



NILE BASIN INITIATIVE
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REPORTING THE NILE BASIN:

A SOURCEBOOK FOR JOURNALISTS - 2025

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Cover Photo:
Fishermen on the Nile in Cairo, Egypt

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Abbreviations and Acronyms

BCM	Billion Cubic Meters
CFA	Cooperative Framework Agreement
DCCEEW	Australian Government Department of Climate Change, Energy, the Environment and Water
ECI	Environmental Compliance Institute
ENTRO	Eastern Nile Technical Regional Office
EPA	United States Environmental Protection Agency
GDP	Gross Domestic Product
GERD	Grand Ethiopian Renaissance Dam
HYDROMET	Hydrometeorological Survey of the Catchments of Lake Victoria, Kyoga and Lake Albert Project
IPCC	The Intergovernmental Panel on Climate Change
ISP	Nile Basin Initiative Institutional Strengthening Project
KM	Kilometer
Ma	Mega Annum (This means “million years”)
MDPI	Multidisciplinary Digital Publishing Institute
MLHUD	Ministry of Lands, Housing and Urban Development of the Government of Uganda
NaFFRI	National Fisheries Resources Research Institute
NAPE	National Association of Professional Environmentalists
NBDF	Nile Basin Development Forum
NBI	Nile Basin Initiative
NBMN	Nile Basin Media Network
NIH	United States National Institutes of Health
Nile-COM	Nile Council of Ministers of Water Affairs
NRDC	Natural Resources Defence Council
TECCONILE	Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile
UBOS	Uganda Bureau of Statistics
UK	United Kingdom
UN	The United Nations
UNESCO	The United Nations Educational, Scientific and Cultural Organisation
UN-Habitat	United Nations Human Settlements Programme
UNISDR	United Nations International Strategy for Disaster Reduction
UNWTO	The United Nations World Tourism Organisation
UWA	Uganda Wildlife Authority
WCED	World Commission on Environment and Development
WHO	World Health Organisation
WTTC	World Travel & Tourism Council
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation)

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Foreword

Dear Journalist,

The Nile River is far more than a source of water; it is a lifeline for over 300 million people across the eleven countries of its vast basin (source). As the world's longest river, it sustains unique ecosystems, underpins regional economies, and nurtures cultures that have flourished for centuries.

Yet this extraordinary resource is under mounting pressure. Climate change, water scarcity, high population growth, and rapid urbanisation are converging to threaten both the river and the services it provides. With the population of Nile Basin countries projected to exceed one billion by 2050, and urbanisation rates expected to double within the same period, the strain on resources will intensify.

These pressures are compounded by the diverse and sometimes competing demands of the Basin's riparian states. Each nation seeks to harness the Nile's potential to fuel economic growth and secure food and water for its people. Balancing these interests requires cooperation — and it is here that journalism plays a critical role.

Solutions-focused reporting can help re-frame the narrative from competition to collaboration, from mistrust to shared stewardship. Covering transboundary water issues demands not only technical accuracy, but also a deep grasp of the political, environmental, and social realities that define the Basin. Balanced and well-researched reporting can strengthen cooperation among Nile Basin countries, promote sustainable resource management, and help communities understand the challenges and opportunities that surround them.

This Sourcebook has been developed to equip journalists — reporters, editors, analysts, illustrators, and writers — with the context, knowledge, and tools necessary for authoritative coverage of Nile-related issues and transboundary cooperation. It offers reliable data, practical guidance, and good practices for enterprise journalism. It is equally valuable for other professionals within and beyond the Basin who wish to better understand the subject and engage meaningfully in the cooperation journey.

I thank WB/CIWA for funding this important project, and I commend all journalists who dedicate their craft to telling the Nile's story. May this Sourcebook serve as a trusted companion in your pursuit of clarity and truth on one of the world's most vital shared resources.

Finally, I acknowledge NBI's governance bodies — the Nile Technical Advisory Committee and the Nile Council of Ministers — whose commitment and strategic direction continue to guide the organisation's mission.



Dr Florence Grace Adongo,
Executive Director
Nile Basin Initiative (NBI)

Acknowledgments

This Sourcebook is a professional guide developed under the auspices of the Nile Basin Initiative (NBI) primarily for media practitioners, to promote accurate and informed reporting on the Nile River. It aims to enhance journalists' and editors' understanding of the River, its ecosystems, and regional cooperation among the 11 riparian countries.

The Nile Basin Initiative is grateful to a selected group of journalists, its own specialist staff in water resource management and contributors from the Nile Basin Discourse and the Nile Basin Media Network for their participation in compiling this product.

INTRODUCTION

The Nile is one of the world's most iconic and historically significant rivers – a cradle of civilisation that has supported human development for millennia. Stretching approximately 6,695 kilometres, it is the longest river on Earth, flowing Northward and traversing 11 countries across northeastern and eastern Africa (NBI, 2020). Its entire Basin, the fourth largest globally, spans an area of approximately 3.2 million square kilometres (NBI, 2020 & Williams et al., 2015).

The Nile holds exceptional economic, environmental, and cultural importance for the 11 riparian countries – Burundi, the Democratic Republic of Congo (DR Congo), Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda. Its extensive ecosystem is home to a diversity of flora and fauna, including numerous species of fish, birds, mammals, and plants, making it one of the most vital and complex freshwater systems in the world.

Beyond its ecological richness, the Nile is a crucial source of livelihoods for more than 300 million people within its Basin. This figure represents nearly 20 percent of Africa's projected population of 1.5 billion by 2025 (UN estimate), highlighting the River's central role in shaping the region's socio-economic landscape.

However, this lifeline is under severe threat. Climate change impacts, rapid population growth, and environmental degradation are accelerating pollution and resource scarcity, threatening both ecosystems and livelihoods.

Now more than ever, journalists and the media must prioritise reporting on the Nile and its Basin. The media has a critical role in raising awareness about good and sustainable management of transboundary waters. But beyond informing the public, the media has a duty to champion regional cooperation to secure the River's sustainability for the benefit of both the current and future generations.

There is a way living things – such as plants and animals – live and interact with each other and with their non-living environment – such as air, water and soil – to create a balanced system. This is what scientists mean when they talk about an ecosystem or ecological system.

1.1. The Purpose of this Sourcebook

Journalists usually face challenges including limited access to sources and reliable information, difficulty in interpreting scientific and technical data, limited resources for in-depth reporting, insufficient specialisation in water journalism, and the high staff turnover in newsrooms. The rise of online journalism and digital influencers has also complicated the media landscape, making consistent and accurate reporting a challenging task.

This book has been developed to strengthen journalists' capacity to effectively report on the Nile Basin. It is a reference guide designed to:

- I. Deepen understanding of the iconic River Nile and its ecosystems, related environmental challenges and socio-economic implications, the River's place in the world and the region, as well as matters related to Basin-wide cooperation
- II. Facilitate accurate, fact-based reporting, and understanding of water resources management and development-related scientific concepts and terminologies
- III. Introduce the Nile Basin and the Nile Cooperation to new journalists
- IV. Provide a central repository for key information about the Nile.

1.2. Process of Developing the Sourcebook

This Sourcebook was developed in various stages, including a document review and qualitative research through online questionnaires. A consultative workshop with senior journalists and water resource experts provided further inputs and knowledge for the enrichment of the Sourcebook. The process also involved a review by the management of the Nile Basin Media Network.

1.3. Target Audience

This book is useful for journalists, editors, local or international media outlets interested in environmental, socio-economic, cultural and political issues in the Nile Basin.

The book is also a critical resource for other professionals and entities interested in the Nile Basin. These include students, academicians and researchers, policy makers, as well as civil society and non-government organisations.

1.4. Structure of the SourceBook

While this Sourcebook may not provide exhaustive details, it offers essential information to boost journalists' general understanding of the Nile and facilitates access to additional sources of information.

Part 1 Introduces the Sourcebook, offering brief yet crucial information and key facts that journalists can use in their day-to-day reporting on the Nile.

Part 2 Explains the significance of the Nile River and its ecosystems, highlighting their critical importance to the people and economies of the riparian States.

Part 3 outlines the major challenges affecting the Nile River and its ecosystems. This section intends to deepen the reader's understanding of these pressing issues and encourage further exploration of sustainable solutions.

Part 4 Provides a historical perspective on regional cooperation efforts. It reviews the current

Cooperative Framework Agreement (CFA) as well as colonial-era treaties and other post-independence cooperation arrangements.

Part 5 Offers insights for effective reporting on the Nile Basin. This section includes guidelines and additional reference materials to help journalists improve their coverage. It also features a list of some credible sources of information to support thorough and accurate reporting.

Part 6 Concludes with a glossary.

1.5. Quick Facts about the Nile River

The following are the key facts about River Nile, extracted from the *State of The River Nile Basin* 2021 report:

- 1) The Nile is the longest river in the world. It flows for 6,695 km through 11 countries until it drains into the Mediterranean Sea.
- 2) On its way from the Equator to the Mediterranean Sea, the landscape becomes more even, the climate turns warmer, water resources become scarcer and more variable (amount fluctuates according to season) and there are fewer plant and animal species. These and other factors have determined where and how humans have developed the Basin's water and land resources.

This map illustrates the Nile River Basin, highlighting its sub-basins and wetland cover. The basin is divided into several sub-basins, each outlined in orange: the Main Nile, White Nile, Blue Nile, Tekeze Atbara, Bahr el Ghazal, Baro Akobbo Sobat, and Victoria Nile. Wetland cover is indicated by green areas, primarily concentrated in the Blue Nile, Bahr el Ghazal, and Victoria Nile sub-basins. The map also shows the political boundaries of the countries within the basin: Egypt, Sudan, South Sudan, Ethiopia, Eritrea, Uganda, Rwanda, Burundi, Tanzania, Kenya, DR Congo, and Chad. Major cities are marked with black squares, including Cairo, Khartoum, Asmara, Addis Ababa, Juba, Kampala, Kigali, Bujumbura, and Nairobi. The Mediterranean Sea is visible to the north, and the Indian Ocean to the east. A legend in the top right corner defines the symbols used: Capital city (black square), River (blue line), Boundary (black line), International (dashed line), Disputed (dashed line), Wetland cover (green area), Sub-Basins (orange outline), and Water body (blue area). A scale bar at the bottom left indicates distances in kilometers (0, 150, 300, 600). An inset map in the top left corner shows the location of the Nile River Basin within the African continent.

TABLE 1: A QUICK OVERVIEW OF THE MAIN FACTS ABOUT THE NILE BASIN

	Description	Source of Information
Length	6,695km (Lake Victoria to Mediterranean Sea)	NBI, 2020
Basin Area	3,200,000 square kms	NBI, 2020
Location	Eastern Africa and Northern Africa	NBI, 2020
Riparian Countries	Burundi, DR Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, Uganda	
Eastern Nile Basin	The part of the Nile River Basin that drains from the eastern part of the Nile Basin. It includes parts of Egypt, Eritrea, Ethiopia, South Sudan, and Sudan.	
Nile Equatorial Lakes	The part of the Nile River Basin that drains from the southern part of the Basin past the Sudd region. It includes Lake Victoria, Victoria Nile, Albert Nile, Bah El jebel, Bahr El Ghazal, and the White Nile.	
Sub-basins	Lake Victoria (Burundi, Kenya, Rwanda, Tanzania & Uganda); Victoria Nile (Uganda); Albert Nile (DR Congo & Uganda); Bahr El Jebel & Bahr El Ghazal (South Sudan); White Nile (South Sudan & Sudan); Baro-Akobo-Sobat (Ethiopia, South Sudan & Sudan); Blue Nile (Ethiopia & Sudan); Tekeze-Atbara (Eritrea, Ethiopia & Sudan); and the Main Nile (Egypt & Sudan).	
Major Natural Lakes	Victoria, Kyoga, Albert, Edward and Tana	NBI, 2020
Total Population of 11 Nile Countries	600,230,520	World Bank, 2023; UBOS, 2024
Population within the Basin	300 million	NBI, 2020

3) Tributaries

The White Nile and the Blue Nile are the two main tributaries of the Nile River. The Blue Nile originates in the Ethiopian Highlands. The White Nile originates in Lake Victoria and flows north through Uganda, DR Congo, and South Sudan until it meets the Blue Nile in Khartoum, Sudan to form the Main Nile.

Below the confluence, the only major tributary is the Takeze-Atbara that descends from the northern part of the Ethiopian Plateau, passing along Ethiopia-Eritrea border and joins the Nile north of Khartoum.

Figure 2: The Nile Confluence in Khartoum, Sudan



The White Nile with its sub-catchments of Lake Victoria, Victoria Nile, Albert Nile, Bahr El Jebel, Bahr El Ghazal and Baro-Akobo-Sobat contributes 15 percent of the Nile waters. The remaining 85 percent of the Nile's flow is mainly from the Blue Nile with considerable contribution from Tekeze-Atbara. This makes Blue Nile the main source of water for the downstream riparian countries, Egypt and Sudan. The total water of the Nile annually is in the order of 85-94 billion cubic meters (BCM) as measured at High Aswan Dam in Egypt.

While the White Nile contributes less water than the Blue Nile, its annual discharge is stable throughout the year. The Blue Nile and Tekeze-Atbara are highly seasonal, with around 75 percent of the total annual yield generated between July and October. During the other periods of the year – from November to June – the White Nile becomes the dominant contributor, providing 70 percent to 90 percent of the Nile's total discharge.

1.6. Physical Geography and Drainage Network of the Nile Basin

It is estimated that the Nile Basin covers about one-tenth of the surface of the African continent, draining 3,200,000 km² in total. The Nile Basin comprises three sub-systems that have distinctive characteristics:

The Eastern Nile sub-system: This part of the Nile River Basin drains from the eastern part of the Nile Basin. This covers the catchments of the Blue Nile – Abay, Tekeze-Atbara, and Baro-Akobo-Sobat past the White Nile. It encompasses large parts of the Ethiopian Highlands past Eritrea border and the plains of the eastern region of South Sudan and Sudan.

The Equatorial Lakes and the Sudd: This section drains from the southern part of the Nile Basin past the Sudd region. This is the region where Burundi, DR Congo, Kenya, Rwanda, Tanzania, and Uganda as well as most of South Sudan are located. It covers the entire watershed (see glossary for definition) upstream of the Sobat–White Nile confluence. It includes the Equatorial Lakes region, which encompasses Lake Victoria (involving Burundi, Kenya, Rwanda, Tanzania and Uganda); Victoria Nile in Uganda (passing through lakes Kyoga, George, and Edward); Albert Nile (flowing out of Lake Albert in Uganda to the South Sudanese border); as well as the Bahr El Jebel and Bahr El Ghazal in South Sudan that form the main stem of the White Nile and the largest tropical wetland, the Sudd Wetland.

The Main Nile and the Nile Delta: This encompasses the downstream River reach, starting at the Blue Nile–White Nile confluence at Khartoum, joins downstream by Tekeze-Atbara from Ethiopia-Eritrea border and the river streams through Sudan and Egypt before its outfall into the Mediterranean Sea, forming Nile Delta at Alexandria, Egypt’s second largest city. The Nile Delta is an extensive wetland system accommodating lakes, freshwater and saline wetlands, and seashore areas that the Egyptians intensely cultivated through irrigated agriculture, including fish farming.

1.7. How the Nile Was Formed

Stretching from equatorial regions in East Africa to the hyper-arid deserts of Egypt and Sudan, the Nile is an exotic River (one flowing through regions that do not generate its water) (Woodward et al., 2022). The River shaped over millions of years by a combination of tectonic, climatic, and hydrological forces.

It is said that the name Nile is derived from the Greek word Neilos that was used in Greek drama to stand for the Nile, which means “of unknown origin” (Mamdouh Shahin, 1985).

The Nile’s origins are traced to the period when tectonic forces formed highlands and valleys that directed the River’s northward course (Adamson, 1982; Adamson et al., 1993).

Although there is no consensus on exactly when the Nile’s current form emerged, various scholars propose periods ranging from 33.9 to 23.03 million years ago – Oligocene to the Pleistocene period – (Issawi & Farouk, 2023).

While the Ethiopian Highlands have been delivering water to the Mediterranean Sea through the Nile for at least 30 million years, as evidenced by deep marine deposits in the Nile Cone (Fielding et al., 2018), there are conflicting accounts about the evolution of the White Nile.

Tectonic forces are the geological forces that cause changes and movements within the Earth’s crust, including earthquakes, volcanic activity, and mountain building. On the other hand, hydrological forces are the natural processes and factors that drive the movement and storage of water on, above, and below the Earth’s surface. These forces include precipitation, evaporation, and the physical and chemical interactions that shape the water cycle.

Figure 3: Victoria Nile in Uganda



Some of the latest research has suggested that the White Nile emerged 25,000 – 500,000 years ago (Smith & Hurst, 2025; Williams, 2019) yet earlier reports had indicated that an integrated south-to-north Nile system likely dated back to the Early Miocene period – 23.03 to 15.97 million years ago – (Adamson & Williams, 1980).

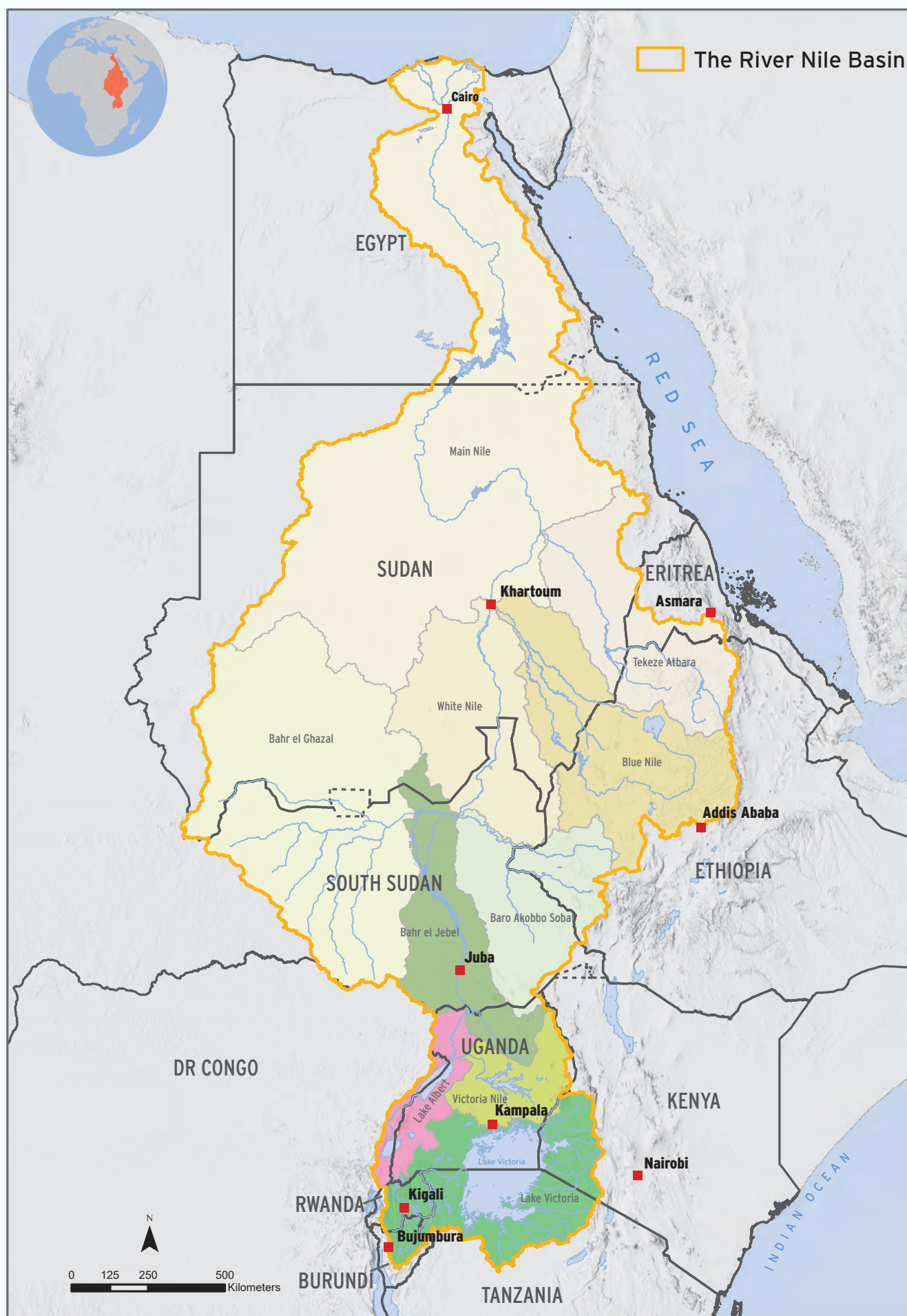
What is clear, though, is that while the southern headwaters of the White Nile arose from rocks uplifted during the Earth's formation (Precambrian) in the Equatorial Lakes region (DR Congo, Kenya, Uganda) (Woodward et al., 2022), the White Nile and its key source, Lake Victoria, is geologically younger compared to the Blue Nile and Atbara rivers (Williams, 2019).

Smith and Hurst (2025) explain that roughly 25,000 years ago, the East African drainage basin developed a northward outlet into Lake Victoria. This overflow passed through the Sudd (in present-day South Sudan) and gradually formed a river channel connecting the southern and northern parts of the Nile, creating the unified Nile system we recognise today (ibid).

During the Late Glacial and Early Holocene periods (starting around 14,500 years ago), increased rainfall in the tropics led to the overflow of lakes Victoria and Albert, transforming the White Nile valley with perennial flows and vegetated floodplains (Williams et al., 2000; Talbot et al., 2000).

Studies show that despite interruptions over time due to climatic and tectonic shifts, the Nile has continually evolved as a dynamic river system, shaped by natural forces and feeding civilisations for millennia.

Figure 4: The Nile River Basin in Africa



1.8. Other Key Natural Features in the Nile Basin

Beyond the Nile River itself, the Nile Basin is endowed with a range of significant natural features, including expansive lakes and ecologically rich wetlands. The most notable are Lake Victoria, the Sudd wetland, Lake Tana, Machar Marshes, Kagera River, and the Blue Nile Falls.

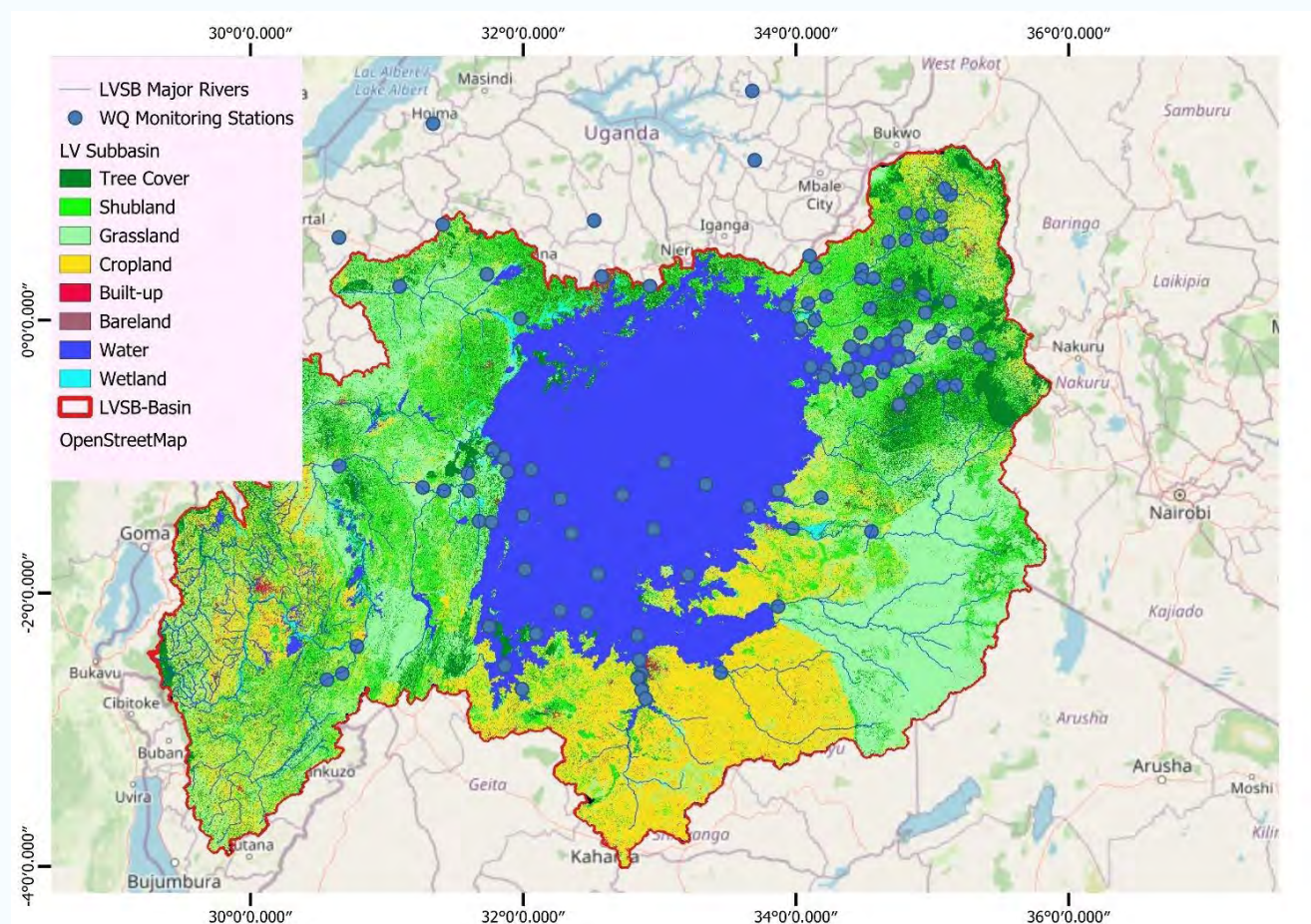
Lake Victoria: Africa's Largest and World's Second-Largest Freshwater Lake

Lakes account for approximately 3 percent (about 95,926 km²) of the Nile Basin's open water area (NBI, 2012). Major lakes in the Basin include Victoria, Albert, Edward, George and Kyoga, located in the Equatorial Lakes Plateau, and Lake Tana in the Ethiopian Highlands. In the desert zone, Lake Nasser/ Nubia stands out as the only large lake, created by the construction of the Aswan High Dam.

Lake Victoria is the most prominent of all these lakes. Covering a surface area of 68,800 km² and with a vast catchment of 193,000 km², Victoria is the largest natural lake in Africa and the second-largest freshwater lake globally after Lake Superior in North America (Hamza, 2014).

Lake Victoria spans a shoreline of about 3,450 km, has an average depth of 40 meters, and reaches a maximum depth of 80 meters (Hamza, 2014). Its waters are shared among Kenya (6 percent), Uganda (43 percent), and Tanzania (51 percent) (ibid).

Figure 5: Lake Victoria Sub-basin location Map indicating land use/cover



As the primary reservoir of the White Nile, Lake Victoria plays a vital hydrological role. Although rainfall over the lake is largely balanced by evaporation, most of its outflow – approximately 23 BCM annually – originates from rivers feeding it, especially the Kagera River (Smith & Hurst, 2025).

The Lake is home to more than 500 fish species and sustains one of the world's largest inland fisheries, yielding around 1 million metric tonnes of fish annually (NBI, 2012; Witte et al., 2009). Nile perch, Nile tilapia, and silver cyprinid dominate its commercial catches. The Lake also serves multiple other purposes including hydropower generation, domestic water supply, tourism and recreation, and as a receptor of municipal and industrial wastewater.

The Sudd: The Largest Tropical Wetland in Africa

Wetlands cover approximately 1.1 percent of the Nile Basin, comprising diverse ecosystems such as montane bogs, swamp forests, riverine wetlands, and seasonally flooded grasslands (NBI, 2012). The most expansive wetland system is the Sudd in South Sudan, which is one of the largest tropical wetlands globally.

Situated at the confluence of the White Nile tributaries, the Sudd encompasses the Bahr el Ghazal, Bahr el Jebel, Sobat–Baro–Pibor, and Machar marshes. Spanning about 57,000 km² and extending over 900 km from Juba to Malakal, it covers nearly 10 percent of South Sudan's land area (NBI, 2012; Wilusz et al., 2017).

Figure 6: Central View of the Sudd Wetlands



Recognised as a Ramsar Site, the Sudd holds international ecological significance. It provides vital habitat for a variety of wildlife, including endangered species such as cheetahs, white addax, Grevy's zebra, African wild dogs, hippopotamuses, sitatunga, and marsh mongooses. White-eared Kobs undertake long migrations across its grasslands, while elephants move locally with the shifting water levels. Giraffes also wade through the wetland's flooded areas, which offer crucial dry season grazing grounds for migratory mammals (NBI, 2024).

Over 350 plant species, 100 mammalian species, 470 bird species, 100 fish species, an unknown number of reptilian and amphibian species, and 120 species of insects inhabit the Sudd (NBI, 2022)

The wetland is also a key wintering ground for Europe's migratory birds, supporting millions of individuals from species such as the great white pelican, black-crowned crane, whiskered tern, glossy ibis, marabou stork, African open bill, cattle egret, and spur-winged goose. It is estimated to host over 80 percent of the global population of the iconic shoebill stork (NBI, 2012).

The Sudd also provides food, such as fish, game, and wild fruits along with freshwater, medicinal plants, and materials for construction. Its seasonally flooded grasslands are especially critical for year-round livestock grazing, owing to the high protein content of its dry grasses (NBI, 2024). The wetland has the potential to sustainably yield up to 300,000 tonnes of fish annually and supports around 1 million cattle, sheep, and goats, mainly grazing on the nutrient-rich toic (NBI, 2012). The estimated value of the Sudd wetland was \$3,286,019,767 in 2019, over a quarter of the South Sudan's annual GDP (NBI, 2020).

Figure 7: Lake Tana in Ethiopia



Lake Tana

Lake Tana is Ethiopia's largest lake, covering a surface area of 3,100km² and accounting for nearly 50% of the country's freshwater resources (ENTRO, June 2009; Stave et al., 2017). The lake has a maximum depth of 14 metres and hosts several minor islands, along with two major volcanic islands (NBI, August 2022).

Situated in Ethiopia's northern highlands, Lake Tana and its wetlands form the source of the Blue Nile. The wetland area extends across approximately 3,050km² and belongs to the Afro-tropical wetland system (NBI, August 2022). The basin experiences a single rainy season from May to October, peaking in July and August, with rainfall reaching up to 2,000 mm in good years (NBI, August 2022). The lake is fed by seven large permanent rivers and about 40 seasonal streams, the main tributaries being Gilgel Abbay (Little Nile), Megech, Gumara, and Rib. Wetlands such as Yiganda and Welala directly connect to the lake in the wet season, while others like Fidiamba and Infraunz link through flooding and river inflows.

The Lake Tana wetlands serve as the "kidneys" of the landscape, playing vital roles in sediment retention, flood regulation, and water purification. They also provide breeding grounds for fish species such as Nile Tilapia and habitats for numerous bird species (Stave et al., 2017). These wetlands, the largest in Ethiopia, consist of permanent swamps, seasonal swamps, and floodplains. They act as nurseries for most fish populations and are critical for waterfowl and mammal breeding (Vijverberg et al., 2009).

The area is a biodiversity hotspot, home to globally threatened species. The 40-metre-high Tisisat Falls, located 30km downstream of the Blue Nile outflow, isolate the lake's freshwater fauna from the rest of the Nile system (NBI, August 2022). Unique fauna include the endemic Fogera cattle, adapted to marshy conditions with broad hooves.

Lake Tana is also an Important Bird Area, hosting over 150,000 birds in winter counts (NBI, August 2022). Notable species include the Wattled crane, Lesser flamingo, Rouget's rail, Pallid harrier, and Greater spotted eagle (Menbere & Menbere, 2018). Mammals in the area include Grivet monkey, Spotted hyena, Blue Nile patas monkey, Mongalla gazelle, Black-and-white colobus monkey, Hippopotamus and Crested porcupine.

Lake Tana and the Blue Nile provide critical economic, social, and ecological benefits to Ethiopia and downstream countries. Riparian communities rely on the lake for drinking water, irrigation, fishing, livestock watering, and recreation. The lake also facilitates transport between islands and lakeshore towns.

The lake underpins Ethiopia's development vision, supporting irrigation agriculture, hydropower (including the Tana Beles and national hydropower projects with expected capacities of 460 MW and 6,000 MW, respectively), fisheries, tourism, and biodiversity conservation (Stave et al., 2017). Around 2 million people lived in the Lake Tana catchment by 2009, including Bahir Dar town, while over 500,000 directly or indirectly depended on the wetlands (Vijverberg et al., 2009). Historically, the Blue Nile shaped ancient Egyptian civilization and remains central to the economies of Sudan and Egypt.

Despite its great ecological and socio-economic importance, human activity poses the greatest threats to Lake Tana and its wetlands. Key pressures include agriculture, leather tanning,

overgrazing, wetland drainage, vegetation clearance, water abstraction, waste dumping, and eucalyptus plantations (NBI, August 2022). These contribute to deforestation, erosion, sedimentation, reduced water levels, flooding, water pollution, and the spread of invasive species (Menbere & Menbere, 2018 cited NBI, August 2022).

During the dry season, falling lake levels expose land that farmers cultivate. In southern Bahir Dar, wetlands retain water for about four months and host Ethiopia's largest rice production area (NBI, August 2022).

Machar Marshes (Baro, Akobo and Sobat Rivers)

The Machar Marshes, located east of the Sudd in South Sudan, form the largest wetland in the Baro-Akobo-Sobat (BAS) sub-basin of the Nile. Covering an area that extends roughly 200 km north–south and 180 km east–west, the marshes are primarily sustained by the Baro River in southwestern Ethiopia, which spills into the wetland during peak floods between July and September. Additional inflows come from tributaries such as the Yabus and Dagga (Mohamed, 2016; NBI, 2022). Because the terrain has extremely flat slopes of less than 1%, only a limited portion of this water drains into the White Nile through the Khor Adar (Mohamed, 2016).

The marshes exist as a result of Baro overflows, eastern highland torrents, and local rainfall (Mohamed, 2016). Streams descending abruptly from the Ethiopian Highlands fan out across a flat plain, dispersing into a network of minor channels. According to NBI (2024), there are four main hydrological pathways feeding the Machar Marshes:

1. Overbank spill from the Baro River during high flows between June and November, including contributions via the Khor Machar;
2. Inflows from eastern torrents such as the Tombak, Yabus, and Daga through the Khor Daga;
3. A tributary of the Khor Machar that parallels the Sobat before becoming the Khor Tiebor and later the Khor Wol; and
4. Direct rainfall over the marshlands.

The Khor Adar and Khor Wol serve as the main drainage routes, eventually joining the White Nile.

The wetland comprises vast swamps and seasonal floodplains, interwoven with a complex network of channels and lakes. Runoff and drainage from the Ethiopian Highlands spread across the system before converging towards the White Nile below Malakal. Like the Sudd, the marshes expand and contract seasonally, depending on rainfall levels. They support rich biodiversity and serve as critical grazing grounds for Nilotic communities in South Sudan (Hughes & Hughes, 1992 cited in NBI, 2024).

Average rainfall in the marshes is about 933 mm annually, with a distinct rainy season from May to September (NBI, 2024). Estimates of the wetland's size vary widely. Previous studies placed its extent between 1,500km² and more than 12,000km², reflecting challenges in mapping seasonal flooding (NBI, 2022). Hughes and Hughes (1992 cited in NBI, 2024) suggested a total of 900,000 ha, with 500,000 ha in South Sudan and 400,000 ha in Ethiopia's Gambela Valley.

Sutcliffe and Parks (1999) estimated between 150,000 and 600,000 ha depending on rainfall intensity and season. But more recent analyses indicate the marshes are largely seasonal, with evapotranspiration significantly lower than in the Sudd (Mohamed, 2016; Mohamed et al., 2004). These discrepancies highlight the limited scientific understanding of the system (NBI, 2024).

The ecological value of the Machar Marshes is immense. Any upstream diversion would reduce the extent of the seasonal floodplain, threatening livestock, wildlife, and local livelihoods (Rebelo & McCartney, 2012; NBI, 2022). Land cover in the area can be broadly divided into three zones: permanent wetlands, seasonally inundated floodplains, and dryland fringes (NBI, 2022).

The biodiversity is notable. Mammals include hippopotamus, sitatunga, Nile lechwe, white-eared kob, tiang, and oribi. The Baro River supports fish species such as Nile perch, Nile tilapia, and lungfish, while birdlife features Shoebill, Great white pelican, African openbill, Pel's fishing owl, and Ferruginous pochard (NBI, 2022).

For surrounding communities, the marshes are indispensable. They provide grazing land during the dry season, water, fish, construction material, and medicinal plants (Rebelo & McCartney, 2012). Yet rising population pressures have intensified farming and degradation. The Baro-Akobo headwaters also play a hydrological role, sustaining dry-season flows in the Sobat and the White Nile (NBI, 2022).

Culturally, the Machar Marshes are home to Nilotic groups such as the Dinka, Nuer, and Shilluk, alongside the Morlei and Anuak. These predominantly pastoral communities move seasonally with their cattle to the floodplains ("toich"). The marshes are also associated with the Mangala Ghazals, an ancient poetic tradition (Mohamed, 2016). Infrastructure remains sparse; during the rainy season, access is possible only by air, as tall grasses and shallow waters block road transport (Mohamed, 2016).

Kagera River

River Kagera, located in East Africa, originates from the highlands of Burundi and flows through Rwanda, Tanzania, and Uganda before entering Lake Victoria at Sango Bay in Uganda. It forms natural borders first between Rwanda and Tanzania and later between Tanzania and Uganda (Hagai, 2019). The river is regarded as the furthest source of the Nile and the major tributary feeding Lake Victoria (NBI, August 2022).

River Kagera stretches about 400 km and is formed by two headstreams: the Ruvubu, which rises north of Lake Tanganyika in Burundi, and the Nyabarongo, which rises in north-west Rwanda. These converge at Rusumo Falls near the Rwanda–Tanzania border, from where the River flows northwards along the border before bending east across a lowland floodplain in Tanzania and Uganda to enter Lake Victoria (altitude 1,145 m) (NBI, April 2022).

Along its course, the River drains the mountains of Burundi and Rwanda, then meanders north through a swampy valley with interconnected lakes before turning eastward near Kakitumba. It eventually enters Lake Victoria through a wide swampland along the mid-point of the lake's western shore (NBI, August 2022).

Kagera is by far the longest of the 23 rivers flowing into Lake Victoria (NBI, April 2022). It contributes about 7.5 km³ of water per year, equivalent to 34% of the total river inflow into the lake

– more than twice the contribution of the Nzoia River in Kenya. When rainfall and evaporation over the lake are factored in, this contribution falls to about 24% (Hagai, 2019; NBI, April 2022). Kagera is also estimated to provide 10% of the outflow from Lake Victoria into the Nile, making it vital for sustaining downstream flows (NBI, April 2022).

Kagera Basin covers approximately 59,700–60,500 km² and spans four countries: Burundi (23%), Rwanda (34%), Tanzania (35%) and Uganda (8%) (NBI, April 2022; NBI, February 2009). In Rwanda, the Basin occupies 75% of the national territory, while in Burundi it covers 52% (NBI, April 2022).

Kagera is one of the most densely populated basins in the Lake Victoria catchment. In 2019, about 14 million people lived in the Basin – almost 40% of the Lake Victoria Basin population – with densities averaging 227 persons/km², compared to 174 persons/km² in the wider Lake Victoria Basin (Hagai, 2019). By 2020, the population was estimated at nearly 21 million, with the highest density in Rwanda (525 persons/km²), followed by Burundi (490 persons/km²) while Tanzania has the lowest density (115 persons/km²) (NBI, April 2022). Ethnic groups within the basin include the Haya, Nyankole, Nyambo, Tutsi, Hutu, Gganda, Shubi, Zinza, and Waha (Hagai, 2019).

River Kagera sustains an extensive wetland system covering about 1,444km², including 500km² of open lakes (NBI, August 2022). These wetlands form a broad swamp belt, 2–18km wide, along the river's flat-bottomed valley below Rusumo Falls. The swamps are bordered by substantial papyrus-fringed lakes, more developed on the Rwandan side, some with seasonally inundated savannas. Few of these lakes have permanent links to the River (NBI, August 2022). Protected areas include 600 km² of swamp within Kagera National Park in Rwanda and 350 km² of wetlands in Tanzania (Hughes & Hughes, 1992 cited in NBI, August 2022).

The wetlands host a rich diversity of fauna and flora. Mammals include hippopotamus, sitatunga, roan antelope, African buffalo, waterbuck, African elephant, leopard, southern reedbuck, common duiker, and primates such as the black-and-white colobus monkey and a subspecies of the blue monkey (NBI, August 2022). The sitatunga is of particular conservation concern. Reptiles and amphibians include crocodiles, water turtles, snakes, and the *Phrynomantis bifasciatus* frog, which is restricted to the Kagera wetlands (Hughes & Hughes, 1992; Ramsar, 2019 cited in NBI, August 2022).

Fish diversity exceeds 12 species, including the critically endangered *Labeo victorianus* and the endemic *Synodontis ruandae*. Fishing is permitted in Lake Ihema within Kagera National Park under regulation, but elsewhere it is largely uncontrolled and overfishing is common (NBI, August 2022).

The Kagera Basin is heavily farmed: agriculture contributes over 90% of basin GDP and employs more than 95% of the population (URT, 2004 cited in Hagai, 2019). Food crops include bananas, cassava, maize, beans, sweet potatoes, yams, groundnuts, finger millet, and sorghum, while coffee and tea are the main cash crops (Hagai, 2019). Fishing, pastoralism, and wood logging are also key livelihoods.

The wetlands provide food security through fish and game meat, though wildlife has been depleted

in some areas due to overharvesting (NBI, 2019). Harvested water hyacinth is used as fodder and for crafts.

The Kagera wetlands also provide essential ecosystem services: reducing sediment load into Lake Victoria, controlling floods and erosion, recharging groundwater, and purifying water (NBI, 2019). They also support soil formation, pollination, and habitats for aquatic and terrestrial species.

Culturally, the wetlands are sites for religious and spiritual practices. Communities use swamp waters for baptisms, blessing rituals, and cleansing ceremonies intended to remove bad luck (NBI, 2019).

However, the river has experienced extensive land use and land cover changes due to agriculture, urbanisation, and deforestation. Drainage of tributary swamps for farming has caused erosion and reduced soil fertility (NBI, August 2022). Farmers report shorter and less reliable rains, while the spread of invasive water hyacinth has shrunk watercourses and lakes (Hagai, 2019). Rapid population growth has increased pressure for farmland, grazing, firewood, and charcoal, leading to forest loss and wetland degradation (NBI, 2019). These changes threaten the ecological processes that sustain the Basin and Lake Victoria.

Figure 8: River Kagera in Isingiro, Uganda



Mara Wetlands

The Mara Wetlands form an important transboundary system between Kenya (65%) and Tanzania (35%) (NBI, August 2022). The catchment covers 9,574 km², with the Mara River extending 198 km and averaging 5km in width (MEMR, 2012 cited in NBI, August 2022). Together, the Mara River and Mara Swamp constitute the two primary aquatic habitats of the basin, linked in a continuous system from the Napuiyapui Swamp in Kenya's Mau Forest Complex through Mara Bay into Lake Victoria at Musoma, Tanzania.

The Mara River originates in the Napuiyapui Swamp within the Mau Forest Complex. Its two perennial tributaries – the Amala and Nyangores rivers – drain the western Mau Escarpment. Seasonal tributaries include the Talek, Engare Nigoto, and Sand Rivers (NBI, August 2022). The river meanders through the globally renowned Masai Mara-Serengeti ecosystem before flowing into Lake Victoria at Musoma, Tanzania.

The Mara River is often described as the lifeblood of the Masai Mara-Serengeti ecosystem, which spans 25,000 km². This ecosystem not only sustains one of the world's greatest wildlife migrations but also plays a critical hydrological role, regulating both the quality and flow of water into Lake Victoria (MEMR, 2012 cited in NBI, August 2022).

The Mara wetlands encompass floodplain grasslands, woodlands, swamps, and open water, around half of which remain permanently inundated. The extent and composition of the wetlands fluctuate seasonally, expanding during the rainy seasons (September–December and March–June). Over the past three decades, the wetlands have doubled in size, encroaching into former shrubland and grassland (NBI, August 2022).

Dominant plant species include *Cyperus papyrus*, *Typha domingensis*, and *Phragmites australis*. The wetlands also underpin a vibrant fisheries industry dependent on inflows from the Mara River, with over 10 fish species of conservation and economic importance supporting local food security and livelihoods (Dickens, 2010 cited in NBI, August 2022).

The Mara wetlands host an exceptionally rich diversity of wildlife. They are home to high concentrations of non-migratory predators such as the African lion, leopard, cheetah, and spotted hyena. Other resident mammals include elephant, black rhino, Masai giraffe, Grant's gazelle, Thomson's gazelle, hippopotamus, sitatunga, olive baboon, vervet monkey, and warthog. Birdlife is equally diverse, with species such as the African pygmy goose, grey-crowned crane, grey parrot, shoebill, woolly-necked stork, martial eagle, and the papyrus yellow warbler (MEMR, 2012; Tetra Tech, 2017 cited in NBI, August 2022).

The wetlands lie along the route of the Great Migration, one of the most spectacular wildlife events in the world. Each year, more than 1 million wildebeest, 200,000 zebras, and 400,000 Thomson's gazelles move from the Ndutu Plains in Tanzania (April–May), reaching the Mara River in July or August, and crossing into Kenya's Masai Mara National Reserve by September or October (NBI, August 2022).

This migration is closely linked to water availability and quality. During severe droughts, which occur roughly every 6–7 years, the Mara River becomes the only reliable water source in the region, critical for the survival of migrating herds (NBI, August 2022).

Human activity is widespread in the Mara wetlands. Land use includes cultivation, livestock rearing, forestry, fishing, dairy farming, and gold mining. Agriculture dominates, with encroachment into over 100 km² of wetland. Overgrazing, burning to improve pastures, and deforestation in the upper catchment have degraded forests, grasslands, and savannah (Tetra Tech, 2017).

In the Mau Forest Complex, forest cover declined from 752km² in 1973 to 493km² in 2000, reducing both base flow and water quality in the Mara River (NBI, August 2022). These pressures have increased siltation, sediment and nutrient loads, and pollution in the lower basin.

The Mara wetlands provide essential ecosystem services: regulating flows into Lake Victoria, maintaining water quality, and supporting both local and migratory wildlife populations. However, growing human populations and intensifying land use threaten the abundance of species, biodiversity, water resources, and the resilience of the watershed system (NBI, August 2022).

Blue Nile Falls (Tis-Abay)

The Blue Nile Falls, locally known as Tis-Abay or Tis-Issat (meaning “Great Smoke” or “Smoking Water” in Amharic) stand among Ethiopia’s most iconic natural wonders. Situated in the West Gojjam zone of Amhara Province, the falls are located about 35 km southeast of Bahir Dar, near Lake Tana, and 587 km north of Addis Ababa, at an elevation of 2,744m (Nadew et al., 2022). Formed by the powerful flow of the Blue Nile, with an estimated 4 BCM of water annually (Setegn et al., 2008), the falls are the most formidable in the country.

Just 30 km downstream from Lake Tana – the source of the Blue Nile – the falls epitomise the raw force of the Ethiopian Highlands. Rising mist forms a cloud visible from miles away, while the thunderous roar of water plunging 45m creates an awe-inspiring spectacle. In the rainy season, the falls can expand to a width of nearly 400m, producing dazzling rainbows in the spray (Melesse, 2011).

The grandeur of Tis-Abay has long captivated travelers. Notable visitors include Scottish explorer James Bruce in the 18th century and Britain’s Queen Elizabeth II centuries later (Bruce, 1813 cited in Nadew et al., 2022). Today, the site is one of Ethiopia’s top tourist destinations, renowned for its scenic views, hiking trails, and cultural significance. Tourism linked to the falls plays a vital role in supporting local livelihoods, reinforcing the need for sustainable management.

Geographically, the falls mark a striking point where the Blue Nile cuts across a basalt escarpment within the Ethiopian Highlands. The river basin here spans roughly 63,000 km³, forming part of the larger Eastern Nile Basin that extends into Sudan and Eritrea (Kebede, 2013). This region is not only ecologically important but also central to Ethiopia’s hydrological system (Melesse, 2011).

Yet, the majesty of Tis-Abay is under growing threat. The Blue Nile Basin faces environmental pressures from climate variability, deforestation, and shifting land use (ENTRO, 2024). Soil erosion – driven by overgrazing, poor land management, and vegetation loss – is accelerating sedimentation in the river (Worku, 2008). This reduces water clarity, degrades aquatic ecosystems, and threatens the long-term stability of the falls. Increased sediment loads also erode the rock faces and damage tourism infrastructure such as trails and viewing platforms.

Unless soil conservation and watershed protection are prioritized, the ecological and economic

value of the falls could decline sharply. Therefore, protecting the headwaters and promoting responsible tourism are critical not only for preserving biodiversity and water quality but also for sustaining the livelihoods that depend on this extraordinary natural site.

1.9. Opportunities in the Nile story

As water, land, and other vital resources increasingly become scarce, public interest in the Nile will intensify. People will seek information on the threats to the Nile ecosystems and their governments' efforts to protect the River. In particular, Nile Cooperation will become a key focus across the region.

This presents a crucial opportunity and responsibility for media managers, editors, and journalists to lead the conversation. Strategic, accurate, and solution-driven reporting can raise awareness, influence policy, promote sustainable practices, and drive regional cooperation and collective action. From households to policymakers, responsible journalism can bridge knowledge gaps, drive positive change, and support sustainable resource management.

SIGNIFICANCE OF THE NILE

The Nile is the only river that flows through the Sahara, the largest arid region on Earth. While most rivers and streams in the Sahara are seasonal or intermittent, the Nile remains the primary water source for Egypt and Sudan (Soghayroun, 2009).

Along its long journey, the Nile supports the livelihoods of more than 300 million people living within its Basin. This accounts for approximately 54 percent of the total population in these nations (NBI, 2020). This section examines the significance of the Nile River in three key dimensions: 1) Economic Importance, 2) Environmental Importance, and 3) Cultural Importance.

2.1. Economic Importance

2.1.1. Electricity

Governments across the Nile Basin are increasingly harnessing the River's flow to generate hydroelectricity, an essential driver of industrialisation, job creation, and economic growth (Crerar & Azza, 2022). The history of large-scale hydropower development along the Nile dates back to 1902 with the completion of Egypt's Aswan Old Dam, the first major dam on the River. Documented by Ana Elisa Cascão in 2009, other landmark projects such as Sudan's Sennar Dam (1925-1927) & Roseires Dam (1961-1966) on the Blue Nile, and Khashm el-Girba Dam (1964) on Tekeze-Atbara; Egypt's Aswan High Dam (1959-1970); Uganda's Owen Falls Dam, later renamed Nalubaale Dam (1954) & Bujagali Dam (2008-2012); Ethiopia's Tekeze-Atbara Dam (2009); and the Sudan's Merowe Dam (2002-2009) on the Main Nile followed, collectively laying the ground for modern hydropower infrastructure in the Basin.

A more recent and significant project is the Grand Ethiopian Renaissance Dam (GERD), launched in 2011 on the Blue Nile. The GERD began generating electricity in 2022 and was inaugurated in September 2025, with an installed capacity of 5,150 megawatts (5.15 GW) and a reservoir capable of storing 74 BCM of water (Crerar & Azza, 2022). That makes it the largest dam by power capacity in Africa, though still outside the top 10 globally (AFP, 2025). Other dams are Uganda's Isimba (2013-2019) and Karuma (2013-2024) hydropower stations on the Victoria Nile.

Further, under the auspices of NBI through NELSAP-CU, the Rusumo Falls Hydroelectric Project (2017-2024) on the major tributary of Lake Victoria, the Kagera River, was built as a joint venture by Burundi, Rwanda, and Tanzania.

Figure 9: Rusumo Falls Hydroelectric Power Dam, jointly owned by Burundi, Rwanda and Tanzania



As of July 8, 2024, the Nile Basin Dams Database [<https://dams.nilebasin.org/>] comprised a total of 813 power-generating dams (existing, under implementation and planned) across the nine NBI countries – Burundi, DR Congo, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda. The combined output of these dams plays a significant role in boosting the region’s electricity supply, reducing dependence on fossil fuels, and helping to alleviate energy poverty.

Electricity generated from the Nile is vital for powering homes, industries, irrigation systems, and urban centres. It supports manufacturing, agro-processing, and digital infrastructure, while also enabling some countries to export surplus electricity to neighbours through regional power pools, which strengthens cross-border trade and economic integration (NBI, 2020).

However, electricity supply across most Nile Basin countries remains inadequate, unreliable, and costly. Nearly half the population lacks access to electricity, while over 90% depend on traditional biofuels—such as firewood, charcoal, and agricultural or animal waste—for cooking.

Despite an estimated hydropower potential of 31,000 MW in the region, only 42% has been harnessed. Therefore, accelerating hydropower development is urgent. Interconnecting national power grids and promoting regional power trade are also key to building a robust, flexible, and efficient energy infrastructure — one that can meet the region’s growing energy demands while improving sustainability and reliability.

Other functions of the power dams

In addition to generating electricity, dams constructed along the Nile serve other essential functions that contribute to economic development, environmental management, and social well-

being. One of their main roles is water storage, which ensures a reliable supply for irrigation, particularly during dry seasons. This enables year-round agriculture, a critical factor for food security in countries such as Egypt and Sudan, where farming is heavily dependent on the Nile's waters (Crerar & Azza, 2022). Large reservoirs such as Lake Nasser – formed by the Aswan High Dam – store vast volumes of water for domestic, industrial, and agricultural use.

Reservoirs created by these dams also support inland fisheries, which provide both food and income for local communities. For example, Lake Nasser serves as a major fishing ground, sustaining thousands of livelihoods in the sector (NBI, 2020). In addition, dams play a key role in flood control by regulating the Nile's flow, thereby protecting surrounding communities, agricultural lands, and infrastructure. The Aswan High Dam has been particularly effective in this regard, significantly reducing the seasonal flooding that once posed recurring threats to Egypt and enabling more effective land use planning and development (Crerar & Azza, 2022).

Moreover, dams enhance river navigability by maintaining consistent water levels, facilitating the movement of goods and people. This supports trade and commerce along the Nile, reduces transportation costs, and improves regional connectivity.

Dams also contribute to tourism and recreation: the reservoirs and associated infrastructure often become attractions in themselves, while creating opportunities for boating and sightseeing. The Aswan High Dam and Lake Nasser in Egypt, and the Nalubaale and Bujagali dams in Uganda, are notable examples that generate local tourism revenues (NBI, 2020).

2.1.2. Agriculture

Agriculture – including crop production, animal husbandry, and fisheries – remains a cornerstone of economic and social development across the Nile Basin. It contributes between 12 percent and 43 percent to national GDP, provides employment for 32 percent to 94 percent of the labour force, and plays a vital role in ensuring food security (NBI, 2012). Beyond food production, agriculture supports agro-industrial development and promotes regional integration through trade. Over 60 percent of poor households in the Basin depend primarily on agriculture for their livelihoods (ibid).

Historically, the Nile River has been integral to agriculture in the region. Its annual floods deposited nutrient-rich silt across floodplains, enriching the soil and enabling crop cultivation in arid areas such as Egypt and Sudan (El-Behaedi, 2024). The stark contrast between the fertile green banks and the surrounding desert landscapes illustrates the River's significant impact on land productivity. This natural process supported the rise and sustainability of civilisations along the Nile for millennia.

The River's significance is particularly evident in Egypt, where the Nile Delta – formed by centuries of silt deposition – continues to serve as the country's main agricultural hub. With over 96 percent of Egypt classified as desert, an estimated 95 percent of the population lives and farms along the Nile (Goldschmidt & Hopwood, 2025). Currently, the cascade of hydropower facilities has significantly reduced silt transport downstream.

Beyond natural flooding, irrigation systems play a vital role in expanding agricultural production in the Nile Basin. While over 87% of cultivated land still depends on rainfall, approximately 4.9 million hectares are irrigated – often through large-scale schemes exceeding 1,000 hectares (NBI, 2012). Agriculture remains the largest consumer of water in the basin, with irrigation alone accounting for about 78% of the Nile’s peak flow at Aswan. Notably, 97% of all irrigated land is located in Egypt and Sudan, while upstream countries account for just 3%. These irrigation systems support both subsistence and commercial farming, contributing to food security and generating export revenues through high-value crops.

Despite these efforts, food security remains a pressing challenge. Agricultural production has not kept pace with population growth, leading to increasing levels of undernourishment. None of the Nile countries is food self-sufficient; all are net food importers. Except for Egypt, undernourishment is prevalent across the region, with serious implications for poverty reduction, economic development, and public health.

Rainfed agriculture, which dominates the Basin, is characterised by smallholder farms, low input use, and low productivity—further exacerbated by the impacts of climate change. Although the total area under irrigation is estimated at 6.6 million hectares, more than 90% of this lies in just two countries, Egypt and Sudan, highlighting the uneven distribution of irrigation infrastructure. Strengthening regional cooperation on irrigation and agricultural development is essential. It provides a platform for coordinated planning and sustainable management of the basin’s most water-intensive sector. Moreover, joint efforts can help address regional food insecurity while minimising the environmental impacts of irrigation—ensuring the protection of biodiversity, water quality, and ecosystem health.

2.1.3. Fishing

The fisheries sector, too, is a vital component of the Nile Basin economy. The Nile River drainage system – including its interconnected network of rivers, lakes, wetlands, and floodplains – supports one of the most diverse and economically important freshwater fisheries in Africa. More than 800 fish species have been identified across the Basin, with 128 species from 27 families found within the Nile River itself (El-Sayed, 2017). Among these are species such as the sharp-toothed tiger fish and the Nile perch – the largest freshwater fish in Africa. In 2013, a record-breaking 114kg Nile perch was caught in Uganda’s Murchison Falls National Park, although local anglers often report catches exceeding 160kg (UWA, 2024).

The Nile's aquatic ecosystems support this productive sector. Between 1991 and 2007, 12 major water bodies within the Nile River drainage system – the Albert Nile, Kazinga Channel, Sudd Swamps, and lakes Victoria, Kyoga, Albert, Edward, George, Nubia, Tana, Manzala, and Borullus – collectively yielded an estimated 1.7 million tonnes of fish annually (Witte et al., 2009). Lake Victoria alone contributed more than half of this output in 2005, producing over one million tonnes of fish.

Fisheries in the Nile Basin are essential for not only ensuring food security and nutritional health, but for supporting livelihoods and contributing significantly to the region's socioeconomic development. They provide income, employment, and foreign exchange earnings for millions of people. Lake Victoria's fisheries sector alone employs around 500,000 people across Uganda, Kenya, and Tanzania (Fulgencio, 2009). Fish, particularly Nile perch, has been one of Uganda's top foreign exchange earners among non-traditional exports. In 2001 alone, Uganda exported around 28,000 metric tonnes of Nile perch, valued at approximately US\$78 million (Hamza, 2014).

Other Nile Basin countries also rely heavily on fishing. In 2003, Sudan exported 1,629 tonnes of fish worth about US\$533,000 (Hamza, 2014). In Egypt, over 65,000 fishermen, and around 300,000 people in associated industries, depend on the fishing sector (ibid). Egypt also processes non-edible fish into 543 tonnes of fish powder annually for use as poultry feed supplements.

TABLE 2: ANNUAL FISH PRODUCTION IN MAJOR NILE BASIN WATER BODIES

Water Body	Estimated Annual Production (Tonnes)	Year
Lake Borullus	91,852	2020
Lake Manzala	82,500	2020
Lake Albert	335,475	2019
Lake Victoria	1,000,000	2014
Lake Tana	1,454	2011
Lake Nubia	5,100 (potential yield)	2003
Sudd Swamps	140,000	2021
All Egypt's inland water bodies (including Lake Nasser)	250,000	1999
Albert Nile	5,900	2012
Lakes Edward, George and Kazinga Channel	6,637	2020
Lake Kyoga	78,000	2022

Sources: Witte et al. (2009); Nakiyende, H. et al. (2020); Muganga, E. (2022); Taabu-Munyaho A, D. et al. (2012); FAO. (2021); Njiru, M. et al. (2014); Nakiyende, H. et al (2019); Mehanna, S. et al. (2023); Mehanna, S. et al. (2023).

The fish resources within the Nile's natural and artificial lakes are essential for food security, particularly in poor and food-insecure regions. Even in traditionally low-consumption countries like Ethiopia, fish plays a key dietary role during religious fasting periods (Witte et al., 2009). Fish is also a major source of affordable animal protein.

Figure 10: Fishermen at Rwenshama Landing Site on Lake George



2.1.4. Transport

The Nile River has long served as a vital transportation artery across the Nile Basin, offering a cost-effective, energy-efficient, and environmentally friendly mode of transport (NBI, 2022; and Mugume, 2018).

Historically, the Nile played a central role in regional commerce, especially during the colonial era. It facilitated the transport of raw materials such as cotton, coffee, and ivory from the interior of Africa to coastal ports for export. By the late 19th and early 20th centuries, the River bustled with activity as steamboats, barges, and dhows navigated its waters, integrating remote inland economies into global trade networks. The development of river ports and railways further entrenched the Nile's role as a commercial lifeline for the region.

A cataract is a section of a river characterised by shallow, rocky rapids that disrupt the smooth flow of water and hinder navigation

In Sudan, transport on the Nile was highly organised in the early 20th century. Dongola, the capital of Northern State, became a seasonal trade hub where two major networks converged – northward to Halfa and southward deeper into Sudan. This seasonal activity coincided with the date harvest and annual floods that rendered the cataracts temporarily navigable (Osman, 1984). Local products such as pottery, wooden artefacts, woollen goods, and spices were transported north and traded for dates, which were then shipped further north into Egypt (Soghayroun, 2009).

By the early 2000s, river transport remained significant, with around 3 million tonnes of cargo moved annually between Alexandria, Cairo, and Aswan (Abdel-Aziz, 2004). Additionally, Egypt's tourism sector thrived on the River, with over 290 cruise ships (known as floating hotels) operating between Luxor and Aswan, offering space for over 26,000 passengers.

Even today in South Sudan and Sudan, the Nile remains indispensable when a number of roads are impassable during the rainy season (May to November). Steam-powered vessels cover approximately 2,400 miles of navigable water, spanning the Main Nile, the Blue Nile, the Sobat River (reaching Gambela in Ethiopia), and the Al-Ghazāl River during high water periods (Smith & Hurst, 2025).

Egypt continues to rely heavily on the Nile as a transportation corridor, connecting its southern and northern regions. The River is navigable up to Aswan by sailing vessels and shallow-draft steamers, while thousands of small boats crisscross the delta and its canals. In urban areas like Cairo, water taxis, ferries, and private speedboats help residents avoid road traffic (El-Behaedi, 2024). Regular river services between Alexandria and Aswan serve both domestic freight and the tourism industry. Key transported goods include heavy equipment, coal (notably for the Aswan power plant), steel, wheat, and sugar (Elsayed et al., 2019). Egypt's inland ports are integrated with rail and road networks, facilitating the movement of cargo and passengers across the country and into regional markets.

The Nile River Navigation Report (NBI, 2022) - <https://nilebasin.org/node/11899> - identifies 13 major navigation stretches on the River. The stretches from north to south appear in Table 3 .

TABLE 3: THE 13 MAIN NAVIGATION STRETCHES OF THE NILE RIVER

STRETCH	LOCATION	NAVIGABILITY
Main Nile in Egypt – Nile Delta to Aswan	Egypt	Fully navigable due to a diverse web of artificial canals
Lake Nasser (Lake Nubia) – High Aswan Dam to Wadi Halfa	Egypt-Sudan	Mostly navigable
Main Nile — Wadi Halfa to Khartoum	Egypt-Sudan	Very limited for the whole reach (due to cataracts and high slopes). It has some local navigation for relatively short reaches
Blue Nile – Khartoum to Renaissance Dam	Sudan-Ethiopia	Navigable during high water season
White Nile – Khartoum to Malakal	Sudan – South Sudan	Navigable but affected by low water levels
Sobat River	South Sudan	Navigable during high water season for light boats
Bahr el Jebel – Malakal to Juba	South Sudan	Navigable but Low & seasonal Navigation
Bahr el Jebel – Juba to Lake Albert	South Sudan – Uganda	Limited navigation and partly - Rejaf to Nimule - not navigable at all
Lake Albert	DR Congo - Uganda	Limited navigation. No significant commercial traffic in lake Albert Navigable at Ugandan side along a 200-km reach from its northern tip to its southern shores
Kyoga Nile	Uganda	Limited navigation (1 ferry crossing)
Lake Kyoga	Uganda	Not connected & limited navigation
Victoria Nile	Uganda	Limited navigation
Lake Victoria	Uganda-Kenya-Tanzania	Navigable

NOTE:

1. Between 2000-2010, inland waterways transported 114,000 tonnes of cargo and 13,000 passengers
2. Traffic across all public ports on Lake Victoria is estimated at 500,000 tones a year

SOURCE: NBI, 2020

Other Stretches with Navigation Potential

Several other stretches within the Nile Basin are either currently used for navigation by smaller barges or possess untapped navigational potential, though they remain isolated from the main Nile transport network. The main ones are as follows:

- Atbara River (Sudan)
- Lake Tana (Ethiopia)
- Baro River (South Sudan & Ethiopia)
- Akobo and Pibor River (South Sudan and Ethiopia)
- Bahr el Ghazal (South Sudan)
- Semliki River (DR Congo and Uganda)
- Kagera River (Rwanda)

However, despite the considerable potential for navigation, there is little use of water transport in the Nile region, especially in the headwater areas in the Ethiopian highlands, and Nile Equatorial Lakes region. Several challenges hinder the full potential of Nile navigation. In Sudan, for example, the River is navigable only in three disconnected sections due to cataracts north of Khartoum (Smith & Hurst, 2025). Seasonal flow variability also causes sharp fluctuations in water levels, while physical obstacles, such as sharp bends, dense aquatic vegetation, and limited water depth, hamper smooth passage. Several dams have been constructed along the Nile's course, many without locks, disrupting continuous river navigation. The River is spanned by 95 bridges, mostly in Egypt, which further complicate navigation for large vessels (NBI, 2022). Infrastructure limitations also remain a concern. Modern, well-equipped river ports are concentrated primarily in Egypt and the Lake Victoria region, while most other areas lack adequate bulk handling facilities, warehouses, fuel stations, and shipyards.

Enhancing the River's transport function requires comprehensive hydrographic surveys, the production of detailed navigation charts, the establishment of well-defined routes, and the installation of navigation aids such as buoys and beacons (Abdel-Aziz, 2004).

2.1.5. Recreation and Tourism

Beyond its essential roles in agriculture, urban development, industry, and transportation, the Nile River and its vast drainage system are central to the growth of tourism and recreational activities across the Nile Basin (Prideaux et al., 2009; and Shetawy, 2016). The River's breathtaking landscapes, dramatic waterfalls, and biologically rich ecosystems form the foundation for a thriving ecotourism sector and a growing adventure tourism industry.

The scenic beauty of the Nile, particularly in sections where the River cascades through forested gorges or winds through remote savannah, has made it a premier global destination for adventure travellers. Activities such as white-water rafting, bungee jumping, kayaking, canoeing, tubing, and boat cruises are popular along many parts of the River, particularly in Uganda. The Nile's world-class rapids have earned international acclaim among kayaking enthusiasts, with annual events like the Nile River Festival attracting professional athletes and adventure tourists from around the world (Egesa, 2017, cited in Williams, 2017). These events not only generate tourism revenue, they also help raise awareness about river conservation.

Figure 11: A local acrobat entertains tourists near Bujagali Falls in August 2010



In addition to adventure activities, the Nile serves as a critical migratory corridor for birds traveling from Europe to Africa. Every year between September and October, thousands of migratory birds arrive in Nile Basin countries, returning north around March and April. This seasonal movement has turned the River and its wetlands into hotspots for birdwatchers and a growing niche market in eco-tourism.

Besides, the ecosystems nourished by the Nile drainage system, including wetlands, forests, and savannahs, support a diverse array of ecotourism activities such as nature walks, wildlife safaris, and community-based tourism. These habitats are home to endangered species such as chimpanzees and mountain gorillas in DR Congo, Rwanda and Uganda, which draw thousands of international visitors annually.

Egypt stands as the most prominent example of the Nile's central role in tourism. The Nile is the backbone of Egypt's tourism sector, accounting for nearly 40 percent of service exports, 19.3 percent of foreign exchange earnings, and around 12 percent of GDP (Farag & El-Alfy, 2013; and

WTTC, 2019). The River acts as a natural corridor linking many of Egypt's most iconic attractions, including the Pyramids of Giza, the Valley of the Kings, and the ancient temples of Luxor and Aswan. Cruises along the Nile are a staple of the Egyptian tourism experience, offering visitors a tranquil journey through the country's cultural and natural heritage. Tourism also provides employment to approximately 12.6 percent of Egypt's workforce (Egyptian Tourist Authority, 2008, cited in Farag & El-Alfy, 2013).

Beyond Egypt, several other Nile Basin countries are witnessing steady growth in their tourism sectors. In Uganda, the Nile is one of the country's top tourism attractions. Tourists visit to witness the Source of the Nile and take part in activities such as boat cruises, diving, bungee jumping, and riverbank walks. Tourism is a major contributor to Uganda's economy, generating over \$1.6 billion annually (Kamoga, 2024). This growth has driven investments in tourism infrastructure, including hotels, campsites, walking trails, and eco-lodges (Kimbowa, 2014; and UTB, 2021).

In Ethiopia, the Nile also contributes to tourism through its integration with agricultural landscapes, historic sites, and cultural heritage. The Blue Nile Falls, monasteries along Lake Tana, and surrounding highland scenery are key tourist attractions tied to the River system (UNWTO, 2019).

Figure 12: Blue Nile Falls in Ethiopia



2.2. Environmental Importance

The Nile River plays a critical role in sustaining a wide array of plant and animal life by supporting diverse natural habitats and ecosystems. Its vast network of tributaries, wetlands, and forests helps regulate water flow across the region. These natural systems act as water reservoirs, storing moisture and gradually releasing it as rainfall during dry periods, thereby maintaining river flow and preventing seasonal drying.

Among the Nile's most ecologically significant systems are Lake Victoria and the extensive forests and wetlands its catchment, as well as the Sudd Wetlands and the Machar Marshes along the Blue Nile in Ethiopia.

Several wetlands in the Nile Basin have been designated as Ramsar Sites, wetlands of international importance. These sites play a vital role in the conservation of biodiversity, supporting various species of birds, fish, and aquatic organisms. Biodiversity, defined as the variety of all living organisms including plants, animals, microorganisms, and their ecosystems, is fundamental to ecological stability and resilience.

In Uganda, prominent Ramsar sites include Lutembe Bay, the Murchison Falls-Albert Delta Wetland System, Mabamba Bay, Lake Nabugabo, Musambwa Island, Lake George, and Mount Elgon. These areas serve not only as biodiversity hotspots but also provide critical ecosystem services to surrounding communities.

The wetlands along the Nile offer ideal conditions for the growth of the papyrus plant (*Cyperus papyrus*), which has long been used in artisanal crafts such as mat-making. In ancient Egypt, papyrus was a multipurpose material used in the manufacture of cloth, boxes, rope, and most notably, paper (El-Behaedi, 2024). In recent times, papyrus has also been explored as a raw material for producing biodegradable sanitary pads in Uganda.

The Nile is also an essential migratory route for birds fleeing the harsh winter conditions in Europe in Northern Hemisphere and Southern Africa in the Southern Hemisphere. Migratory birds arrive in Nile Basin countries between September and October and return to Europe around March and April. Lutembe Bay wetland on Lake Victoria serves as a major stopover point for these birds, regularly hosting between 20,000 and 50,000 roosting waterbirds. During peak migration (October to February), these numbers can soar to over 100,000, with some estimates reaching up to 200,000 (Travel Expert Safaris, 2024). Twenty-six species of migratory birds have been recorded at Lutembe, including the White-winged Tern, Slender-billed Gull, Gull-billed Tern, Madagascar Squacco Heron, Greater Cormorant, and Black Heron (ibid).

The Nile River ecosystem is also home to a rich diversity of fauna. It supports populations of lions, giraffes, antelopes, hippopotamuses, monitor lizards, Nile crocodiles, and numerous species of fish, reptiles, and amphibians. Besides, the river serves as a migratory corridor for large mammals such as elephants, particularly in transboundary areas between South Sudan and Uganda, including the region between Murchison Falls National Park and Jonglei State.

The forest ecosystems along the Nile Basin are vital for the survival of critically endangered

species such as mountain gorillas – found exclusively in DR Congo, Rwanda, and Uganda – as well as chimpanzees. These primates not only represent significant biodiversity but also contribute substantially to the region's tourism industry.

Notably, the Sudd wetlands host the largest population of the globally threatened Shoebill (*Balaeniceps rex*). Without adequate protection of their habitats and enforcement against poaching and habitat destruction, the Shoebill population risks further decline. Current estimates place the global population of Shoebills between 5,000 and 6,000, with substantial populations in eastern South Sudan, followed by Uganda, Rwanda, Tanzania and DR Congo (Binder, 2024).

In addition to their ecological value, wetlands and forests along the Nile are critical tools in the fight against climate change. They buffer water flow by absorbing excess water during rainy periods and slowly release it during dry spells. They also act as natural filters, improving water quality by removing pollutants before the water is discharged into rivers and streams. Wetlands are also places where peat that hold carbon from the air are found.

2.3. Cultural Importance

Religion

Water is not only a physical substance or biological necessity, but also an intrinsic part of people's identities, cultures, worldviews and religious perceptions of themselves and afterlife (Oestigaard, 2009). Likewise, the Nile River is deeply rooted into the traditions and norms of the people in the communities where it flows. It contributes significantly to sustaining the stability of people's social, religious/spiritual and cultural activities.

The River is highly recognised by Christians and all people who believe in the Bible because without its waters, the Biblical history could not have evolved and unfolded in Egypt as it did (Oestigaard, 2018). When Jesus and his family fled from Isreal to Egypt, to escape King Herod's ploy to kill Jesus, they found refuge on the banks of the Nile.

In Ethiopia, Gish Abay – the source of the Blue Nile – is considered sacred, believed to be the earthly manifestation of the Biblical River Gihon from Paradise. This site holds profound spiritual importance, especially among followers of the Ethiopian Orthodox Church. It is widely believed that those baptised or sprinkled with water from Gish Abay are cleansed of sins, healed of illnesses, and protected from misfortunes (Oestigaard, 2018). Additionally, devotees who undertake pilgrimages to the River, offer prayers, and use its waters in sacred rituals are thought to secure divine blessings for up to 70 generations of their descendants (ibid)

Besides Christians, the Nile has had an important role to Muslims. For instance, Lutfi (1998, cited in Oestigaard, 2009) narrates that the first Arab Muslim Governor of Egypt banned the ritual of sacrificing a virgin into the Nile. When the River failed to rise for three months, he grew desperate and sought guidance from Caliph Umar I. In response, the Caliph sent a note stating, "Allah alone causes the Nile to flow." The Governor cast the note into the River a day before the al-Salīb festival. Later, the Nile is said to have miraculously risen 16 cubits overnight, saving Egypt from hardship.

Equatorial Lakes Region

Most of the indigenous peoples that live along the Nile and its related tributaries, waterfalls, lakes, wetlands and forests in the Equatorial Lakes Region – Burundi, DR Congo, Kenya, Rwanda, Tanzania, and Uganda – believe that the River harbours ancestral spirits. These spirits are revered as sources of life and well-being, believed to bestow blessings such as childbirth, success in business, agricultural prosperity, and fruitful hunting and fishing (Banze, 2014).

In DR Congo, settlements, traditions and social relations within and between communities are grounded on water resources. For instance, the initiation rituals among the Wagenia people involved the boy taking his first bath in a river after shaving and circumcision rituals (Tshimanga, 2009). The second and final bath in a river would be taken after the boys completed an initiation camp in the bush to indicate that they have now transited from childhood to manhood before they were reunited into their respective communities, now as grown-up men.

In Tanzania, the River Kagera drainage system was paramount in the development of Karagwe and Milansi kingdoms, particularly due to its importance in ironworking and water had a major influence on the selection of iron smelting sites (Mapunda, 2009). This is because it was needed for kneading clay for furnace construction.

The Nile River holds profound cultural and spiritual importance for Uganda, especially among the Buganda and Busoga kingdoms. In Busoga, traditional songs and dances honour the Nile, believed to house powerful deities within its waterfalls. Bujagali Falls was once the sacred seat of the living Bujagali, a revered spiritual leader likened to an “archbishop,” believed to heal and resolve communal issues (Oweyegha-Afunaduula, 2005).

The spiritual hierarchy includes Bujagali as the supreme deity, with subordinate spirits like Kiyira and Itanda – all named after Nile waterfalls – who govern the River’s mystical forces (Oestigaard, 2018). Musoke, the god of rain and thunder, is also believed to reside at Itanda Falls (ibid). Despite the disruption caused by the Bujagali Dam, many still visit the site for rituals, preserving their ancestral ties to the River.

In South Sudan, the Dinka and Nuer tribes have rich cultural traditions deeply connected to the Nile River. Both tribes performed a variety of rituals – such as rainmaking ceremonies – along the riverbanks to honour their deities and ancestors and to invoke blessings (Gillam, et al, 1935). Rainmaking ceremonies conducted during droughts often involved sacrifices and offerings such as livestock, grains, and traditional beer to deities associated with rain and fertility. The Nile also features prominently in South Sudanese poetry, music, and storytelling.

In Ethiopia, the Nile River was fundamental to the emergence and growth of the ancient kingdoms of Nubia, including Ta-Seti, Kush, and later Meroë. The River’s annual floods deposited nutrient-rich silt along its banks, creating fertile land that supported a thriving agricultural economy (Wilkinson, 2010). Currently, the cascade of hydropower facilities has significantly reduced silt transport downstream.

Downstream, the Nile River was fundamental to the emergence and growth of the ancient kingdoms of Nubia, including Ta-Seti, Kush, and later Meroë. The River’s annual floods deposited nutrient-rich silt along its banks, creating fertile land that supported a thriving agricultural economy (Wilkinson, 2010). The Nile remains central to Nubian culture to date. Communities hold vibrant

celebrations to honour the Nile, incorporating Nubian music and dance as a tribute to the River's enduring cultural and economic significance (Oestigaard, 2018).

Egypt: As far back as 5,000 years, ancient Egyptians regarded the Nile as a divine gift from the gods (Chakraborty et al., 2015). The River was believed to be sacred, a symbolic pathway between life, death, and the afterlife. Polluting the Nile, therefore, was not just an environmental offense, but also a spiritual one: those who defiled its waters were believed to be denied access to paradise (Shea, 2024; and El-Sheekh, 2009, cited in Chakraborty et al., 2015).

The Nile shaped the ancient Egyptian calendar, dividing the year into three four-month seasons: Akhet (flooding), Peret (growth), and Shemu (harvest) (Springer & Neil, 2010). Akhet (July–October) marked the annual flooding, during which farming paused and labour shifted to state projects. The flood, attributed to Hapi – the Nile god – and the Pharaoh as the divine intermediary, deposited fertile silt vital for agriculture. Peret (November–February) saw planting, while Shemu (March–June) was harvest time, requiring intense labour (Springer & Neil, 2010).

The Nile also shaped Egyptian spiritual life. Ra, the sun god, was believed to be reborn each day, linking the River's west bank with death and the afterlife. Pharaohs and others were thus buried on the Nile's western side to ensure safe passage into the afterlife (Mark, 2021; Drower & Dorman, 2024).

2.4. Takeaways for Journalists

This part has demonstrated that environmental knowledge is informed not only by the tangible relationship between humans and nature, but also by the interplay between the physical and spiritual realms (Oweyegha-Afunaduula, 2005). The Nile River represents far more than a source of water – it is a living thread that connects diverse cultures, histories, and spiritual traditions. Its influence in shaping civilisations, nurturing unity, and inspiring religious expression underscores its unparalleled cultural significance in the region.

It is therefore essential for journalists to incorporate the voices and cultural knowledge of indigenous communities in their reporting. These communities possess a unique, lived understanding of the Nile River – and of nature more broadly – that can deepen and enrich environmental discourse.

ENVIRONMENTAL AND SOCIO-ECONOMIC CHALLENGES OF THE BASIN

The Nile Basin is grappling with a range of environmental and socio-economic pressures that are significantly affecting the quality and quantity of its resources. The following table (Table 4) from the NBI's State of the River Nile Basin 2021 report illustrates this concerning trend:

TABLE 4: LAND-USE AND LAND-COVER CHANGE STATISTICS FOR THE NILE BASIN, 1985-2015. PERCENTAGE OF TOTAL AREA BASED ON LAND COVER IN 2015

Landcover Class	1985(km2)	2015(km2)	Change 1905-2015 (%)	Proportion of total basin area (%)
Water	92,552	95,771	3	3
Papyrus	11,665	5,897	-49	0
Wetland grasses	10,963	8,285	-24	0
Reeds	10,371	17,329	67	1
Shrub land	1,608,712	1,024,495	-36	31
Forest	63,276	45,115	-29	1
Agriculture	527,839	1,115,463	111	34
Desert bare soil	947,307	960,339	1	29
Settlement	1,946	1,945	0	0
TOTAL AREA	3,274,631	3,274,638	0	100

■ Source: NBI State of the River Nile Basin 2021 report

3.1. Pollution of Rivers and Lakes

The Nile's drainage network consists of numerous rivers, both large and small. Besides the Blue Nile and the White Nile, its other key sources are the tributaries of Atbara, Sobat, and Bahr el Jebel.

Lakes cover about 8.9 percent of the Basin area. These lakes play a vital role in ensuring food security, supporting fisheries-based livelihoods, and preserving biodiversity. Besides, lakes like Victoria, Kyoga and Albert, along with the Sobat River, help regulate the flow of the White Nile. Similarly, Lake Tana and its outflows, alongside the downstream tributaries of the Abay River, contribute significantly to the Blue Nile.

Despite their importance, pollution poses a growing threat to the Nile River system and the quality of the Nile's waters is deteriorating. There is a worry that freshwater sources in major urban areas may become unusable due to heavy pollution (NBI, 2020).

The principal pollutants are industrial waste, heavy metals (lead, cadmium), pathogens (bacteria, virus, or other microorganisms that can cause disease), parasites, oxygen-demanding compounds, nutrients, suspended solids, and organic micro-pollutants (Chakraborty, et al., 2015). Other major causes of water quality degradation are municipal wastewater, domestic sewage and agricultural fertilisers and chemicals (NBI, 2020). Besides, annual flooding, which used to flush and clean the water of human and agricultural waste, no longer occurs along parts of the Nile (El-Behaedi, 2024).

The increasing pollution harm the fish and other creatures that live in the water and threatens the livelihoods of people who depend on the Nile and other water-related resources for fishing, drinking water, and irrigation.

Ground Water Quality

Ground water is a vital alternative source of water in the Nile Basin. Besides surface water, there are also growing concerns over the quality of ground water in the Basin. The State of the River Nile Basin 2021 report indicated that in the Equatorial Lakes Plateau – Burundi, Rwanda, Tanzania, Kenya, and Uganda – groundwater quality was still meeting WHO standards for water that is suitable for human consumption (potable water). However, aquifers (underground rock layers that store water) in densely populated areas were already vulnerable to heavy contamination due to poor sanitation – pollution from fertilisers and pit latrines.

Poor water quality imposes economic costs across various sectors. It degrades natural resources, poses serious health risks, disrupts economic activities such as agriculture, industrial production, and tourism, and increases costs for treating water supplied for domestic and industrial use.

3.2. Degradation of Wetlands

Wetlands cover 1.1 per cent of the total Nile basin area (NBI, 2024). They provide fisheries, fuelwood and papyrus reeds for making baskets and mats. They also moderate floods, purify surface water, recharge underground water sources, and often supply rare sources of water for livestock or agriculture during the dry season.

Figure 13: A wetland in the Nile Basin



TABLE 5: WETLAND EXTENT PER SUB-BASIN OF THE NILE RIVER BASIN

Sub-Basin	Area (km2 2015)	Total wetland extent (km2)	Total wetland extent(%)	Identified overall wetland extent (km2)	Permanent Overall wetland extent (%)
Main Nile	1,027,806	9,869	1	29,332	28
Bah el Gazal	609,723	5,186	0.9	5,313	7
Blue Nile	313,861	4,320	1.4	4,671	82
White Nile	265,257	1,938	0.7	1,566	64
Lake Victoria	264,040	69,434	27	6,203	52
Tekeze Atbara	240,084	355	0.14	63	82
Bara Akobo Sobat	206,294	1,554	0.8	12,906	4
Bahr el Jebel	186,875	17,108	9	23,719	34
Victoria Nile	85,771	6,351	9	6,337	64
Lake Albert	74,920	8,977	12	10,590	78
TOTAL AREA	3,274,631	125,092	3.82	100,700	

■ Source: NBI State of the River Nile Basin 2021 report

Figure 14: Major Wetland Systems of the Nile



However, the wetlands are also threatened by pollution (including plastic waste), siltation, and conversions into agricultural land, settlement, and infrastructural development. Other threats include impacts of climate change, unsustainable harvesting/exploitation of wetland resources and deforestation. Oil exploration, such as in South Sudan and Sudan; damming of rivers, and industrial development are the other factors fuelling the destruction of wetlands in the Nile Basin.

As a result, wetland grasses in the Nile Basin reduced by 24 percent between 1985 and 2015. Papyrus reduced by 49 percent in the same period.

3.3. Degradation of Forests

Forests cover approximately 7 percent of the Basin territory, yet exist almost exclusively in the upper parts of the Basin (NBI, 2020). Besides their many functions such as supporting tourism and provision of timber, forests serve as ‘water towers’ – natural reservoirs that collect rainfall and release it gradually to supply rivers and streams.

In the Nile Basin, the most important water towers are the Ethiopian Highlands, the Rwenzori mountains and Mt Elgon in Uganda, as well as the Mau Forest of Kenya. The Ethiopian Highlands are the largest water tower, generating 85 percent of the Nile River water.

However, the region has experienced a significant decline in forest cover over the past decades. Between 1985 and 2015, the Basin’s forest area decreased by 29 percent (NBI, 2020). Notably, the Basin’s critical water towers have suffered substantial forest loss, which has disrupted the water flow of several rivers they support. Table 6 below shows this decline in forest cover over the years.

Figure 15: Main Water Towers in East Africa

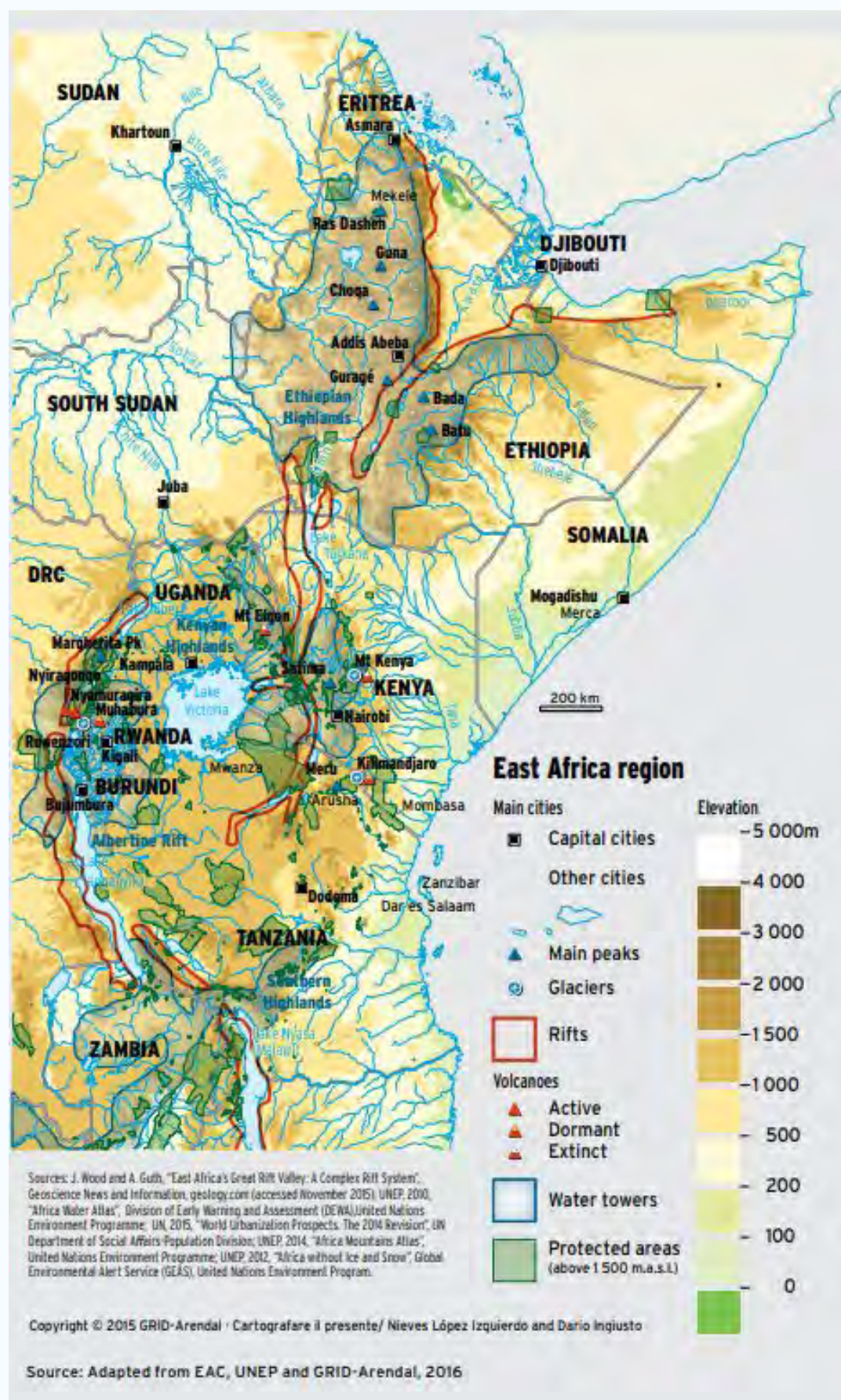


TABLE 6: FOREST COVER AND DEFORESTATION RATES IN THE NILE BASIN

Indicator	Year	Burundi	DR Congo	Ethiopia	Egypt	Kenya	Rwanda	South Sudan	Sudan	Uganda	Tanzania	Eritrea
Forest Cover (Percentage of land area)	2000	7.7	69.4	13.7	0.1	6.2	13.9			19.4	58.6	15.6
	2012	9.9	68.0	12.3	0.1	7.4	18.1			13.7	54.1	15.1
	2016	10.9	67.2	12.5	0.1	7.8	19.7			6.9	51.6	14.9

■ Source: NBI State of the River Nile Basin 2021 report

Rampant deforestation in the Nile Basin, particularly in its water towers, has exacerbated the region's vulnerability to environmental degradation. Deforestation not only threatens biodiversity; it also impairs the Basin's ability to regulate water cycles, leading to reduced water availability, soil erosion, and increased vulnerability to floods and droughts. These changes can severely affect agriculture, food security, and overall economic stability in the region.

3.4. Climate Change

The Earth's climate has always changed but because of human activities, it is now changing faster than it has for thousands of years, which is called climate change (Banda, 2013). Climate Change is manifesting in various forms, such as global warming (the consistent increase in Earth's average surface temperature), increased frequency and intensity of extreme weather events such as heatwaves, heavy rainfall and flooding, and prolonged dry spells and droughts. A heatwave hit South Sudan in March 2024 with temperatures that reached 45°C (113°F).

Wetlands in the Nile Basin are highly vulnerable to climatic changes. Prolonged drought or altered flood patterns are reducing the size of wetlands, threatening biodiversity (plants, animals and birds that stay in wetlands) and the livelihoods of communities relying on them for fishing and grazing. In the wet season, the size of the Sudd wetland increases up to 90,000km² and gradually decreases to about 42,000km² depending on high seasonal floods (UNESCO, 2017).

Since 1906, more than 80 percent of the Rwenzori's ice has melted, and UNESCO reported that a third of the 50 World Heritage sites that contain glaciers, including the Rwenzori's, will disappear by 2050 no matter what actions are taken to slow global warming (Wendle, 2023).

Likewise, changes in rainfall patterns and increasing temperatures are likely to reduce the Nile's flow. Droughts are becoming more frequent in some parts of the Basin, threatening water availability for agriculture, domestic use, and energy production. Goulden and Conway (2009) also explain that global warming-related reduction of underground water reserves is one of the main causes of decline in the Nile's water resources in recent times.

Climate change is intensifying concerns about water variability in the Nile River, with increasingly frequent periods of both drought and excessive rainfall. This variability poses significant risks to hydroelectric power generation across the region.

Recent studies suggest that while the overall volume of water in the Nile could rise, the flow is expected to become more erratic from year to year. This unpredictability will make it more difficult to manage and allocate water resources efficiently. Additionally, climate change is likely

to increase the frequency and severity of flooding in the Nile Basin's densely populated floodplains and exacerbate the threat to the fertile Nile Delta from rising sea levels (Woodward et al., 2022).

3.5. Poverty

Regardless of how it is defined – whether as limited income, lack of basic assets, inadequate access to education and healthcare, or inability to influence decisions – poverty remains widespread in the Nile Basin, with most of the population facing difficult socio-economic conditions (Akol et al., 2016). By 2016, over 40 percent of people in most Nile Basin countries lived below the international poverty line of \$1.25 per day (in purchasing power parity terms) (ibid).

High poverty levels exert pressure on the environment and water resources. Poor communities, in their daily struggle for survival, often rely heavily on the River and its surrounding ecosystems for basic needs such as water, food, energy, and agricultural production. This over reliance, coupled with limited access to alternatives, leads to unsustainable practices such as overfishing, deforestation for fuelwood, cultivation along riverbanks, and wetland encroachment, all of which contribute to environmental degradation and threaten the ecological integrity of the Nile Basin.

Poverty-driven agricultural practices, such as slash-and-burn and unregulated irrigation, lead to land degradation, inefficient water use, and runoff of agrochemicals into the River, polluting water sources and harming aquatic life. The absence of basic waste management infrastructure in low-income areas results in the dumping of solid waste and untreated sewage directly into the Nile, compounding pollution challenges.

Poverty also limits institutional and community capacity to adapt to, and mitigate environmental stress and the impacts of climate change. Governments with constrained resources often struggle to enforce environmental regulations or invest in sustainable infrastructure.

3.6. High Population Growth

The population of the Nile States is projected to almost double, from 556 million (2020) to 1.044 billion by 2050 (Crerar & Azza, 2022). This high population growth exerts pressure on natural resources as it raises the demand for food and, therefore, demand for land for farming. Demand for land for settlement and industries also increases.

This results into unsustainable use of natural resources, water pollution and land-use change – converting woodlands, wetlands and forests into areas for farming and settlement. Most of the land in the Nile Basin is cleared for subsistence farming although largescale commercial agriculture projects are also taking root in the 11 countries (NBI, 2020). Consequently, rivers and wetlands increasingly compete with agriculture for water. There is also increased pollution in the form of discharge of fertiliser and pesticides from farms into the water bodies.

More people, amidst the high poverty levels in the Basin, also means increased competition for

natural resources such as fish. As a result, overfishing is speedily resulting into the dwindling fish stocks in the Basin's wetlands and major lakes. All water bodies except the Sudd are suffering from overfishing (NBI, 2020).

While rural electrification rates are increasing, it is estimated that over 90 percent of the population still relies on fuelwood. The increasing need for fuelwood, resulting from high population growth, has increased tree cutting in woodlands, forested wetlands, and mountain forests.

3.7. Rapid Urbanisation and Industrialisation

It has been reported that urban land will expand by 600 percent in Africa between 2000 and 2030 (Seto et al., 2012, cited in NBI, 2020). Three out of Africa's five main urban-growth areas are located in the Nile Basin: The Ethiopian Highlands, the Nile Delta (Egypt) and Nile Valley (Egypt, Sudan, Ethiopia, and Uganda), and the Equatorial Lakes Plateau (ibid).

Sudan's urban population has been growing at a significantly faster rate than its overall natural population growth (UN-Habitat Sudan, 2016). As a result, the share of urban residents within the total population has steadily increased. In 1955–1956, when the first population census was conducted, only 18.5 percent of Sudan's population lived in urban areas. By 2008, this figure had risen to 29.8 percent. By 2023, the urban population had further increased to 36.34 percent. This trend is consistent almost across the region.

Uganda's population living in urban areas increased from 12.3 percent in 2002 to 18.6 percent in 2014, which reflects an annual urban growth of 5.2 percent for 2014 while urbanisation increased to 26.5 percent in 2021 with a growth of 8.8 percent (MLHUD, 2022). The level of Urbanisation in Uganda is projected to increase to 50 percent by 2050 (UBOS, 2014)

As urban areas continuously grow close to ecosystems, many forests and wetlands are cleared to create space for urban settlements and industrial areas as well as peri-urban agriculture. Several large-scale infrastructures linking cities, such as tarmac roads, also go through these natural resources. There is also increasing discharge of untreated wastewater and sludge from urban homesteads and factories, which destroys habitats and kills species like fish.

Besides rapid growth, urbanisation in the Nile Basin is characterised by a high percentage of informal settlements caused by a number of factors, including poverty, rural-to-urban migration, refugee flows, social inequalities, poor housing policies, and forced evictions.

Most informal settlements emerge by encroaching on forests, wetlands and urban green spaces. Besides, informal settlements lead to increased pollution, not only by domestic and industrial wastewater, but also by solid waste, such as plastic, that ends up in surface water bodies. These challenges are already being witnessed in some urban areas, such as Cairo, Kampala and Khartoum, which are closely located to rivers and lakes (NBI, 2020).

3.8. Takeaways for Journalists

Part 3 has outlined the current state of the Nile Basin's ecosystems, which play a crucial role in meeting the water needs of millions and supporting the region's economies. Poverty and rapid population growth remain the most significant drivers of pressure on these vital natural resources. As the demand for water, firewood, and agricultural land intensifies, competition for these resources is escalating, threatening the balance of the ecosystem.

In areas where environmental degradation is most pronounced, the Nile Basin is witnessing an increase in the frequency and severity of natural disasters, such as landslides and floods. These events are leading to widespread displacement, loss of life, and destruction of property. Such occurrences are becoming particularly common in the mountainous regions of Mt. Elgon and the Rwenzori, as well as in the low-lying areas around lakes Victoria, Kyoga, and Albert.

Raising public awareness about the urgent need for sustainable ecosystem management is a vital responsibility for a journalist. Effective reporting can encourage meaningful action to protect the region's vital water resources for future generations. You can achieve this through:

- Producing news, features, and documentaries that educate the public about the importance of the water-related resources, their ecological significance, and the threats they face, such as pollution, climate change, and overuse due to high population growth
- Investigating and highlighting the drivers of resource degradation
- Sharing success stories from communities on sustainable resource management and conservation
- Engaging stakeholders, including policymakers, local communities, and conservation experts, to promote practical solutions
- Highlighting the interconnected nature of the Nile countries and the shared benefits of cooperation in managing these water-related natural resources. Constructive reporting can counter misinformation and reduce geopolitical tensions related to water use.

KEY AGREEMENTS SHAPING THE NILE COOPERATION

4.1. Introduction

Transboundary water cooperation involves collaboration among two or more countries sharing freshwater resources. It helps to mitigate risks of competition and potential conflicts over shared water resources. By promoting dialogue, building mutual trust, and establishing effective frameworks for joint management and dispute resolution, transboundary cooperation ensures equitable and peaceful sharing of resources.

The diverse interests of the riparian countries and geopolitical complexities surrounding the Nile have necessitated cooperation efforts to ensure equitable and sustainable use of the River's resources for mutual benefit. This cooperation is reflected in the many agreements signed by riparian countries since colonial times, which are the focus of this Part 4.

4.2. Cooperation through NBI

On February 22, 1999, in Dar es Salaam, Tanzania, the Nile riparian states launched their first inclusive transitional institutional arrangement, intended to succeed the Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile (TECCONILE). Subsequently, in May of the same year, the Council of Ministers of water-related affairs (Nile-COM) met in Addis Ababa, Ethiopia, where they formally adopted the name “Nile Basin Initiative” (NBI) for the new cooperative institutional arrangement.

The NBI marked the first genuinely comprehensive, home-grown mechanism for collaboration among the Nile countries. This transitional arrangement was designed to lay the groundwork for a permanent framework – the Cooperative Framework Agreement (CFA).

Since its inception, the NBI has facilitated dialogue and regional cooperation, supported the articulation of a shared vision for the Basin, and implemented water-related investment projects, such as promoting efficient agricultural water use. It has played a central role in shaping both regional and Basin-wide decision-making concerning the management and development of transboundary water resources (NBI, 2019).

Among its flagship initiatives is the Nile Basin Development Forum (NBDF), a biennial science-policy-practice dialogue that convenes stakeholders from across the Basin and beyond. The NBDF serves as a platform for building consensus on the Nile cooperation agenda and charting a path toward the sustainable development and management of the Basin's resources.

4.3. The Agreement on the Nile River Basin Cooperative Framework/Cooperative Framework Agreement (CFA)

Background

The period between 2010 and 2012 marked a significant moment in Nile Basin relations. In May 2010, a new form of collective action emerged when six upstream countries – Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda – signed the CFA. This agreement aimed to establish a permanent legal and institutional framework for equitable and sustainable management of the Nile's shared water resources.

However, the signing of the CFA triggered strong opposition from downstream countries, particularly Egypt and Sudan, as well as concerns from some of NBI's development partners. In June 2010, during the Nile Council of Ministers (Nile-COM) meeting in Addis Ababa, Egypt and Sudan formally announced their suspension from participation in NBI activities.

Their withdrawal effectively undermined a key assumption of the NBI's Institutional Strengthening Project (ISP): that the CFA would be signed and ratified by a critical mass of countries, leading to the eventual transformation of the NBI into a permanent Nile River Basin Commission.

The ISP had been designed to enhance the NBI's capacity to support sustainable socio-economic development through equitable water resource management across the Nile Basin. It sought to achieve this by strengthening institutional sustainability, enhancing technical and managerial capacity, and harmonising corporate governance across the NBI's three core institutions: the Nile Secretariat (Nile-Sec), the Eastern Nile Technical Regional Office (ENTRO), and the Nile Equatorial Lakes Subsidiary Action Program Coordinating Unit (NELSAP-CU).

The withdrawal of Egypt and Sudan mostly affected ENTRO, which had been established by Egypt, Ethiopia and Sudan. Consequently, ENTRO was forced to operate with only one country remaining (Ethiopia) because South Sudan was not yet an independent state and, thus, not a member of the NBI (Azza, 2024).

This dilemma in the Eastern Nile Basin was addressed when Egypt, Ethiopia and Sudan met in Addis Ababa in November 2012 to find a way of resuming participation by Egypt and Sudan in ENTRO. On November 12, 2012, Sudan and Ethiopia ministers signed an agreement that would allow them to continue their cooperation under ENTRO without necessarily compromising their positions regarding the CFA (NBI, 2019). Egypt declined to endorse the deal, while Sudan returned to the NBI. In February 2025, Egypt resumed full participation at both political and technical levels after almost 15 years of non-participation at the technical level.

Key Provisions

The CFA officially came into force on October 13, 2024. Negotiated in 2010 among nine Nile riparian countries – Burundi, the Democratic Republic of Congo (DRC), Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda – the CFA became effective following its signature and ratification by five countries: Burundi, Ethiopia, Rwanda, Tanzania, and Uganda, with South Sudan later acceding as the sixth member. The African Union, acting as the Depositary of the CFA, officially confirmed its ratification in a memo dated September 6, 2024.

The Agreement enshrines the principles of collaboration, equitable use, and mutual respect among the countries that share the Nile's waters. It further establishes a mechanism for peaceful dispute resolution, fostering a culture of dialogue and understanding.

Another crucial pillar of this framework is equity. In order to rectify historical imbalances in access to the Nile's waters, it gives member States equal right to utilise and develop the water resources of the Nile River System in an equitable and reasonable manner.

However, in ensuring that their utilisation of Nile River System water resources is equitable and reasonable, Nile Basin States are required to consider all relevant factors and circumstances. The circumstances to consider include the effects of the use or uses of the water resources in one State on other States and the availability of alternatives, of comparable value, to a particular planned or existing use.

In the spirit of cooperation, Article 5 specifically states, "In utilizing Nile River System water resources in their territories, [States shall] take all appropriate measures to prevent the causing of significant harm to other Basin States."

Where significant harm nevertheless is caused to another Nile State, the agreement requires the State, whose use causes significant harm to take all appropriate measures, in consultation with the affected State, to eliminate or mitigate such significant harm and, where appropriate, to discuss the question of compensation.

It also obligates States to collaboratively develop contingency plans for emergency response, coordinating, where appropriate, with other potentially affected States and relevant international organisations.

Conservation of the Nile Ecosystem under CFA

The CFA is strong on conserving the Nile River and its ecosystem. Specifically, Article 6 requires the Member States to take all appropriate measures, either individually or jointly, to protect, conserve and, where necessary, rehabilitate the Nile River Basin and its ecosystems, by:

- Protecting and improving water quality within the Nile River Basin
- Preventing the introduction of species, alien or new, into the Nile River system which may have effects detrimental to the existing ecosystems of the Nile River Basin
- Protecting and conserving biological diversity within the Nile River Basin
- Protecting and conserving wetlands within the Nile River Basin
- Restoring and rehabilitating the degraded natural resource base

Pending Article

The CFA was negotiated and all its Articles, except one, were agreed upon by all nine-member states of the NBI, including Egypt and Sudan. However, no consensus was reached on Article 14(b), which reads: "not to significantly affect the water security of any other Nile Basin States".

Burundi, DR Congo, Ethiopia, Kenya, Rwanda, Tanzania and Uganda agreed to this proposal, unlike Egypt and Sudan. To this effect, Egypt proposed that Article 14(b) should be replaced by the following wording: “not to adversely affect the water security and current uses and rights of any other Nile Basin State” (NBI, 2024).

The pending Article was placed in the Annex of the CFA for resolution within six months of establishment of the Commission.

4.4. Colonial Agreements

4.4.1. Background

The Nile River agreements date back to the 19th century Scramble for Africa when European powers divided the continent for political and economic gain. In particular, the agreements signed during the colonial era enabled Britain to harness the Nile’s waters for agricultural and trade purposes. Egypt inherited the British water rights but upstream countries rejected these treaties upon attaining independence (Azza, 2024).

4.4.2. Anglo-Italian Protocol (1891)

This was the first protocol signed by Great Britain and Italy on April 15, 1891. Article 3 was dedicated to restricting Italy from constructing a water project over the Atbara River, whose upper reaches fell within the newly acquired Italian possession of Eritrea (Frede and Abebe, 2014).

Italy agreed to refrain from constructing anything on the Atbara that would influence the flow of water into the Nile. This meant that Italy would not undertake irrigation projects or other works on the Atbara.

This Protocol was signed by the colonial powers without considering the interest of third parties, most notably Ethiopia. Thus, the principle of “relative effects” of contracts, which aims to protect the interests of those parties who are not signatories of a given contract, was violated (ibid).

When Italy tried to invade Ethiopia in the battle of Dogali (January 26, 1887) and Battle of Adwa (March 1, 1896), it was defeated. It therefore was not in position to implement this treaty.

4.4.3. Anglo-Ethiopian Treaty (1902)

In 1902, British diplomat John Harrington was sent to Addis Ababa, Ethiopia, to negotiate a treaty establishing boundary demarcations between Ethiopia and Anglo-Egyptian Sudan. This mission culminated in the signing of the Anglo-Ethiopian Treaty on May 15, 1902. Harrington signed the agreement on behalf of Great Britain, representing Anglo-Egyptian Sudan, while Emperor Menelik II represented Ethiopia.

The agreement meant that Ethiopia would not undertake or permit the execution of any building projects that would impede the movement of its waters into the Blue Nile, Lake Tana, or the Sobat River, unless agreed upon with the governments of Sudan and Britain (Okoth-Owiro, 2004).

4.4.4. Great Britain and Congo Agreement (1906)

On May 9, 1906, Great Britain and the Independent State of the Congo (then under King Leopold II of Belgium) signed an agreement in London to Re-define Their Respective Spheres of Influence in Eastern and Central Africa. Under the agreement, the authority of the sovereign nation of the Congo agreed not to build any construction across or close to the Semliki or Isango rivers that would lower the amount of water flowing into Lake Albert except with the consent of the Sudanese government (Okoth-Owiro, 2004).

4.4.5. Tripartite Treaty (1906)

Britain, France and Italy with Ethiopia as their main target signed the Tripartite Treaty of December 13, 1906. Earlier, Emperor Menelik had suffered a stroke; so, the three countries desired a legal framework that could regulate their influence in case succession problems emerged in Ethiopia (Frede and Abebe, 2014). Consequently, they agreed to safeguard the interests of Great Britain and Egypt in the Nile Basin, which was stipulated in Article IV (a) of the treaty (Okoth-Owiro, 2004).

This agreement excluded the participation of all riparian countries, as its signatories were exclusively colonial powers. Moreover, agreements made by colonial states on behalf of their colonies could not automatically bind the newly independent states (Frede and Abebe, 2014). Such agreements would only be valid if those states explicitly consented to the terms.

4.4.6. The Anglo-Italian Secret Agreement (1925)

Great Britain and Italy exchanged letters that culminated in the 1925 Anglo-Italian Secret Agreement. Italy made significant concessions to Great Britain, including a pledge to assist in securing Ethiopia's approval for the construction of a dam on Lake Tana. Britain also sought Italy's backing for its plans to build a barrage at Lake Tana and a road linking Sudan to the lake to facilitate the transportation of goods and personnel (Kendie, 1999).

As part of a give-and-take arrangement, Britain agreed to support Italy's efforts to obtain a concession from Ethiopia to construct a railway connecting the Eritrean border to the border of Italian Somaliland, a project that was aimed at enhancing Italy's economic influence in the region. This mutual understanding led to an agreement formalized through an exchange of notes.

The notes contained a key provision: Italy, recognizing the water rights of Egypt and Sudan, committed not to undertake any construction on the headwaters of the Blue Nile, the White Nile, or their tributaries that would significantly alter the flow of water into the main River (ibid).

However, Ethiopia denounced the secret agreement and took the matter before the League of Nations. Both Britain and Italy defended their actions, denying any infringement on Ethiopia's

sovereignty. The secret nature of the agreement itself was deemed fraudulent, a basis for termination under international law. Furthermore, Ethiopia was not a party to the agreement. The League of Nations ruled in Ethiopia's favour, stating that it was not bound by the terms of the agreement (Azza, 2024).

4.4.7. The Anglo-Egyptian Nile Water Agreement (1929)

This Agreement was concluded through exchange of letters between the United Kingdom (acting on behalf of the upstream lands under British colonial administration) and Egypt.

Ferede and Abebe (2014) narrate that on May 7, 1929, an exchange of notes took place between Egypt's Prime Minister Mohammed Pasha and British High Commissioner to Egypt Lord Lloyd, who represented Sudan. This exchange became known as the Nile Water Agreement of 1929.

The agreement dictated that no irrigation or power projects could be initiated on the Nile, its tributaries, or its source lakes within Sudan or British-administered territories if such projects would harm Egypt's interests (Kendie, 1999). Under this framework, Egypt acknowledged Sudan's right to an adequate share of water for its development, if Egypt's "natural and historic rights" were upheld (Swain, 1997).

Egypt was allocated 48 BCM annually, while Sudan received 4 BCM. Additionally, Egypt was granted the authority to inspect and veto upstream projects that could affect the volume or perennial flow of the Nile (Ferede and Abebe, 2014). Therefore, Egypt got the mandate to inspect and approve or reject projects on the Nile waters in upstream countries.

The treaty notably left 32 BCM of water unallocated, likely to avoid provoking counter-claims, as it was negotiated without the involvement of other riparian states (Swain, 1997). Ethiopia, despite being a non-colonial state, persistently called for inclusion and renegotiation but was also excluded (ibid).

4.4.8. Kagera River Agreement (1934)

The 1934 Kagera River Agreement was signed between Great Britain, on behalf of Tanganyika (present-day Tanzania), and Belgium, on behalf of Rwanda and Burundi. The Agreement forbade building projects that may impair the Kagera River's flow into Lake Victoria. Article VI obliged any state that wished to use the River's waters for irrigation purposes to notify the other contracting parties six months in advance in order to allow for possible objections to be raised and studied (NBI, 2009).

4.4.9. The Owen Falls Dam Agreement (1949)

The Government of the United Kingdom of Great Britain and Northern Ireland and the Government of Egypt exchanged notes that constituted an agreement regarding construction of the Owen Falls Dam in Uganda. This agreement was signed on May 30 and 31, 1949. It allowed Uganda to build the Owen Falls Dam for electricity generation and the UK government agreed to finance the construction of the dam and its associated infrastructure. Queen Elizabeth II commissioned the dam on April 27, 1954.

Although the 1949 agreement allowed Uganda to build a critical infrastructure project, it granted Egypt the right to station engineers at the dam to monitor and manage water discharge in accordance with Egypt's needs (Azza, 2024).

4.4.10. The Owen Falls Modifications Agreement (1952)

In 1952, there were further exchanges of notes between Britain and Egypt, in which they agreed to raise the level of the Owen Falls Dam higher than was necessary for hydropower production to increase water storage for Egypt. Azza (2024) writes that Egypt agreed to meet the cost of increasing the dam height and compensate the governments of Kenya and Tanzania for damage that would come from flooding of lands. In addition, Egypt would compensate Uganda Electricity Board for loss of power generation caused by extending the height of the dam. Kenya and Tanzania in 1952 initially agreed to be compensated, but in 1953, they revoked their consent, wanting to use the dam construction as advantage for re-negotiation of the Nile Waters Agreement on 1929 (ibid).

4.5. Post-Colonial Cooperation Arrangements

After gaining independence, some riparian states began raising concerns about their exclusion from previous agreements and their restricted access to the Nile's resources. This initiated a movement toward more inclusive collaboration, reflected in the following cooperative frameworks:

4.5.1. The Nile Waters Agreement (1959)

The Nile Waters Agreement was signed between Egypt and Sudan in 1959. After voting for independence and rejecting unification with Egypt, Sudan officially became a republic in 1956. One of the new government's first actions, led by Prime Minister Ismail al-Azhari, was to call for a revision of the 1929 treaty (Swain, 1997). At the same time, Egypt's President Gamal Abdel Nasser envisioned constructing the Aswan High Dam to secure water resources and strengthen Egypt's influence in the region's hydro-political landscape (Amare, 2000).

The resulting agreement helped the two countries settle an old controversy over the average annual flow of the Nile, agreeing it to be 84 BCM as measured at Aswan, in Egypt. The agreement provided for the sharing of this annual flow of the River between the two countries, with 55.5 BCM allocated to Egypt, 18.5 BCM allocated to Sudan, and 10 BCM considered as losses from seepage and evaporation (Frede & Abebe, 2014).

The Agreement stipulated that in case the Nile waters increased, the additional yield would be shared equally between Egypt and Sudan. The Agreement also stipulated joint management of future complaints from other Nile states. If disputes arose and resulted in a redistribution of the Nile's waters, Egypt and Sudan agreed to equally share the impact by allocating water from their respective quotas (Ferede & Abebe, 2014).

Notably, the Agreement permitted Egypt to build the Aswan High Dam, and supported Sudan's plans to construct the Roseires Dam on the Blue Nile. Both projects aimed to enhance irrigation and hydroelectric power generation. The agreement established a Permanent Joint Technical Commission to foster institutional cooperation between the two countries.

4.5.2. The HYDROMET Project (1967-1992)

The “Hydro meteorological Survey of the Catchments of lakes Victoria, Kyoga and Albert” Project (HYDROMET Project) was a technical cooperation initiative between eight Nile riparian countries – Burundi, DR Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania and Uganda. The project had its headquarters in Entebbe, Uganda, where a weather station was also set up.

The Project’s objective was to improve understanding of the water flow of the Upper Nile Region following a period of strangely heavy rains in 1961-1962. The heavy rains resulted into large rises in the level of the Nile Equatorial Lakes (Edward, George, Kyoga, Victoria and Albert), and flooding of vast areas on the shorelines of the lakes and the Sudd.

The project resulted in the establishment and operation of an expanded hydrological and meteorological observation network in the Upper Nile and creation of a database of hydrological, meteorological, sediment and water quality data (Azza, 2024).

4.5.3. UNDUGU (1983 - 1992)

Undugu (Swahili for ‘brotherhood’) was a platform established for exchange of information and viewpoints on the wider economic development of the Nile region. Burundi, Central African Republic, DR Congo, Egypt, Rwanda, Sudan, Tanzania and Uganda formed the platform’s membership with Ethiopia and Kenya participating as observers.

The objective of the platform, which was not realised, was to establish a Nile Economic Community. However, the framework was abandoned by the upstream countries because it was promoting discussion without any tangible benefits (Azza, 2024).

4.5.4. TECCONILE (1992-1999)

The Technical Cooperation Committee for the Promotion of the Development and Environmental Protection of the Nile (TECCONILE) was established in 1992 as a direct successor of the HYDROMET Project.

The cooperation was established by six Nile countries (DR Congo, Egypt, Rwanda, Sudan, Tanzania and Uganda), with the other riparians (Burundi, Eritrea, Ethiopia and Kenya) participating as observers.

TECCONILE was established as a transitional arrangement with the expectation that after three years, a permanent Basin-wide institution would be established, which did not happen.

TECCONILE’s greatest contribution was in developing the first Nile River Basin Action Plan, which included the development of a cooperative legal framework on the Nile, and preparing for the creation of the NBI (Azza, 2024).

4.5.5. The Jonglei Canal Project

The Jonglei Canal Project, launched in 1980 in what is now South Sudan, was designed to reduce water loss through evaporation in the vast Sudd wetlands, and thereby increase the flow of water downstream to Sudan and Egypt. The concept dates back to 1904, when Sir William Garstin, then Undersecretary of State for Public Works in Egypt, proposed digging a canal east of the Sudd to divert and conserve an estimated 14 BCM of water annually (Azza, 2024). In addition to boosting water supply, the project was expected to reclaim approximately 100,000 hectares of land for agriculture by draining parts of the wetland. The canal was projected to lower the swamp's water level by about 10 percent during the flood season and by 20 percent in the dry season.

By 1984, 240 kilometres of the planned 360-kilometer canal had already been completed. However, construction came to a halt in 1983 following the outbreak of civil war in Sudan, and the project was formally suspended a year later (Azza, 2024). Although efforts to revive the project were renewed in 2008, continued conflict and political instability in South Sudan have left its future uncertain (Lunt et al., 2019).

Draining major wetlands can have profound ecological consequences (Woodward et al., 2022). If completed, the Jonglei Canal could significantly reduce groundwater recharge, and lead to a deterioration in water quality, changes in sediment transport, and disruption of the local climate (NBI, 2024). These changes could lead to a dramatic loss of biodiversity, destruction of fish habitats, and the degradation of critical grazing lands.

Furthermore, the Canal would interfere with the seasonal migration patterns of both wildlife and livestock. Traditional livelihoods that depend on fishing, herding, and seasonal agriculture could be severely impacted (NBI, 2024 and Azza, 2024).

4.6. Why Nile Cooperation Matters

The Nile Basin faces an increasing array of complex challenges that threaten its environmental sustainability and the livelihoods of millions who rely on the River. Addressing issues such as rapid population growth, urbanisation, poverty, and impacts of climate change demands coordinated, basin-wide strategies that balance development with sound environmental stewardship.

When managed collaboratively, the Nile River can serve as a catalyst for shared growth and sustainable development. Joint investments in agriculture, energy, transport, and conservation have the potential to transform the Basin into a model for regional integration and transboundary cooperation.

Coordinated infrastructure and resource management can mitigate risks, prevent conflict, and unlock shared benefits - outcomes unlikely to be achieved through fragmented, autonomous efforts.

The 80MW Regional Rusumo Falls Hydroelectric Project, jointly owned and financed by Burundi, Rwanda, and Tanzania, stands as a flagship example of effective sub-basin investment cooperation. The project showcases full-cycle collaboration, spanning joint identification, preparation, financing, implementation, and shared management and benefits. It demonstrates how countries

can successfully work together to deliver sustainable, regionally beneficial infrastructure that supports energy security and economic development.

Thus, cooperation among the 11 Nile riparian countries is not optional, but essential to:

- Advance regional social and economic development, integration, and stability
- Promote win-win development strategies that enhance food security, energy access, industrial growth, environmental sustainability and climate adaptation
- Build stronger economic and political collaboration, as an alternative to actions that risk exacerbating poverty, environmental degradation, and regional tensions

4.6.1. Takeaways for Journalists

Although water distribution in the Nile Basin has long been a source of tension (Chakraborty et al., 2015), the history of Nile agreements reflects a gradual shift from exclusivity and conflict toward greater inclusiveness and cooperation. NBI, through its mandate to promote Basin-wide collaboration, has created a vital platform for dialogue among riparian states. This platform has laid the groundwork for sustainable socio-economic development by encouraging the equitable use and shared benefits of the Nile's water resources. Building on this foundation, the CFA aims to strengthen transboundary cooperation and ensure that all riparian countries have an equal voice in the management of the Nile River.

REPORTING ON THE NILE

Covering transboundary water resources like the Nile is both inspiring and demanding. From identifying compelling story ideas, to sourcing accurate information and credible experts, to ensuring balanced representation across the region, journalists often invest significantly more time and resources than they would when reporting on national water issues. This section explores the unique challenges of reporting on the Nile and offers a practical guide to help journalists navigate them and produce impactful stories.

5.1. Gaps in Media Coverage of the Nile

The impact of journalism in the Nile Basin will depend heavily on how stories are framed – whether as opportunities for collaboration or as flashpoints for discord (Aman, 2021). Several studies have highlighted persistent shortcomings in how the media covers Nile-related issues. The Netherlands-based IHE Delft Institute for Water Education analysed 980 articles published between 2013 and 2018 across 10 media outlets – two each from Egypt, Ethiopia, Sudan, Uganda, and global media. The findings revealed a significant underrepresentation of scientists and scientific research in coverage of Nile affairs (Fantini, 2021).

The study showed that journalists most frequently quoted politicians (in 72 percent of articles), followed by government officials such as diplomats or representatives from technical ministries (38 percent), and then experts or scientists (31 percent). However, most of the experts cited were government-affiliated and primarily reinforced political narratives rather than providing independent analysis. When independent scientists were quoted – whether local or international – their commentary often emphasised risk and crisis, further entrenching a conflict-focused framing. Additionally, the voices of local communities, such as farmers and other ordinary citizens, were largely absent. When included, they were typically portrayed only as passive victims.

National vs. Regional Perspectives

Although the Nile River is a transboundary resource, media coverage often frames it through narrow national or local lenses. Most reporting focuses on national interests, with little effort to present the broader regional context. The IHE Delft Institute report reveals that media narratives in Eastern Nile countries predominantly focus on issues of security, conflict, and international relations – only recently incorporating environmental perspectives. In Egypt, for instance, the media often frames the Nile as “a critical resource for the Egyptian people, a matter of life or death” (Aman, 2021).

Inconsistent Coverage

Media attention to the Nile tends to be event-driven and sporadic, typically triggered by developments such as high-profile visits, diplomatic meetings, negotiations, or the inauguration of major projects (Aman, 2021). This irregular coverage leaves critical long-term issues such as water scarcity, environmental degradation, the impacts of climate change, and the ever increasing water pollution largely underreported, limiting public understanding and engagement with the River's broader challenges.

Specifically, about climate change, the media has a pivotal role in bridging the information and knowledge gap. According to a global analysis by the Reuters Institute, traditional and digital media remain the public's main sources of climate information – 31% of people rely on television, while 24% turn to websites and social media (Ejaz et al., 2025).

Yet despite this central role, mainstream media is falling short in preparing audiences for the escalating impacts of climate change and environmental degradation (Mahoozi, 2025). Coverage spikes during major events such as UN Climate Summits (COPs) or World Water Day but quickly declines afterward, leaving long stretches with little reporting.

This event-driven approach means environmental issues receive attention only in bursts, while their ongoing, structural nature is sidelined. The problem is even more acute in countries grappling with conflict or political instability, where environmental journalism ranks low on editorial agendas (Mahoozi, 2025). As a result, chronic threats such as climate-induced migration, food insecurity, and water scarcity remain largely invisible to both domestic and global audiences.

Delayed and reactive coverage weakens public awareness and reduces pressure on policymakers. Mahoozi (ibid) posits that without consistent media scrutiny, policy makers face little accountability to adopt or enforce strategies needed to protect vulnerable communities and ecosystems.

Other Gaps in Nile Media Coverage

Insights gathered from interviews and questionnaires with senior journalists, water experts, civil society actors, and government officials also highlight several recurring challenges in how the Nile is reported. These gaps not only point to areas where journalists can develop new and compelling story angles; they offer newsroom managers ideas for strategic intervention and training. Key issues identified include:

- **Politicised and shallow coverage:** Many stories are framed to fit prevailing political narratives, often at the expense of depth, balance, and nuanced analysis.
- **Oversimplification of complex issues:** Reporting often fails to provide adequate context, reducing multifaceted topics to simplistic headlines.
- **Event-driven reporting:** Coverage tends to be reactive – focused on conferences, announcements, or official events – rather than proactive or investigative.
- **Neglect of ecological dimensions:** Disputes over dam construction, water allocation, and regional tensions dominate headlines, while environmental and sustainability

concerns receive minimal attention.

- **Repetitive themes:** Many stories centre on dwindling water levels or geopolitical rivalry, limiting the diversity of stories.
- **Sensationalism:** Politically charged or emotionally exaggerated reporting often obscures the real, underlying issues.
- **Poor use of visual and data tools:** There is limited use of graphics, data visualizations, photos, and statistics to enrich storytelling and support facts.
- **Missing community perspectives:** Coverage rarely highlights how Nile-related issues affect everyday lives. There is little reporting on local participation, social impacts, or governance failures.
- **Lack of investigative and analytical work:** There is a noticeable deficit in enterprise journalism, in-depth analysis, and long-form investigations.
- **Need for specialised training:** Journalists and editors lack access to targeted training on how to effectively report on issues of complex transboundary resources like those of the Nile.

5.2. How to Write Better Stories

The challenges outlined in Part 5.1 shed light on ways journalists can strengthen their coverage of the Nile and produce more impactful, credible stories.

Yearn for Knowledge

Reporting on water is a form of science journalism, grounded in facts, research, and data, not assumptions or opinions (Dewedar, 2021). A strong science journalist is one who constantly seeks knowledge. As Aman (2021) notes, journalists need a sound understanding of the issues in order to communicate them clearly and accessibly to the public.

For those covering Nile water issues and transboundary cooperation, it is essential to invest in research and continuous training. Understanding the technical, political, legal, and social dimensions of transboundary water management requires continuous professional development. Not only does this deepen a journalist's expertise, but it also builds credibility with expert sources, who are more likely to collaborate with journalists they can trust to report accurately and thoughtfully.

Pluralise Sources

Effective reporting on Nile-related issues must reflect the diversity of perspectives across disciplines and societies. This means going beyond purely technical or legal views to include voices from social sciences, economics, environmental studies, and cultural perspectives.

Importantly, research should not be treated as unquestionable truth. Instead, it must be critically examined, verified, and supplemented through further investigation. As Abdelmohsen (2021) emphasizes, journalists must avoid single-source stories, no matter how authoritative a source may appear.

To achieve this pluralism, journalists must proactively seek out and build relationships with a broad range of experts, including scientists, civil servants, and researchers across the Nile Basin. These relationships should be based on trust and mutual respect – journalists need to choose sources with relevant qualifications and transparent motivations, and maintain those relationships over time (Mugira, 2021). When covering sensitive topics, the safety and anonymity of sources must be considered (ibid).

Moreover, journalism in water science and diplomacy – both traditionally male-dominated fields – must work to amplify the voices of women scientists and professionals. As Fantini (2021) notes, women's perspectives are often overlooked, despite their unique insights and innovative approaches to water management, climate adaptation, and cooperation. Including women, youth, and other underrepresented groups enriches coverage and ensures that water policies reflect a broader range of needs and priorities.

Expertise is also not limited to academics or scientists. Farmers, indigenous communities, and everyday water users – who are often portrayed solely as victims – also hold valuable, experience-based knowledge (Fantini, 2021). Elevating their voices can enhance the relevance and depth of stories, and help shape more responsive policies.

Use Visuals Effectively

Water and environmental issues can be technical and abstract. Photographs, maps, infographics, and data visualizations can help simplify complex concepts, especially for TV and online audiences. These tools improve engagement and comprehension, making the story more accessible and visually compelling.

Go there!

While digital tools have made remote reporting easier, they should not replace fieldwork. Many newsrooms have adopted “armchair reporting” as a cost-saving measure, but stories produced without direct engagement often lack depth and originality. Truly impactful stories require on-the-ground investigation, face-to-face interviews, and first-hand observation.

Pursue Impartiality

Upstream developments are frequently perceived as threats by downstream countries, creating polarizing narratives and nationalistic reporting (Schneider, 2021). In such contexts, journalists must resist the temptation to adopt activist or advocacy roles. Objectivity, balance, and accountability are essential pillars of responsible journalism – and must be upheld to foster constructive public discourse.

Seek Trust; the Rest Will Follow

Many scientists are wary of journalists, fearing their work will be misrepresented. In the sensitive

realm of transboundary water reporting, a single misquote or error can escalate tensions (Abdelmohsen, 2021). Building trust takes time, but it begins with ethical and accurate journalism. There are no “stupid” questions in science reporting – journalists must feel confident to ask for clarification whenever needed. If something is unclear to the journalist, it will likely be unclear to the audience as well.

Recording interviews, helps ensure accuracy, and it is often appropriate to return to sources to verify quotes or clarify complex points. Over time, accurate and responsible reporting builds stronger relationships with scientists, who will be more willing to share information and insights.

Highlight Solutions

The old journalism adage — “When a dog bites a man, that’s not news; but when a man bites a dog, that is news”- highlights a tendency to prioritize conflict and crisis. Yet, the Nile Basin is also home to many constructive initiatives. Communities are finding ways to adapt to climate change, and national and regional programmes are working to improve water security. For example, some countries are investing in seawater desalination to expand freshwater access. Highlighting such positive developments offers a more balanced view and can inspire other countries. Solution-focused journalism supports regional cooperation and forward-looking policymaking.

- Always use credible sources and, where possible, explain your source’s attachments for any possible conflict of interest. Research has shown that most scientists commenting on the Nile issues are embedded in governments and may have vested interests. To write a balanced story, speak to scientists from different institutions.
- Provide clear background and context.

5.3. How to find Nile Basin Stories

Pursue the regional perspective

While identity remains a vital narrative (Aman, 2021), journalists stand to make a greater impact by approaching the River as a shared regional resource. National policies and local practices frequently produce ripple effects that extend across borders, influencing the ecological, social, and political dynamics of the entire Basin. A shift in perspective toward what might be termed a “Nile lens” offers a more comprehensive and constructive framework for reporting. Explore and highlight the interdependence among Nile Basin countries. Bring attention to shared development challenges and collective aspirations.

This approach invites critical, regionally attuned questions: In what ways might a new policy or development decision alter the health of the Nile or the equilibrium of the Basin? What are the broader consequences – environmental, social, or diplomatic – that may follow? Where might opportunities lie for mutual benefit, and where might tensions emerge?

Such framing encourages reporting that moves beyond national boundaries and prevailing narratives of competition or exclusivity. Instead, it brings into view the deep interdependence among Nile Basin countries. Stories that centre on shared vulnerabilities and collective aspirations can reframe the public discourse and promote a deeper understanding of regional stakes.

One especially potent journalistic avenue lies in exploring how cross-border collaboration may offer answers to national or local problems. Consider, for example, the implications of an upstream irrigation scheme on downstream water availability, or the potential for a successful climate adaptation strategy in one country to inform initiatives elsewhere. Cooperative approaches to water management, energy sharing, and environmental conservation offer compelling case studies in how regional thinking can yield practical solutions.

Investigative and feature reporting that probes these dimensions has the potential to inform, to connect, and to reimagine what is possible in a region shaped by both shared resources and shared futures.

Networking

The Nile story is not new. Start by reading the existing stories, study the gaps and get follow-ups and updates. There are journalists who have specialized in reporting about the Nile. Some of them have formed associations such as the Nile Basin Media Network, which discusses cross-border issues and publishes several stories on its website - <https://www.theniles.org/>.

Teaming up with like-minded colleagues will help you get more information and news tips and uncover angles you may not have considered about the Nile. By networking with journalists from other countries, you can easily get voices of local people, private experts and government officials from those countries. You can even agree to share bylines. Besides, NBMN offers journalists reporting grants.

Leveraging Social Media

Social media platforms such as X (formerly Twitter), Facebook, and LinkedIn can be valuable tools for monitoring emerging narratives, public sentiment, and underreported stories. These platforms can help surface new angles on existing coverage and highlight issues not yet in the spotlight. They also offer opportunities to connect with experts and sources across the region, broadening the scope and depth of reporting.

Follow the Commitments

The riparian countries and development partners have made commitments in regard to regional cooperation and sustainable use of transboundary natural resources. Investigate and report any successes or diversions (in policy and practice) from these commitments. As discussed in Part 4.2, the CFA has a number of commitments. You can start with those and probe how these commitments relate with the Global Goals, the 17 Sustainable Development Goals.

Build a Network of Sources

The Nile story is big. It has a variety of perspectives. The geopolitics/cooperation, environment, water security, pollution, climate change, energy, agriculture, population, economic growth and development, poverty, and Urbanisation are some examples of news angles to the Nile story. Having contacts of sources in these various fields will simplify your news reporting process. These sources may include experts, policy makers, political and religious leaders, and even the local people.

Commit to Consistent Coverage

Sustained media coverage is essential for shaping public understanding and influencing policy regarding the Nile River and its related resources. Inconsistent reporting undermines the media's ability to fulfil its role of raising public awareness and holding policymakers accountable for adhering to principles of regional cooperation and sound water resource management.

To maintain consistent coverage, journalists are encouraged to pursue follow-up stories and revisit earlier reports. Providing updates on developments, outcomes, or unresolved challenges ensures that audiences remain informed and engaged over time.

Water is a crosscutting issue that intersects with various aspects of society, including economic development, cultural identity, and daily livelihoods (Jadallah, 2021). Approaching Nile-related stories through these broader lenses, rather than limiting coverage to high-level meetings or political negotiations, can generate a steady stream of meaningful and compelling content.

Climate change should be treated as an ongoing, everyday story, not just an occasional headline. However, research has shown that media coverage of climate issues tends to spike around high-profile international events such as UN Climate Summits (COPs) and World Water Day, only to decline sharply in between (Mahoozi, 2025). This episodic approach undermines public understanding of the persistent and evolving nature of the climate crisis. In the Nile Basin, consistent media reporting is especially vital. The region is highly vulnerable to climate-related impacts on water availability, agriculture and food security, public health, and infrastructure. Sustained and locally grounded coverage could help amplify the lived experiences of affected communities, drive policy dialogue, and support adaptation efforts.

Study Journals and Reports

The other way to build knowledge about the complex Nile River system, the geopolitics and development in the Nile Basin as well as get fresh news angles, is through routinely studying journal articles and reports. It helps to keep track of the latest research and scientific articles, and always be on top of new research.

The NBI, along with academic institutions and independent researchers, regularly produces studies on the Nile River and regional cooperation. These reports offer valuable insights and potential leads for original, in-depth reporting. Access to such material is often available through the NBI Secretariat, its regional centres, or national focal points within water ministries.

The NBI has also uploaded a number of reports on its website. These reports give updates on the state of the Nile River and related resources, cooperative arrangements and programmes and projections on various issues among other materials. On the website, go to 'e-library' under 'data & knowledge' - <https://nilebasin.org/e-library>.

On the NBI website, you can also subscribe to the Nile–Flow, a periodical newsletter that features institutional and technical information related to Nile water cooperation activities.

On the other hand, most academicians publish their research reports in online journals. The following are some of the journals featuring research papers on the Nile:

- Nile Water Science and Engineering Journal
- <https://www.nilebasin-journal.com/index.php>
- East African Journal of Environment and Natural Resources
- <https://journals.eanso.org/index.php/eajenr/article/view/1673>
- ScienceDirect - <https://www.sciencedirect.com/>
- Chinese Journal of Population Resources and Environment
- <https://www.tandfonline.com/doi/abs/10.1080/10042857.2010.10684960>
- Journal of Resources and Ecology - <https://www.jorae.cn/EN/home>
- Water Research Journal - <https://www.sciencedirect.com/journal/water-research>
- Journal of Water Resource and Protection - <https://www.scirp.org/journal/jwarp/>
- Water and Environment Journal - <https://onlinelibrary.wiley.com/journal/17476593>
- Water and Environmental Sustainability Journal - <https://www.journalwes.com/>
- Water and Climate Change Journal - <https://iwaponline.com/jwcc>
- Journal of Water and Environmental Nanotechnology (JWENT)
- <https://www.jwent.net/>
- International Journal of Rural Development - <https://www.rural21.com/english/>

The NBI has a dashboard for academic journalists, which you can access if you contact its Secretariat.

Platforms such as Taylor & Francis (<https://www.tandfonline.com/>) to search peer-reviewed journals and articles. Taylor & Francis is both a publisher and aggregator of journals. The Group works in partnership with editors, societies, associations, and librarians to publish over 2,700 journals in the fields of social science, humanities, science, technology, and medicine.

The Multidisciplinary Digital Publishing Institute (MDPI) - <https://www.mdpi.com/>) specializes in open access journals and books. It boasts of 455 diverse and open access journals, including 446 peer-reviewed journals and 9 conference journals, supported by more than 295,000 academic experts.

Springer Nature Link (<https://link.springer.com/>) also provides access to a wide range of scientific, technological, and medical journals, books, and reference works.

Most of the journal aggregators require you to subscribe to their emailing lists and receive routine email alerts on your topics of interest.

Accessing Academic Research

Many academic journal articles are behind paywalls, limiting direct access. However, alternative routes are available. Google Scholar (<https://scholar.google.com/>) often links to free PDF versions when available. If not, the journal's website typically includes the lead author's contact information. Researchers are frequently willing to share copies of their work and may also respond to follow-up questions, contributing to more accurate and well-informed reporting.

5.4. Major Online Sources for Nile Basin Stories

- State of the River Nile Basin report 2021 (updated every three years)
– <https://nilebasin.org/node/11923>
- The Nile water resources atlas - <https://nilebasin.org/node/12311>
- Atlas of transboundary wetlands in the Nile Basin - <https://nilebasin.org/node/13203>
- Nile Basin forecast and monitoring (River flow, floods, early warning and drought monitoring reports) - <https://nilebasin.org/en/action-area/transboundary-wetlands>
- NBI e-learning courses - <https://elearn.nilebasin.org/>
- Nile Basin environmental flows (database, study repository, manuals and guidance)
– <https://nilebasin.org/environmental-flows-portal>
- Nile Basin dams database - <https://dams.nilebasin.org/>
- Nile Basin water quality database - <https://nilebasin.org/waterqualitydatabase>
- Nile Basin groundwater database - <https://nilebasin.org/groundwaterdatabase>
- Socio-economic profiles of Nile countries (GDP, economy and growth, population, agriculture and rural development, education, health, energy and mining, climate change, infrastructure, gender, public sector, trade, etc.)
– <https://nilebasin.org/socioeconomic>
- NBI portal for the different policies, strategies, and guidelines of the Nile Basin Sustainability Framework (NBSF) - <https://nilebasin.org/policy-portal>
- Nile Basin wetlands database
– <https://nilebasin.org/en/action-area/transboundary-wetlands>
- Experts' presentations during the Nile Basin Development Forum (NBDF) conferences
– <https://nilebasin.org/nbdf-archive>

5.5. Story Leads and Reporting Angles

The following are sample themes and angles that may help uncover impactful, underreported stories related to the Nile Basin:

- **Climate Impacts:** Examine how shifting rainfall patterns and rising temperatures are altering River flow, with consequences for agriculture, biodiversity, and water access.
- **Wetland Conservation:** Report on the status of key wetlands such as the Sudd or Lake Victoria, and efforts to protect them.

- **Pollution and River Health:** Investigate sources of pollution—industrial, agricultural, or domestic—and their effects on ecosystems and communities.
- **Governance and Cooperation:** Explore the role of institutions such as the Nile Basin Initiative (NBI), and the state of water-sharing agreements or negotiations.
- **Infrastructure and Development:** Assess the socio-economic impacts of dams, whether operational or planned.
- **Urban-River Dynamics:** Investigate how cities depend on or degrade the Nile and its tributaries.
- **Human Stories:** Share the experiences of those whose livelihoods depend on the River—anglers, farmers, pastoralists, and women collecting water.
- **Cultural Heritage:** Document traditional knowledge and cultural expressions related to the Nile, including songs, rituals, and oral histories across Basin communities.
- **Data Journalism:** Use data to analyse issues such as access to safe water, demographic pressures, or environmental trends within Nile Basin countries.
- **Climate Finance:** Track the flow and effectiveness of climate adaptation funding in the region.
- **Youth Engagement:** Highlight school- or youth-led initiatives focused on conservation and environmental education.
- **Legal and Policy Analysis:** Examine national and regional laws, policies, and governance frameworks for their role in enabling—or undermining—sustainable River management.
- **Multimedia Reporting:** Employ photography and videography to visually depict the changing landscapes and lives along the Nile.
- **Audio Storytelling:** Develop podcasts or mini-documentaries to tell long form narratives about the River’s challenges and significance.

GLOSSARY OF KEY TERMS

A

Afforestation: Planting of trees in an area that has not been forested for a long time. The goal of afforestation is to create a forest.

Algae: Primitive, non-vascular water plants consisting of a single cell or aggregation of cells. Algae occur in both marine and fresh water, while some are terrestrial, living in damp situations on walls, trees, etc.

Algal bloom: The occurrence of a very high population of algae in a water body.

Alluvial: Relating to mud and/or sand deposited by flowing water. Alluvial deposits may occur after a heavy rainstorm.

Aquifer: A layer of underground rock or other material that stores and provides water. Aquifers are made up of permeable or fractured rock, or unconsolidated materials that allow water to flow through them.

B

Barrage: A type of low-head dam with adjustable gates, used to control water levels for irrigation, navigation, or other purposes. A barrage does not create a large, deep reservoir like a traditional dam.

Bio concentration: The accumulation of a chemical in tissues of an organism (such as fish) to levels that are greater than the level in the medium (such as water) in which the organism resides.

Biodegradable: Able to be broken down into basic compounds by microorganisms.

Biodiversity Hotspot: A region with exceptionally high levels of biodiversity, containing a significant number of endemic species and facing threats such as habitat loss and climate change.

Biodiversity: The diversity of species of plants and animals and their habitats on Earth. The term 'biodiversity' includes all genes, species, and ecosystems, and the ecological processes of which they are a part (Gaston 1996 cited in NBI, August 2022).

Biological Degradation or Biodegradation: A process by which microorganisms break down waste materials. Nutrient additives may be introduced into a contaminated area (such as groundwater

or soil) for the specific purpose of encouraging biodegradation.

Biomass: The total mass of living organisms present in an area, ecosystem, environment or in a category of organisms. It also means organic material that comes from living or recently living organisms, including plants, animals, and microorganisms. Biomass is considered a type of carbon-based material, as it contains stored chemical energy that can be released through various processes like combustion, fermentation, or decomposition. It is a renewable source of energy and can be used as fuel or in other applications.

Blackwater: Water that contains animal, human, or food waste.

C

Cataracts: A section of a river characterised by shallow, rocky rapids that disrupt the smooth flow of water and hinder navigation. There are stretches between Aswan and Khartoum where the water's surface is broken by numerous small boulders and stones lying in the Riverbed. Measured upstream (from north to south), the First Cataract is near Aswan in modern Egypt and its length is approximately 6.5 miles, while the rest are in Sudan (Soghayroun (2009)). These distinctive features of the River between Aswan and Khartoum have led to this stretch often referred to as the Cataract Nile, while the downstream portion is occasionally referred to as the "Egyptian" Nile (ibid).

Catchment Area: Catchment is the action of collecting water, especially the collection of rainfall over a natural drainage area. A catchment area is, therefore, a geographical location from which rainfall flows into a River, lake, or reservoir (NBI, no date).

Catchment forest: A forested area that collects water from rain and contributes to the water supply for the surrounding area. The Nile Basin's catchment forests and wetlands are important for water security because they store water, retain floods, and purify water. However, these ecosystems are threatened by pollution and the use of water for energy production and agriculture.

Climate Adaptation: The process of adjusting to the current or expected effects of climate change in order to reduce harm or take advantage of beneficial opportunities.

Climate Change: The long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. However, since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that act as a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures.

Climate Mitigation: Efforts to reduce or prevent the emission of greenhouse gases (GHGs) into the atmosphere, aiming to limit the severity of future climate change.

Climate Proofing: The process of making systems, such as infrastructure, more resistant to climate change. It involves identifying and reducing the risks that climate change poses to a project

Confluence: The point where two or more flowing bodies of water, like Rivers or streams, meet and join.

D

Dam Locks: Watertight chambers with gates at each end, used to raise and lower boats between different water levels on Rivers or canals, enabling navigation past dams. Locks act as "water elevators" for boats, allowing them to navigate Rivers or canals that have dams or sections of water at different elevations.

Deforestation: The clearing or thinning of forests by humans.

Delta: A wetland area that forms when a River empties into a body of water, such as a lake, ocean, or another River. The Nile Delta is the delta formed in Lower Egypt where the Nile River spreads out and empties into the Mediterranean Sea. It is one of the world's largest deltas—from Alexandria in the west to Port Said in the east; it covers 240 km of the Mediterranean coastline and is a rich agricultural region. The Nile Delta is 160 km long and up to 185 km wide, containing extensive areas of swamps and shallow lakes. The Nile Delta has two branches that split roughly 15 km north of Cairo to carry the River's water to the Mediterranean Sea – Damietta flows to the east and Rosetta branch flows to the west (NBI, 2022).

Desalination: The process of removing salts and other impurities from seawater to produce fresh, potable water suitable for drinking, irrigation, and industrial use. This process is especially valuable in areas where freshwater resources are scarce or insufficient to meet demand. Egypt and Kenya have seawater desalination facilities. As of January 2018, the capacity of Egypt's operating desalination plants was reportedly 91 MCM/yr., with plans to build or upgrade facilities to meet a target of 255 MCM/yr. by 2021 (NBI, 2020).

Disinfectant: A chemical or physical process that kills pathogenic organisms in water, air, or on surfaces. Chlorine is often used to disinfect effluent, water supplies, wells, and swimming pools.

Dissolved Oxygen (DO): The oxygen freely available in water, vital to fish and other aquatic life and for the prevention of odours. DO levels are considered a most important indicator of a water body's ability to support desirable aquatic life.

Downstream of River Nile: Areas along the River that are closer to its mouth or endpoint, which is the Mediterranean Sea, as opposed to its sources. The Nile flows from south to north, so downstream areas are those located northward. Key downstream regions of the Nile include northern Sudan and Egypt, particularly the Nile Delta, where the River empties into the Mediterranean. Activities or changes upstream, such as water usage or dam construction, can significantly affect downstream regions, affecting water availability, agriculture, and ecosystems.

E

Ecology: The totality or pattern of relations between organisms and their environment. Note that ecology is the study and the science of the interrelations between living organisms and their environment. The term ecology is frequently misused, usually as "the ecology", when what is meant is a particular ecosystem, a set of ecosystems or the environment.

Ecosystem or Ecological System: The interconnected communities of living organisms—such as plants, animals, and microorganisms—and their physical environments, including water, soil, and

air, that function together as a unit. The Nile Basin's ecosystems include Rivers, lakes, wetlands, forests, and highland areas, which play a crucial role in supporting biodiversity, regulating water flow, and providing essential services such as food, water, and climate regulation. These ecosystems are vital for maintaining the health and sustainability of the Nile River and the livelihoods of millions of people who depend on its resources.

Effluent: Treated or untreated wastewater that flows out of a treatment plant, sewer, or industrial outfall. Generally, effluent refers to wastes discharged into surface waters.

Energy Security: Within the context of the common agenda of the Nile, energy security is about availability at the national and regional levels and is focused i) on the contribution that hydropower, as part of a mix of complementary set of renewables, can make to the availability of electricity across the basin and ii) on the optimization of this contribution which should in turn reduce the pressure on the basin's woodlands and forests (NBI, May 2022).

Environmental degradation: The deterioration of the natural environment, including resources like air, water, and soil, as well as the destruction of ecosystems and the loss of biodiversity. It encompasses any change or disturbance to the environment that is considered harmful or undesirable, often caused by human activities.

Environmental Justice (EJ): The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development and enforcement of environmental laws, regulations, and policies.

Environmental Sustainability: The responsible management of Earth's natural resources to meet current needs without jeopardizing the ability of future generations to also meet their own needs. It is about maintaining ecological balance and conserving resources for the long term, including protecting ecosystems, reducing pollution, and addressing climate change.

Equitable Utilization: Equitable utilization of transboundary resources, especially water, means using shared resources in a fair and reasonable way, considering the needs of all riparian states. It emphasizes that no state can unilaterally control a shared resource without considering the impacts on others. The concept requires states to balance their needs with those of other shared states, ensuring sustainable use and protection of the resource for all.

Eutrophication: The process in which a water body becomes overly enriched with nutrients, leading to the plentiful growth of simple plant life. The excessive growth (or bloom) of algae and plankton in a water body are indicators of this process. Recent data has shown that Lake Victoria is becoming eutrophic (Hamza, 2014).

Evaporation: A physical process that occurs when water on a liquid surface, like a lake or River, is heated by the sun and turns into gas (water vapour) and rises into the air. This occurs when heat energy is applied to water, causing molecules at the surface to gain enough energy to escape into the air as vapour. Evaporation is high in some irrigated areas in Egypt and Sudan, since surface irrigation is vulnerable to evaporation in arid and semi-arid zones, where temperatures are very high compared to other regions in the Basin (NBI, 2020). There are also high evaporation rates in lakes Victoria, Albert, Kyoga, Tana and Edward. High evaporation values in South Sudan are experienced in the Bahr el Ghazal, Sudd, and Pibor wetlands. The zone around the equator in

Uganda and Kenya has generally low evaporation values, supporting permanent vegetation cover throughout the year. Evaporation losses are moderate, with only a few exceptions, in the Nile Delta and Nile Valley.

Evapotranspiration: The combined processes through which water is transferred to the atmosphere from open water and ice surfaces, bare soil and vegetation that make up the Earth's surface. It covers both evaporation and transpiration.

F

Fauna: Animals peculiar to an area or period.

Filtration: A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter. Filtration is also often used to remove particles that contain pathogens.

Flagship Species: A species selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause e.g. Shoebill. In conservation biology, a flagship species is a species chosen to raise support for biodiversity conservation in a given place or social context. Species selected since the idea was developed in 1980s include widely recognised and charismatic species like the black rhinoceros, the Bengal tiger, and the Asian elephant (NBI, August 2022).

Floodplain: The flat or nearly flat land along a River or stream or in a tidal area that is covered by water during a flood.

Food Security: According to the FAO, food security exists when all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (NBI, May 2022).

Floodwater: The water that overflows because of a flood.

Fossil fuels: Fuels derived from fossilized organic matter such as coal, oil and petroleum. **Flora:** The plants of a particular region, habitat, or geological period.

G

Geopolitics of the Nile Basin: The complex political, economic, and strategic interactions among the countries that share the Nile River shaped by their competing interests over access to and control of the River's water resources.

Global Warming: The phenomenon of rising average air temperatures near Earth's surface over the past 100 to 200 years. Global warming results from the increasing concentration of carbon dioxide (CO₂) and other greenhouse gases that trap heat in the earth's atmosphere. This trapped energy comes from incoming solar radiation absorbed by the earth's surface and re-radiated back into the atmosphere as infrared energy (MacMillan & Turrentine, 2024.)

Gorge: A narrow, steep-sided valley formed by the erosive action of a River cutting through rock over a long period.

Grey Water: Wastewater generated from kitchen sinks, washing machines, wash-hand basins, showers and baths, which can be recycled for landscape irrigation and constructed wetlands.

Green water: The portion of rain that is absorbed by soil, stored in the root zone (portion of soil where plant roots grow and actively absorb water, nutrients, and oxygen), and eventually used by plants for growth through transpiration or evaporated back into the atmosphere. It is a key component of the water cycle and is distinct from blue water (surface and groundwater) and grey water (wastewater).

Greenhouse Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), hydro chlorofluorocarbons (HCFCs), ozone (O₃), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Greenwashing: The deceptive practice of portraying a company, product, or service as more environmentally friendly than it is. It involves making false or misleading claims about the positive environmental impact of something, often done through marketing and public relations efforts. Essentially, it is a form of "whitewashing" a company's image to appear more sustainable than it is in reality.

H

Habitat: The locality or natural environment in which a plant or animal lives.

Hardness (of water): The sum of the calcium and magnesium concentrations, expressed as calcium carbonate (CaCO₃) in milligrams per litre. Excessive hardness results in excessive use of soaps and detergents and causes the deposition of scale in teapots, water heaters, etc.

Headwaters: A tributary stream of a River close to or forming part of its source. The headwaters of the White Nile primarily originate in the Great Lakes region of East Africa. The headwaters of the Blue Nile originate in Lake Tana, in the Gish Abay region of the Ethiopian Highlands.

Hydrology: The scientific study of the movement, distribution, and management of water on Earth and other planets, including the water cycle, water resources, and drainage basin sustainability.

I

Indicator Species: An organism that serves as a measure of the environmental conditions that exist in a given area. For example, greasewood indicates saline soil; mosses often indicate acid soil. A bioindicator is any species (an indicator species) or group of species (indicator guild) whose function, population, or status can reveal the qualitative/quantitative status of the environment (NBI, August 2022).

Infiltration: The flow of a fluid into a substance through pores or small openings. For example, rain water enters and moves through the soil.

K

Keystone Species: A plant or animal that plays a unique and crucial role in the way an ecosystem

functions. Without keystone species, e.g. papyrus, the ecosystem would be dramatically different or cease to exist altogether. Some keystone species, such as the wolf, are also apex predators (NBI, August 2022).

L

Landfill Gas: Carbon dioxide, methane, and other compounds produced during the decomposition of organic waste.

Leachate: Liquid that has percolated through solid waste or other solids.

Lead: A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints and plumbing compounds has been sharply restricted or eliminated by laws and regulations.

Limnophilic Species: This pertains mostly to fish, but comprises organisms which prefer to live in lakes, ponds, marshes, pools or other slow moving, still or stagnant water (NBI, August 2022).

M

Marshes: Wetlands frequently or continually inundated (flooded) with water, characterised by emergent soft-stemmed vegetation adapted to saturated soil conditions. There are many different kinds of marshes, ranging from the prairie potholes to the Everglades, coastal to inland, freshwater to saltwater. All types receive most of their water from surface water, and many marshes are also fed by groundwater. Nutrients are plentiful and the pH is usually neutral leading to an abundance of plant and animal life (NBI, August 2022).

Marshland: A type of wetland that is regularly or continuously flooded with water and is dominated by soft-stemmed/non-woody vegetation such as grasses, rushes, sedges, and reeds. Marshes are typically located in low-lying areas near Rivers and lakes, often experiencing periodic or permanent flooding. Marshes help to control floods by reducing the speed and temporarily storing floodwaters. Marshes also act as natural filters by trapping sediment, helping to prevent pollution.

Methane: A colourless, non-poisonous, flammable gas created by microorganisms as they digest (anaerobic decomposition) organic compounds found in landfill wastes.

Modelling: The method of creating a representation of a phenomenon, object, system, or process to help understand, explain, or predict it. These models can be physical, conceptual, or mathematical, and they serve as a tool for scientific investigation and communication.

N

Nile Resources: The various natural assets provided by the Nile River and its basin, primarily water, but also including fertile land, forests, and wetlands. The Nile's water is essential for irrigation, drinking water, fishing, and hydroelectric power generation for millions of people across the Nile Basin. The River's fertile land, historically enriched by annual floods, is also a crucial resource for agriculture.

Nile River Basin: The entire geographical area drained by the Nile River and its tributaries, covering parts of 11 countries in Africa - Burundi, DR Congo, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania and Uganda.

Nile River System: The Nile River and the surface waters (tributaries, wetlands and lakes) and groundwater, which are related to the Nile River.

Non-conventional water resources: Water sources that are not traditionally used, requiring specialized processes or treatment before use. These include recycled water, desalinated water, and other sources like agricultural drainage water or treated wastewater. Sudan reported in 2016 a contribution from non-conventional water sources of 18 MCM/yr. Egypt is the only Nile riparian state that is recycling significant volumes of agricultural drainage water – estimated at 3.5 BCM per year – and treated municipal wastewater – estimated at 1.4 BCM per year (Saad, Marwa, Bayoumi, & Zoghdan, 2015 in NBI, 2020).

Nutrient: Any substance assimilated by living things that promotes growth. The term is often applied to nitrogen and phosphorus in wastewater, where excessive amounts create algae growth and other problems.

O

Ozone Layer: The thin protective layer of gas 10 kilometres to 50 kilometres above the earth that acts as a filter for ultraviolet (UV) radiation from the sun.

P

Palustrine: Vegetation frequenting a group of wetlands traditionally called marshes, swamps, bogs, fens and vleis (NBI, August 2022).

Peatlands: A type of wetland whose soils consist of organic matter from decaying plants, forming layers of peat, a brown deposit-resembling soil. Peatlands arise because of incomplete decomposition of organic matter, usually litter from vegetation, due to waterlogging. While covering only 3 percent of the global land surface, they store more than double the carbon of all forests globally (Leifeld & Menichietti, 2018). This is why their ongoing degradation (17 percent of peatlands are either destroyed or degraded globally) accounts for 5 percent to global greenhouse gas emissions (Crump, 2017 cited in NBI, 2020)

Perennial Water: A surface water that flows continuously throughout the year.

Permeability: The degree to which groundwater can move freely through the rocks and soil of an aquifer, indicative of the degree to which pores and fractures in rocks are actually interconnected.

Phreatophyte: Plants with temporary or permanent access to groundwater (NBI, August 2022). They depend upon ground water that lies within reach of their roots.

Plume: A well-defined area of contamination in groundwater, soil or the air downstream from the source.

Potable Water: Water of sufficient quality to serve as drinking water.

Precipitation: The process by which water in the atmosphere falls to the Earth's surface in various forms. It is a key component of the water cycle and occurs when atmospheric water vapour condenses into water droplets or ice crystals, becomes too heavy to remain suspended in the air, and falls to the ground.

Production Well: A well specifically designed to pump groundwater for domestic or municipal use (to differentiate from a monitoring well).

R

Ramsar Site: A wetland that has been designated as internationally important under the UN Ramsar Convention on Wetlands. The convention was established in 1971 in Ramsar, Iran. Wetlands are designated as Ramsar sites to: Conserve biological diversity, protect rare or unique wetland types, and sustain human life by maintaining the ecosystem's components, processes, and benefits. Ramsar sites in the Nile Basin include the Sudd wetlands in South Sudan; Lake Bisina, Lutembe Bay, Lake Nabugabo, and Mabamba Bay wetland systems in Uganda; Lake Bardawil, Lake Burullus, Lake Qarun and Wadi El Rayan protected areas in Egypt.

Reclaimed Water: Former wastewater that is treated to remove solids and impurities in compliance with set standards in regulation, which may then be used for agriculture, landscape irrigation, recharge of groundwater aquifers, and power generation supplies, industrial and other uses.

Reforestation: The practice of restoring previously existing forests and woodlands that have been destroyed or damaged.

Renewable Energy: Electricity supplied from renewable energy sources, such as wind and solar power, geothermal, hydropower, and various forms of biomass. These energy sources are considered renewable sources because they are continuously replenished on the Earth.

Renewable Water Resources: Those that are naturally replenished through the water cycle, including both surface water (like Rivers and lakes) and groundwater (like aquifers). These resources are essentially recharged by precipitation and can be considered sustainable as long as they are not overexploited.

Riparian Habitat: Areas adjacent to Rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands.

Riparian Zone: The area of land along the banks of a River that is shaped by the presence of water. Riparian zones are important ecosystems.

Riverbed: The ground at the bottom of a River.

River Basin: A geographical area where all precipitation drains into a common outlet (NBI, 2025/1).

Runoff Coefficient: The fraction of rainfall that reaches the River and is available for downstream

users. The runoff coefficient is low (around 5 percent) for large parts of the Nile Basin, with the notable exception of the eastern Nile region in Ethiopia and upper head catchments of the Baro River, where the average runoff coefficient is greater than 20 percent (NBI, 2020). In the large White Nile sub-Basin, the runoff coefficient is very low. This means that most rainfall over the White Nile Basin never reaches the Nile system.

S

Sediment: Topsoil, sand, and minerals washed from the land into water, usually after rain or snow melt. The White Nile supplies only about 3 percent of the sediments to the Nile System because most of the sediment load is trapped in the Sudd marshes. The Blue Nile supplies about 60 percent of its sediment load while the Tekeze–Atbara River contributes an additional 25 percent of sediments to the Nile System.

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Surface Water: Water that is present on the ground or in a stream, River, lake, wetland or ocean.

Sustainability: Human practices that do not result in the permanent damage, alteration or depletion of the environment, ecosystems, species or natural resources.

Sustainable Development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Broadly, sustainable development means maintaining the delicate balance between the human need to improve life styles and the feeling of well-being on the one hand, and preserving the natural resources and ecosystems on which future generations and we depend (Oweyegha-Afunaduula, 2005).

Swamps: Any wetland dominated by woody plants. Swamps are characterised by saturated soils during the growing season and stagnant water during certain times of the year. The highly organic soils of swamps form a thick, black, nutrient-rich environment for the growth of water-tolerant trees such as Cypress (*Taxodium* spp.), Atlantic White Cedar (*Chamaecyparis thyoides*), and Tupelo (*Nyssa aquatica*). Some swamps are dominated by shrubs, such as Buttonbush or Smooth Alder. Plants, birds, fish, and invertebrates such as freshwater shrimp, crayfish, and clams require the habitats provided by swamps. Many rare species, such as the endangered American Crocodile, depend on these ecosystems as well. Swamps may be divided into two major classes, depending on the type of vegetation present: shrub swamps and forested swamps. – (NBI, August 2022)

T

Toic: Extensive shallow floodplains that support many livestock in the Sudd region. It emerges gradually on the edges of wetlands (permanent swamps and marshes) outwards into the plains flooded by rainfall; and includes riverine marshes, seasonal swamps and smaller isolated lakes.

Transboundary Cooperation: The collaboration between different countries or regions that share a common resource, such as a River, lake, or shared environment, to manage and benefit from it sustainably. It involves working together to address issues like water resource utilization, pollution, and environmental protection.

Transboundary Resources: Natural resources, like water or ecosystems that are shared by two or more countries. The activities of one country in managing these resources can directly affect the quantity, quality, or availability of the resource in another country. This shared ownership and interdependence require cooperation and coordination between countries for effective management.

Transpiration: The process that occurs when plants pull water from the soil through their roots and release it into the air through their leaves. The leaves have small pores called stomata that release this water. Average annual transpiration is generally above 750 mm for large parts of South Sudan and the Equatorial Nile region, except for some areas that have traditionally been used as rangeland. Average annual transpiration is also high in the Baro Basin and remains substantial in a considerable part of the Blue Nile Basin in Ethiopia (NBI, 2020)

Treated Wastewater: Wastewater that has been subjected to one or more physical, chemical, and biological processes to reduce its potential of being health hazard.

U

Umbrella Species: These are species selected for making conservation-related decisions, typically because protecting these species indirectly protects the many other species that make up the ecological community of its habitat e.g. Papyrus (NBI, August 2022).

Upstream of River Nile: Areas situated closer to the source of the River and further away from its mouth or endpoint. The River Nile flows from south to north, starting from its primary sources, Lake Victoria in East Africa and Lake Tana in Ethiopia (via the Blue Nile), and emptying into the Mediterranean Sea. Thus, upstream indicates areas along the Nile that are closer to its sources, such as Uganda, Rwanda, Kenya, DR Congo, Tanzania, Burundi, and parts of Ethiopia. Activities or phenomena occurring upstream, like dam construction or water extraction, can influence the flow and availability of water downstream.

V

Vector: Any agent (person, animal or microorganism) that carries and transmits an infectious pathogen into another living organism.

W

Water Quality: The physical, chemical, and biological characteristics of water that determine its suitability for various uses, including drinking, agriculture, industry, and ecosystem support. Clean water is essential for human health and environmental sustainability. In many developing countries, livelihoods depend on safe water access. Contamination, whether from pathogens, chemicals, or heavy metals, poses serious health risks, causing waterborne diseases like cholera and typhoid, and contributing to economic losses through healthcare costs and reduced productivity (NBI, 2025/1).

Wastewater Treatment Plant: A facility containing a series of tanks, screens, filters, and other processes by which pollutants are removed from water. Most treatments include chlorination to attain safe drinking water standards.

Water Security: Water security can be defined in many ways. At the household level, it is about having continuous access to a safe supply of water. At the level of Nile, it is more strategic and is reflected by the definition provided the World Bank “diagnostic Initiative” – “the reliable availability of an acceptable quantity and quality of water for health, livelihoods, production and ecosystems, coupled with an acceptable level of water related to risks” (NBI, May 2022)

Water Towers: Water towers refer to highland and forested areas that act as natural reservoirs, collecting rainfall and releasing it gradually to supply Rivers and streams. The Ethiopian Highlands are the largest and most vital water tower, contributing approximately 85 percent of the Nile’s total flow (NBI, 2020). The other three water towers are located in the equatorial zone – the Rwenzori Mountains and Mount Elgon.

Water Variability: The fluctuations in the availability, distribution, and quality of water over time and space. This variability can occur on different timescales (daily, seasonal, annual, or longer-term) and across different geographic areas. It is influenced by factors such as climate, weather patterns, geological conditions, and human activities.

Watershed: An area or ridge of land that separates waters flowing to different rivers, basins, or seas. Watersheds are defined by natural boundaries like hills or ridges that separate one drainage area from another.

Wetland: An area covered or submerged by surface or groundwater supporting plants and animals, typically adapted for life in water-saturated soil conditions. The term “wetland” is applied to a broad range of different habitats and ecosystems including swamps, flood plains, seasonally flooded grasslands, the edges and shallow waters of Rivers and lakes, estuaries and coastal marshes, as well as mangroves and peat bogs. It also includes man-made or constructed wetlands. “Wetlands occur where water meets land. They include mangroves, peatlands and marshes, rivers and lakes, deltas, floodplains and flooded forests, rice-fields, and even coral reefs (NBI, August 2022).

Sources: These definitions and explanations have been sourced from various materials including: Studdard, 1973; IPCC, 2022; NBI, 2020; Oweyegha-Afunaduula, 2005; EPA, 1989; SNJ, 2018; Kumar, 2024; NIH, 2024; and MacMillan & Turrentine, 2024.

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