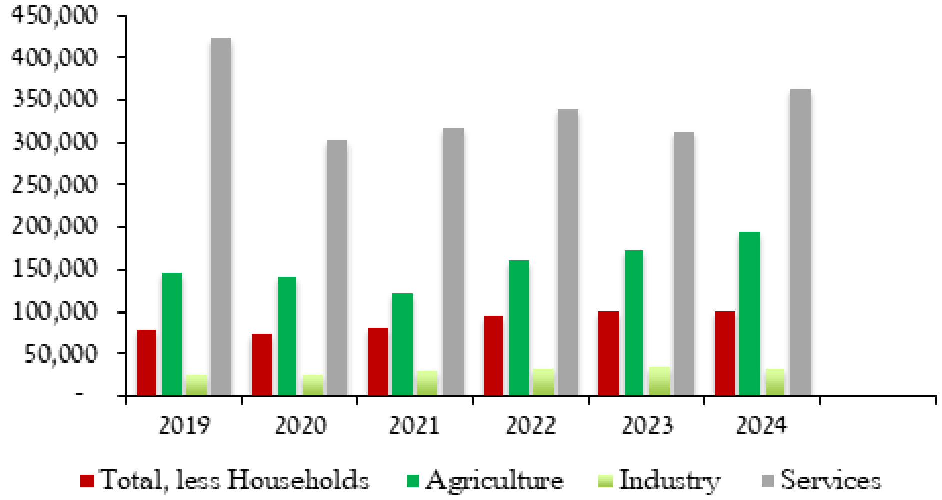
Agriculture remains the largest user of water, accounting for 55.4% of total abstraction in 2024. Abstraction for the sector increased by 1.1%, building on a substantial 7.4% rise in 2023. This growth was primarily driven by a 1.1% increase in rain-fed crop cultivation, highlighting its expanding water demands. However, this trend was not uniform across all sub-sectors. Irrigation water abstraction declined by 1.4%, while fishing saw a marginal 0.9% increase. These patterns underscore the need for targeted water management strategies to optimize resource use and mitigate environmental impacts. The industrial sector recorded a 3.1% decline in water abstraction in 2024, reversing the 9.3% increase observed in 2023. This trend was primarily driven by reduced water demand from the electricity generation and construction sub-sectors. In contrast, the manufacturing and water supply sub-sectors registered growth of 15.6% and 0.9% respectively.

Figure 2: Water Abstraction by source (Million Cubic Meters)



Water consumption reached 37,957 million cubic metres in 2024, translating into a national water productivity water productivity of UGX/m3 5,557. Water productivity consistently outpaced water consumption, indicating a positive trend towards more efficient water use. Sectoral level data shows that although the industry and services sectors accounted for the smallest share of water consumption, they had the highest levels of water productivity, generating significantly more economic value per cubic meters compared to agriculture. Still, agriculture registered notable progress in 2024, recording a 14.1% increase in water productivity, alongside a 1.1% rise in water consumption.

Figure 3: Water use efficiency (UGX/Cubic Meter)



Water Use excluding households was registered at UGX99,865 in 2024, marking a marginal decline of about UGX848.87 (0.8%) from the UGX100,714 recorded in 2023. This decline indicates that a higher volume of water was used to produce a given increase in GDP, reflecting a shift toward less efficient water utilization.

The policy implication is that water-account indicators should not be interpreted only as descriptive statistics, but as are early-warning indicators for sectoral exposure, productivity, ecosystem stress and climate transmission into the macroeconomy.

5 Expanded sectoral impact analysis

5.1 Agriculture, food security and agro-processing

Agriculture remains central to water-accounting because it dominates water abstraction and use, is largely rain-fed, and is highly exposed to rainfall variability. Water stress affects production directly through crop yields and indirectly through input prices, food-processing costs, household consumption and export performance. A CEACM-relevant policy message is that agricultural water policy should not be confined to irrigation expansion. It should combine water-use efficiency, soil-moisture conservation, climate-smart agriculture, storage, catchment restoration, extension services, drought-resilient crop choices and value-chain logistics.

5.2 Fisheries and aquatic value chains

Fisheries are a key sector in water resource accounting because they connect water quantity, water quality, biodiversity, exports, nutrition and jobs. Uganda's fisheries are dependent on the major surface water bodies and associated wetlands. Available data indicates that Uganda's fisheries contribute about 3% of total GDP and 12% of agricultural GDP. The value of fish exports increased from USD 155.20 million in FY2023/24 to USD 216.42 million in FY2024/25 (MAAIF, 2024), making fisheries among the top export earners. This evidence justifies taking a close focus on fisheries as an analytical module in future water accounts rather than as a residual natural-resource activity.

The climate-water transmission channels for fisheries include lake-level variability, changes in water temperature, altered breeding and migration patterns, wetland degradation, pollution, invasive species and pressure on fish breeding areas. Economic impacts then pass through fish catches, processing capacity utilisation, cold-chain logistics, export earnings, household nutrition and livelihoods in landing-site communities. Previous CEACM-related modelling also shows that fishing can be included in climate-shock scenarios, with fishing output negatively affected under rainfall-deficient climate-change assumptions. This implies that water accounting analysis should be paired with fisheries resource accounts, lake water-quality indicators, fish breeding-area protection data, post-harvest loss data and export-value-chain indicators.

5.3 Tourism, biodiversity and water-based recreation

Uganda's tourism assets include national parks, wildlife, landscapes, water and adventure activities, cultural assets and conference facilities. Recent tourism performance data shows strong recovery where over 1.3 million international visitors were received in 2024. International tourism receipts reached approximately USD 1.28 billion, tourism contributed 16% of Uganda's total exports, direct GDP contribution was reported at UGX 6.06 trillion or 3.2% and contributes to 7.2% of total employment. This contribution makes tourism a macro-relevant sector. Water accounts can strengthen tourism planning in at least four ways. First, they can help identify water-dependent tourism assets such as the Source of the Nile, waterfalls, lakes, wetlands, wildlife habitats and recreation sites. Second, they can aid in quantifying water demand by accommodation, hospitality, park operations and destination infrastructure. Third, they can support climate-risk screening for tourism assets exposed to flooding, drought, reduced water quality or habitat degradation. Fourth, they can connect tourism receipts and jobs to ecosystem conditions, strengthening the case for catchment restoration, wetland conservation, wastewater treatment and biodiversity protection.

5.5 Energy, industry and urban systems

Hydropower, manufacturing, construction, water utilities and urban services are exposed to both water availability and water quality. Reduced precipitation can lower water volumes relevant to hydropower generation systems, while flooding can damage infrastructure and raise maintenance costs. Urbanization also intensifies demand for water supply, sanitation and wastewater treatment. Water resource accounting therefore has implications for energy planning, industrial-location planning, public investment appraisal and urban resilience strategies. Monetary water accounts would be particularly useful for pricing, cost recovery, investment prioritization and identifying where water-service constraints are binding productivity.

5.4 Wetlands and ecosystem services

Wetlands are one of the most important cross-cutting water-related ecosystems in Uganda's water-economy system. The National Wetland Strategic Plan 2026–2036 reports a wetland cover of 33,762.6 square Km, equal to nearly 14% of the national total surface area, but only 9.3% remain intact. It also identifies wetland services including water purification, flood regulation, water provision, carbon storage, biodiversity support and livelihood sustenance. Wetlands are estimated to contribute over USD 1 billion annually to national income, in addition to their support for livelihoods through agriculture, fishing and resource harvesting. From a water accounting perspective wetlands should be treated as natural infrastructure to the degree that their degradation raises costs for flood control, water treatment, disaster response, fisheries management, public health and urban drainage. Conversely, restoration can generate co-benefits for agriculture, fisheries, tourism, biodiversity, carbon storage and climate resilience.

5.6 Health, gender, poverty and distributional channels

Water insecurity is also a welfare and human-capital issue. Climate change can increase health risks from waterborne diseases and malaria, while poor water quality and sanitation reduce labour productivity and raise household health costs. The distributional burden is likely to be heavier for poorer households and communities whose livelihoods depend directly on agriculture, fishing, wetlands and informal water-based value chains. Water accounts should therefore support poverty-sensitive and gender-sensitive analysis by linking water access, sanitation, time-use, health exposure, livelihoods and sector employment data.

6 Water accounting and climate change impacts

The World Bank (2021) Uganda Climate Risk Country Profile indicates that average temperatures in Uganda have increased by 1.3°C since the 1960s and that average temperatures have increased at 0.28°C per decade since 1960. The report further notes that hot days increased by 74 days between 1960 and 2003 and hot nights increased by 136 nights over the same period. These trends matter for water resource accounting because heat stress, evapotranspiration and temperature-sensitive demand can all alter the relationship between water availability and economic output. The same report further states that Uganda has experienced a statistically significant reduction in annual as well as seasonal rainfall and that the country's precipitation is highly variable. It also notes that the El Niño weather phenomenon often associated with floods in the September–December rainy season is now a rare occurrence. Furthermore, the Rwenzori ice cap reduced by 49% between 1987 and 2003 and is projected to disappear by the 2040s, with implications for water resources and livelihoods.

6 Water accounting and climate change impacts

The World Bank (2021) Uganda Climate Risk Country Profile indicates that average temperatures in Uganda have increased by 1.3°C since the 1960s and that average temperatures have increased at 0.28°C per decade since 1960. The report further notes that hot days increased by 74 days between 1960 and 2003 and hot nights increased by 136 nights over the same period. These trends matter for water resource accounting The economic transmission channels for all these changes are explicitly documented in several of the reviewed documents. UBOS (2022) notes that Uganda's economy is largely nature dependent and that primary agricultural production is mostly rain-fed. As such, any delays in rainfall or drought spells can be detrimental to the economy and livelihoods overall. It is worth noting that reduced precipitation can lower water volumes in hydropower generation systems and that climate stressors are expected to exacerbate existing developmental constraints. Overall, the existing literature on water resources and climate impacts points to compound risks for agricultural production, agro-processing, electricity supply and overall household welfare.

World Bank (2025) makes the economic consequences more explicit. It states that 80% of the poorest households exposed to climate change already experience income loss from climate shocks and that GDP could drop by up to 3.1% by 2050 without additional climate action. It further stresses that climate change poses challenges including increased variability in crop yields, significant declines in labor productivity due to heat stress, increased health risks from waterborne diseases and malaria, and exposure of physical infrastructure to extreme climate events (see Table 2).

between water availability and economic output. The same report further states that Uganda has experienced a statistically significant reduction in annual as well as seasonal rainfall and that the country's precipitation is highly variable. It also notes that the El Niño weather phenomenon often associated with floods in the September–December rainy season is now a rare occurrence. Furthermore, the Rwenzori ice cap reduced by 49% between 1987 and 2003 and is projected to disappear by the 2040s, with implications for water resources and livelihoods.

Table 2: Climate change-water resources-economy nexus

Projection area	Explicit projected change	Potential policy implication
Temperature	Uganda projected to warm by 1.5°C to 3.5°C by 2080 compared to pre-industrial levels.	Higher heat stress, stronger evaporative demand, and pressure on labor productivity and water management.
Rainfall and extremes	Annual precipitation is projected to increase by 67 mm by 2080, but dry and wet periods are likely to become more extreme.	Planning must focus on variability and extremes, not just average rainfall.
Water availability	Per capita water availability is projected to decline by 2080, mostly due to population growth.	Water saving, allocation efficiency and infrastructure become increasingly important.
Agriculture	Possible increase in cropland exposure to drought; maize, millet and sorghum yields projected to decline.	Adaptation in crop choice, irrigation and water productivity becomes more urgent.
Economy and welfare	GDP could drop by up to 3.1% by 2050; additional poverty and internal migration risks are reported in the CCDR.	Water accounts should inform economy-wide resilience planning, not only sectoral water policy.

Source: World Bank, 2025

7 Policy implications

- Make water accounts a macroeconomic planning tool: Water accounts should inform budget allocation, NDP monitoring, climate-risk planning, public investment appraisal and sector strategies for agriculture, energy, fisheries, tourism and urban development.
- Fiscal options and investment quality: The 2024 accounting policy summary stresses that water accounts provide actionable insights for resource allocation, policy design, investment prioritization and performance monitoring. In the context of climate change, water resource accounting can help government decide where scarce public funds should go, e.g., toward irrigation, rural water systems, wastewater treatment, storage, reuse, or demand-side efficiency measures.
- Connect physical and monetary accounts: While the current physical accounts are useful, monetary extensions would improve pricing, cost recovery, investment appraisal, productivity analysis and fiscal-policy interpretation.
- Climate variability has direct economic transmission channels: Data shows that Uganda's agriculture is predominantly rain-fed and that delays in rainfall or drought spells can severely affect production. The national climate-risk profile adds that reduced precipitation can affect hydropower generation and that climate stressors are expected to exacerbate the existing development challenges. This means climate variability can affect farm output, electricity supply, logistics, export earnings and jobs at the same time.
- Use water accounts for climate-sensitive sector stress testing: Accounts should be linked to climate scenarios and macroeconomic models so that policy makers can estimate direct and indirect impacts on GDP, employment, trade, household welfare and sector value chains.
- Future projections justify a concerted use of the accounts: The CCDR's projected GDP losses, labor-productivity effects, crop-yield variability, infrastructure exposure and poverty impacts suggest that water accounts should be connected more explicitly to climate policy, agricultural transformation, energy planning and infrastructure resilience.

8 Policy recommendations

Recommendation	Rationale	Indicative lead institutions
1. Publish and maintain an annual water-account release calendar	Improves use of accounts in budget cycles, NDP monitoring and climate-risk planning	UBOS, MWE, MoFPED, NPA
2. Adopt transparent revisions and metadata protocol	Clarifies interpretation of revised historical series and methodological refinements	UBOS, NPA, Data-supplying MDAs, Makerere University
3. Expand monetary water accounting	Supports pricing, cost recovery, investment appraisal and macroeconomic interpretation	UBOS, MoFPED, NPA, MWE, NWSC, Makerere University
4. Develop fisheries-linked water-account indicators	Captures water quality, fish-resource, breeding-area, catch, export and livelihood links	MAAIF/DFR, UBOS, MWE, LVFO
5. Link tourism accounts to water and ecosystem accounts	Quantifies dependence of tourism receipts and jobs on water-linked landscapes and biodiversity	MTWA, UTB, UWA, UBOS, NEMA, MWE
6. Integrate wetland accounts into water planning	Recognises wetlands as natural infrastructure for flood regulation, water purification and livelihoods	MWE/Wetlands Management Department, NEMA, UBOS, NPA, Makerere University
7. Pair water accounts with climate-risk and CGE modelling	Supports economy-wide assessment of shocks across agriculture, fisheries, agro-processing, trade and households	Makerere University, MoFPED, NPA, UBOS, MWE
8. Build a sectoral water-data compact	Creates formal data-sharing arrangements for agriculture, fisheries, tourism, energy, industry, WASH and wetlands	UBOS, MWE, Makerere University and all sector MDAs

9 References

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Responsible Fisheries Business Chains Project / Fisheries sector profile for Uganda.

Kilimani, N., van Heerden, J., Bohlmann, H. and Roos, L. (2018). Economy-wide impact of drought-induced productivity losses. Disaster Prevention and Management.

Mbowa, S., Odokonyero, T., & Munyaho, E. (2017). Harnessing floating cage technology to increase fish production in Uganda. Economic Policy Research Centre.

Ministry of Agriculture Animal Industry and Fisheries (2024). Statistical Abstract 2024 (MAAIF).

Ministry of Tourism, Wildlife and Antiquities. (2024). Tourism Performance Statistics / Tourism Trends and Statistics Report 2025.

Ministry of Water and Environment. National Wetland Strategic Plan 2026–2036.

Stanley, W., & Kim, D.-H. (2026). Aquaculture development and biosecurity challenges in Uganda: Toward resilient fish health management. Fisheries and Aquatic Sciences, 29(3), 203-214. https://doi.org/10.47853/FAS.2026.e18

Uganda Bureau of Statistics (UBOS). Uganda Water Accounts Reports: 2022, 2023, 2024 and 2025 editions.

Uganda Bureau of Statistics. (2025). Uganda Aquaculture Census 2025 report. Kampala, Uganda: UBOS.

UNEP-WCMC. Reports on Uganda's Natural Capital Accounts: Biodiversity and Tourism Accounts, Fisheries Resources Accounts, and Land and Soil Improvement Accounts (2021).

van Heerden, J.H., Roos, E.L., Adams, P.D. and Kilimani, N. (2019). Any Rain on Victoria Lake Is Only a Drop in the Bucket: A CGE Analysis of the Effects of Water Shortages on Food Security in Uganda.

World Bank Group (2025). Uganda Country Climate and Development Report (CCDR).

Acknowledgment

This work was funded by the Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Gates Foundation.

In Partnership with

MINISTRY OF FOREIGN AFFAIRS OF DENMARK
Danida

GGGI

The Coalition of Finance Ministers for Climate Action