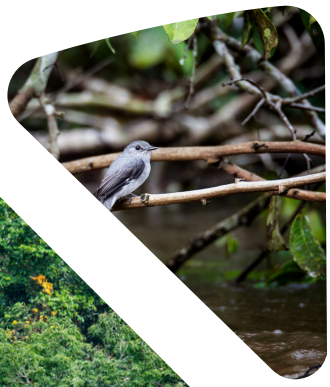
CONGO BASIN
LANDSCAPES INITIATIVE



Water in the Congo Basin

Understanding water cycle interconnections through forests and peatlands in the Congo Basin is essential for predicting how deforestation and climate change will affect water levels, livelihoods, and biodiversity, and for developing early warning systems to protect these important ecosystems.

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WATER AS A LIFELINE IN THE CONGO BASIN:

Connecting Land, Water, and Climate Systems to Sustain Communities and Support Peatland-Forest Biodiversity

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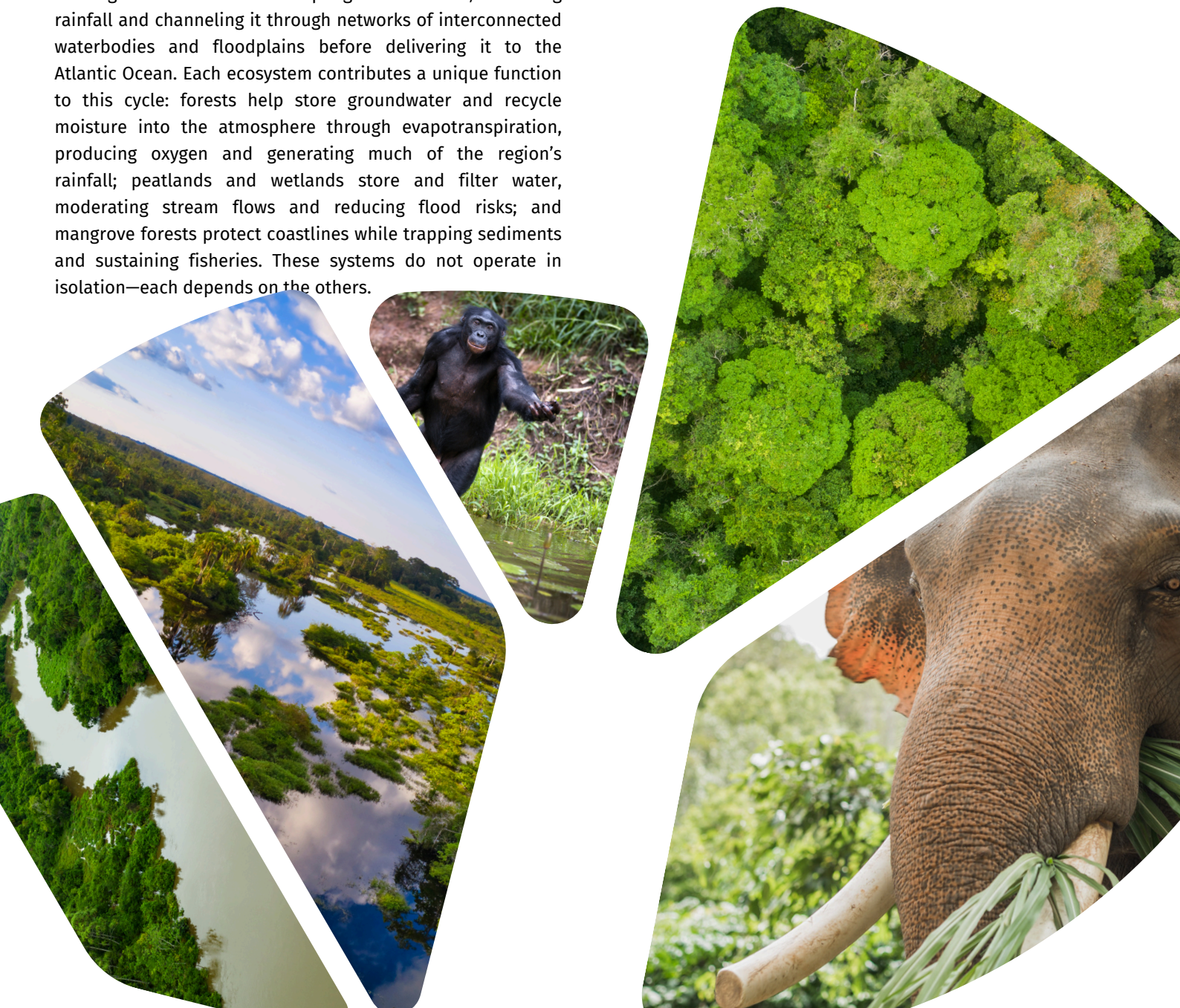
Introduction

The Congo Basin spans six countries—Cameroon, the Central African Republic, the Democratic Republic of Congo, Equatorial Guinea, Gabon, and the Republic of Congo—encompassing over 4 million square kilometres of interconnected rivers, lakes, savannas, peatlands and other wetlands, mangroves, and dense tropical rainforests. At the heart of this vast system is fresh water, the unifying element that weaves these ecosystems together, circulating through the landscape and atmosphere, shaping lives, cultures, livelihoods, and the climate across and beyond Central Africa. This water continuum not only sustains the 65 to 80 million people who depend on these ecosystems for agriculture, fishing, and forest resources, but its influence reaches even further, affecting rainfall patterns as distant as the Sahel — highlighting the Congo Basin's critical role in Africa and in the global water cycle.

The region functions as both sponge and conduit, absorbing rainfall and channeling it through networks of interconnected waterbodies and floodplains before delivering it to the Atlantic Ocean. Each ecosystem contributes a unique function to this cycle: forests help store groundwater and recycle moisture into the atmosphere through evapotranspiration, producing oxygen and generating much of the region's rainfall; peatlands and wetlands store and filter water, moderating stream flows and reducing flood risks; and mangrove forests protect coastlines while trapping sediments and sustaining fisheries. These systems do not operate in isolation—each depends on the others.

The Congo River—the world's second-largest by discharge volume—exemplifies this interconnectedness. It collects water from across the basin and redistributes it downstream, tying upland forests to lowland deltas, estuaries, and coastal mangroves. This water continuum supports a mosaic of different critical ecosystems, creating one of the richest reservoirs of biodiversity—over 1,000 bird species, 700 fish species, 400 mammal species, and 10,000 plant species thrive within this interconnected web.

When one link in this chain is weakened—whether through land degradation, deforestation or drainage, pollution, or climate change impacts—the entire system becomes more vulnerable. Maintaining the health of the Congo Basin's water cycle means protecting the integrity of the Basin's ecosystems as a whole, recognizing that resilience depends on interconnection and continuity.



Peatlands of the Congo Basin

"To maintain these carbon and storage functions, peatlands, simply speaking, must remain wet - they must remain waterlogged."

The Congo Basin holds one of the world's largest tropical peatland complexes, spanning
167,000 km² in the Cuvette Centrale region of the Republic of Congo and the Democratic Republic of the Congo —equivalent to the combined area of England and Wales. These waterlogged ecosystems act as natural regulators, absorbing rainfall and surface water, storing it for extended periods, and slowly releasing it into surrounding rivers, lakes, and aquifers. This hydrological buffering moderates stream flows, reduces flood risks during heavy rains, and maintains water levels during dry periods while filtering sediments and pollutants.

The region's peatlands are divided into rain-fed systems (75%) that rely on direct precipitation, and river-fed systems (25%) that receive water from the Congo River and its tributaries. Many of these wetlands are part of the unique 'Complexe Transfrontalier Lac Télé - Grands Affluents - Lac Tumba'and the world's largest transboundary Ramsar site covering 6.5 million hectares across the two countries.

These peatlands sustain around 5.5 million people and host endangered species like bonobos, western lowland gorillas, and African forest elephants to name a few. They support approximately 200 freshwater species and are integral to local economies through fishing, water and transport access, and forest products.

Peatlands in the Congo Basin, like other peatlands found around the world, are fragile, their health and function is tied tightly to the presence and availability of water at their surface. Because of the critical role the peatlands play for water regulation, their protection, conservation and sustainable management need to be prioritized as called for by the 4th United Nations Environmental Assembly (Resolution 4.16). Beyond water regulation, these peatlands play a vital role in climate stability as they have captured and currently store an estimated 29Gt of soil organic carbon—equivalent to two years of global greenhouse gas emissions alone. In addition, unlike other tropical river systems, the Cuvette Central experiences low seasonal fluctuation, enabling these wetlands to remain continuously inundated, providing unique conditions for sustained water and carbon storage. To maintain these functions, peatlands, simply speaking, must remain wet - they must remain waterlogged. When water tables drop due to unsustainable land use or drought, peatlands release carbon rapidly into the atmosphere, contributing to climate change.

Primary threats to these ecosystems include mining, conversion to agriculture or forestry, oil exploration and extraction, logging, and infrastructure development that result in lowering the water table and exposing peat soil to air. Climate change poses additional risks through changing rainfall patterns and rising temperatures that could increase evapotranspiration rates. However, sustainable alternatives like ecotourism and collection of non timber forest products and paludiculture—productive land use that preserves wet peatlands—offer solutions that support both resilience and local livelihoods.

Water ecosystems in the Congo Basin

"To maintain these carbon and storage functions, peatlands, simply speaking, must remain wet - they must remain waterlogged."

The Congo River drains water from nine countries, originating in Zambia and fed by tributaries like the Kasai, Lomami, Ubangui, and Sangha. It sustains fisheries, agriculture, hydroelectric power, and is critical for navigation across 25,000 kilometers of waterways.
While the Congo River maintains a relatively steady flow throughout the year, this stability is shaped by a mix of natural factors — including the buffering capacity of wetlands ad peatlands — and the river's unique equatorial crossing, which creates a balancing effect as different tributaries experience opposite wet and dry seasons. Yet this balance is fragile. Agricultural runoff, industrial pollution, changing rainfall patterns, and episodic flooding all contribute to water quality degradation and ecological stress downstream, impacting communities and ecosystems throughout the entire basin.

In 2021, pollution from an Angolan diamond factory turned the Kasai River pink, leading to a transboundary human and environmental disaster. In 2024, Kinshasa, Brazzaville and many other towns and villages along the river suffered deadly floods as the water reached record levels. Pollutants and plastics carried downstream reach the Atlantic Ocean, with Congo River waste now traced to and documented on Brazilian shores showing the global interconnectedness of the water continuum.

At the river's mouth, vital mangrove ecosystems filter water, protect coastlines from erosion and storms, and provide livelihoods while absorbing greenhouse gases at outsized rates. The mangroves also provide nurseries and habitat for diverse fauna including manatees, hippos, crocodiles, and serve as refuges for endangered species like the lamantin and turtles. However, they face threats from river pollution, urban development, illegal fishing, mining activities and oil extraction.

Cross-border water management exemplifies these regional interconnections. The proposed Lake Chad replenishment project illustrates complex trade-offs—diverting water from the Ubangi River could restore the lake that has shrunk by 90% since the 1960s but might disrupt the already unstable Ubangi's hydrological balance and harm aquatic biodiversity and livelihoods. This ongoing debate between regional commissions highlights the need for integrated water resource management strategies and basin-wide landscape planning that account for cumulative effects across borders.

Forests of the Congo Basin

“[...] Often called the "lungs of Africa" [...] the world's second-largest contiguous tropical forest. “

The Congo Basin's forests, contributing to approximately 70% of Africa's forested area, are often called the "lungs of Africa" and represent the world's second-largest contiguous tropical forest. These forests provide essential services including water filtration, carbon sequestration, and habitats for threatened species. The Republic of Congo's rainforests alone absorb about 1.5% of global carbon emissions, while supporting the livelihoods of 60 million people and providing food for an additional 40 million in urban areas.

Beyond supporting communities and biodiversity, forests play an important but often overlooked role in the global water cycle. Congo Basin forests release massive amounts of water vapor through evapotranspiration, the combined process by which water moves from the earth's surface into the atmosphere through both evaporation from soil and water surfaces and transpiration from plant leaves.

This water vapor contributes significantly to cloud formation and rainfall patterns in the region. Up to half the region’s precipitation is generated internally by its forests. This moisture can also travel globally on wind currents and influence rainfall as far away as the Sahel and Ethiopian Highlands and contribute up to 85% of surface water reaching Egypt through the Nile River. Studies suggest complete forest loss could reduce western Congo rainfall by 42% while increasing eastern region rainfall by 10%, highlighting complex regional variations. However, these forests face mounting pressures from unsustainable deforestation, mining, illegal logging, agricultural expansion, and infrastructure development. Deforestation increased by 12.5% in 2023 compared to 2018-2020 averages, with the DRC experiencing the world's second-highest deforestation rate after Brazil. If current trends continue alongside population growth of 3% annually, primary forests in the DRC could be cleared by 2100, and at least 27% of undisturbed Congo Basin rainforests may be lost by 2050.

Conclusion and Recommendations

Sustainable land management and Integrated Water Resources Management need to go hand in hand and require a deeper understanding of ecology and ecosystem functions to make good development decisions and inform plans policies and programmes that have long-term positive impacts for people and the planet.

The Congo Basin is not just a regional resource—it is a central node in Earth's hydrological and climate systems. Its forests and wetlands generate rainfall, recharge aquifers, and link with oceanic currents that shape distant coastlines and communities. Disrupting any part of this interconnected system risks triggering cascading effects with far-reaching environmental, economic and social consequences worldwide.

Key Recommendations

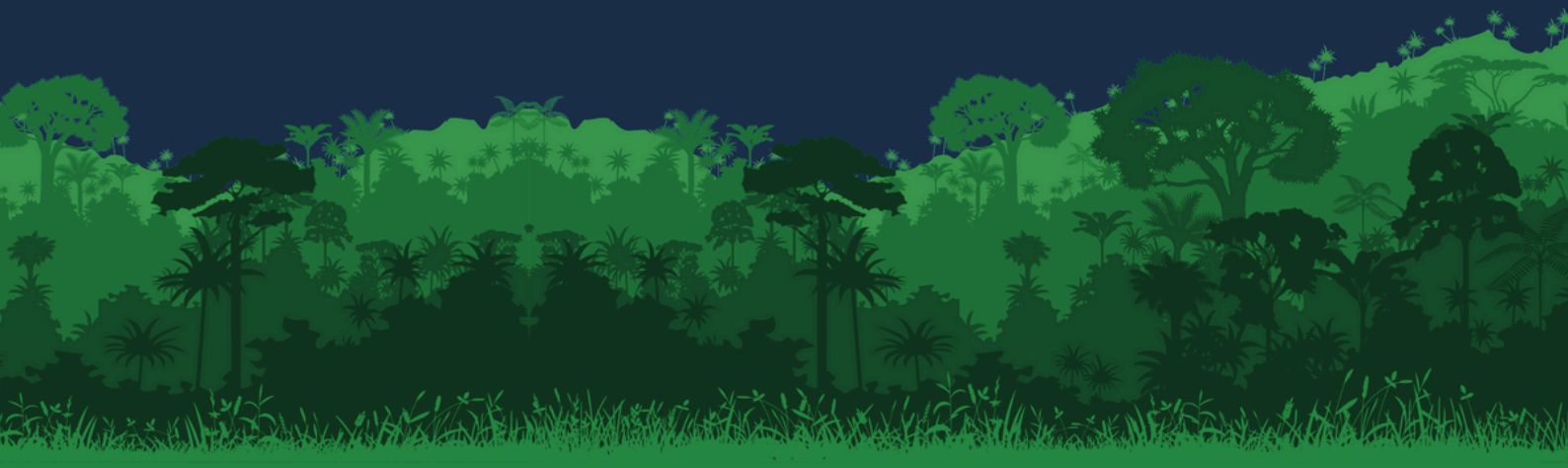
Strengthen International Cooperation. Build upon existing collaborations like the Congo Basin Forest Partnership (130+ partners) and the Central African Forest Initiative (CAFI) by expanding cross-border agreements similar to the Republic of Congo and Democratic Republic of Congo's joint management of three Ramsar sites and their Brazzaville Declaration for peatland protection

Enhance Research and Capacity Building. Scale up successful initiatives like the CongoPeat project (linking six UK universities with five Congolese organizations) and expand the Congo Basin Science Initiative to train more regional experts. Strengthen the Congo Basin Water Resources Research Centre to accelerate technology transfer and build local scientific capacity.

Implement Integrated Management Approaches. Deploy holistic and nexus tools including Integrated Water Resource Management (IWRM), water-energy-food-ecosystem approaches, and source-to-sea / ridge-to-reef approaches to connect land, freshwater, coastal, and marine ecosystems. These approaches should foster cooperation between upstream and downstream stakeholders while encouraging policy integration and cross-sector coordination.

Address Knowledge Gaps. Prioritize research to understand ecosystem interconnections and their role in the global water cycle. Focus on developing evidence-based approaches that address climate change, biodiversity loss, and pollution simultaneously through comprehensive hydrological cycle management.

Build Multi-Stakeholder Partnerships. Establish effective collaborations among policymakers, private sector, scientists, civil society, Indigenous Peoples, and local communities. Address current gaps in science, knowledge, and capacity to enable comprehensive management of the entire land-freshwater-coastal-ocean continuum while safeguarding interconnected upstream and downstream environmental assets.



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