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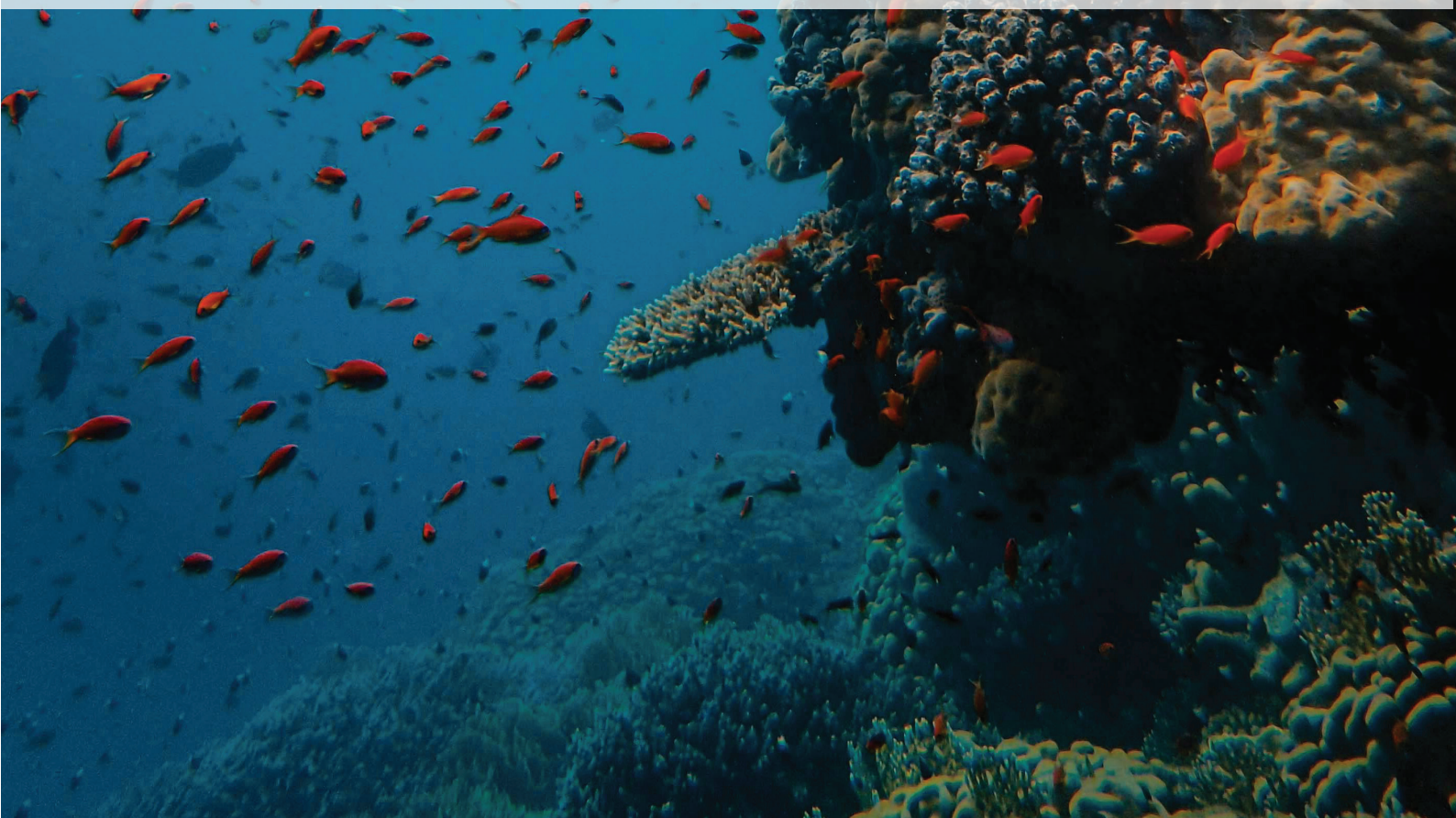
POLICY BRIEF

# Aquatic Biodiversity Hotspots in Africa



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## Background:

This policy brief is based on the report of the study conducted by the consultant, Giorgio Brandolini on the 'Impact of climate change on the aquatic ecosystems and biodiversity and mitigation measures – Case Study for Africa'. Under the SIDA funded project 'Conserving aquatic Biodiversity in Africa Blue Economy', which is implemented by the African Union InterAfrican Bureau for Animal Resources (AU-IBAR.

The study covers both the marine and freshwater ecosystems in Africa. The report identified the key aquatic biodiversity hotspots in Africa and the threats of climate change.

*The identified aquatic biodiversity hotspots are:*

- ***Marine ecosystems*** **-** the mangroves forest habitats of Guinea Bissau, the Gambia, Tanzania, Mozambique (erosion and biodiversity loss e.g. benthic invertebrates like tiger prawns and mud crabs); Madagascar, Tanzania and Kenya coral reefs (growing bleaching); Mauritius seagrass (degradation and biodiversity loss), Banc d'Arguin off Mauritania coast (migratory bird route degradation),

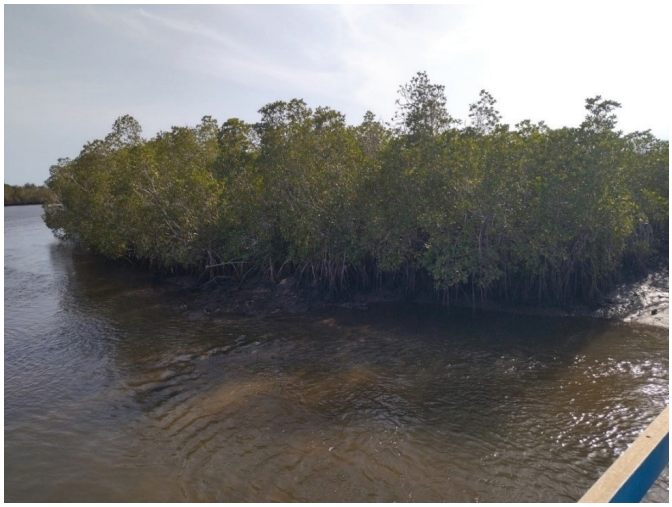

***Plate 1.*** *Mangroves at Buba, Guinea Bissau. Photo credit excited from — Giorgio V. Brandolini 's report (2022)*

***Plate 2.*** *Threatened healthy coral reef ecosystem in Shimoni (south coast -Kenya); Photo by the REEFolution Foundation*

***Plate 3.*** *Ongoing coral reef restoration work in Shimoni (south coast, Kenya) with the REEFolution Foundation. Photo by the REEFolution Foundation.*

***Plate 4.*** *Degraded Coral reefs off Tanzania's coast - the disappearance of the coral's colour, revealing the white skeleton due to heat stress. Photo by Shutterstock*

- ***Freshwater ecosystems -*** the Madagascar freshwater (endemic fish biodiversity loss); the Zaire River basin (degradation and biodiversity loss), Africa's Great Lakes Tanganyika, Malawi, and Victoria – (cichlid and other fishes biodiversity loss), the Sudd swamp in South Sudan and Zambezi valley (migrating bird routes degradation), the Chad lake basin and Okavango Delta (desertification and biodiversity loss); (AU-IBAR, 2022).

***Plate 5.*** *Fishing boats at the shores of Lake Chad" Image Source: "Kri Kri, by EU Civil Protection and Humanitarian Aid is licensed under CC BY-NC-ND 2.0.*

***Plate 6.*** *Section of Lake Tanganyika revealing biodiversity threats: e.g. human activities, such as deforestation, unsustainable agricultural and fishing practices, mining activities and pollution. Photo by Friends of Lake Tanganyika – Tanzania.*

It is important to note that the marine aquatic biodiversity hotspot facing significant decline in biodiversity is the Guinea Current Large Marine Ecosystem (GCLME) region. This decline is the result of anthropogenic and natural causes. The limitation of reliable data on these changes and insufficient coordination among the countries of the region challenge the effective management and protection of the aquatic organisms. On the other hand, majority of freshwater threatened ecosystems lie a cross the Africa's great lakes region, (AU-IBAR, 2021). For example, Lake Tanganyika - a biodiversity hotspot is home to over 700 species of fish that are found nowhere else in the world and borders several national parks and nature reserves that are of worldwide significance for the protection of wildlife. The region includes forest areas that are among the few remaining habitats for chimpanzees (Friends of Lake Tanganyika – Tanzania).

## Notable climate change impacts on selected African aquatic biodiversity hotspots:

***Senegal -*** Seawater seeping into underground freshwater aquifers is slowly increasing soil salinity, wreaking havoc on farming communities living near biodiversity-rich wetlands. Siné Saloum delta in Senegal is a biodiversity hotspot and UNESCO world heritage site encompassing wetlands, lakes, lagoons, and marshes, as well as sandy coasts and dunes, terrestrial savannah areas, and dry, open forest. It is home to endemic species and plays an important role in flood control and regulating the distribution of rainwater for the local people and wildlife. Drought, climate change, and uncontrolled logging of mangrove forests are increasing the salinity of the ground threatening the livelihoods of the people that live there. Over the last decades, the water extracted from the wells has gradually turned salty.

***Egypt -*** This country faces significant challenges as a result of its limited water resources and rapidly growing population. Climate change is expected to raise even more concerns across the country, with serious environmental, social, and economic consequences. Where transboundary water agreement commitments exist, Egypt's current water availability is insufficient to meet the required water demand for agriculture, industry, domestic use, and others. Furthermore, concerns for the Egypt's Nile water share is linked to the economic development of the upper basin. It is worth noting that Climate change can present both challenges and opportunities for the countries that partake the waters of the Nile River Basin to collaborate to reduce the impact of Climate change.

***Uganda -*** Climate variability and change since the 1970' have been accompanied by changes in the hydrology and water balance of inland aquatic systems. Small shallow lakes like Kawi in eastern Uganda and Wamala in central Uganda are extremely vulnerable to the effects of climate change. In the last decades, the average air temperature around Lake Wamala has increased as well as rainfall. In case of Lake Kawi, the air temperature has increased and rainfall decreased. Fishers from Lake Kawi reported that the lakeshore has receded. In practice, the precipitations are no longer sufficient to maintain normal lake water levels and lake surface area as temperature and wind speed, which increase evaporation, continue to rise. This change has serious consequences for lake productivity processes. Presently, the Lake Victoria has a higher level than normal despite the climate change.

***Kenya -*** Climate change affects coral reefs by altering long-term mean environmental conditions, inter-annual cycles, seasonality, and the frequency of extreme climate events. Coral communities in Kenya (as well as in the

Seychelles and Maldives islands) have been assessed to be generally less rich and diverse, with fewer bleaching-tolerant coral taxa, with evidence of continued declines in the abundance of temperature-sensitive taxa and community change. The rise in temperature has been found to be the leading cause of bleaching of corals in Kenya waters.

***Mozambique -*** This country shorelines host large mangroves ecosystems that are mostly found in sheltered shorelines and river estuaries. Mangrove concentrations are highest in central Mozambique, in river deltas and estuaries. Overexploitation for construction and firewood and clearing for solar salt production are major threats to mangroves, along with pollution and expansion of human settlements. Although evidence of the impact of Climate change on mangrove ecosystems are reported, anthropic activities are the leading cause for degradation of mangroves in Mozambique.

***South Africa -*** Some parts of this country will face more severe water shortages, other parts, especially those that are currently water stressed, are predicted to face increased occurrence of extreme flooding events Several small towns in South Africa's Northern and Eastern Cape provinces have been threatened by total water supply failures, and livestock farmers have faced financial ruin as a result of multi-year droughts. Heatwaves and late rains have caused local supply failures in other parts of the country. Although the dams that supply most of the major urban areas are still at safe levels, there are growing concerns that the country is about to enter a major drought. Recent devastating floods in Durban, combined with low rainfall in the Cape Town region, add to the contradictory events. Weather forecasters appear to be incapable of making accurate predictions more than a few weeks in advance. The problems encountered differ greatly from place to place.

***Mauritius -*** The degradation of seagrasses in Mauritius, as in the rest of the WIO has been assessed to be due to a range of causes ranging from local physical disturbance to the impact of Climate change. These causes include deliberate clearance for tourism-related activity, anchor damage, pollution, and sediment inflows, pollution, and sediment inflows, sea urchin herbivory, and climate related extreme weather events. The assessment also established that although seagrasses appear to be able to tolerate gradual changes in climatic conditions, Climate change induced extreme events such as heat waves or severe storms may pose a significant threat.

***Seychelles -*** Climate change-induced shoaling of the mixed layer in the Western Indian Ocean (WIO) between Seychelles, Madagascar and the Mozambique channel may result in significant decreases in surface and subsurface temperatures in the WIO between Seychelles, Madagascar, and the Mozambique Channel. This

would imply that they would be less vulnerable to warm seawater temperature anomalies.

***Angola -*** The distribution of numerous pelagic species including Sardinella and Trachurus has changed with the rise of the water temperature in recent years. The higher depth of colder water and increased oxygen concentration create problems in the small-scale fishers' communities using dugout canoes without engine. They lack the resources to catch fish moving deeper. The change of fish seasonality also affects artisanal fishers that share this activity with agriculture.

***Mali -*** Flooding is a big issue as the part-time fishers are able to catch only immediately after flood, otherwise they need to travel a long distance to follow the water and the fish. Some marine artisanal fishers do not fish during high waves periods as the canoes are too small and it is too dangerous to fish in some seasons.

***Sierra Leone -*** The marine and lagoon fishermen operate inside Bonthe lagoons during the energetic ocean period. Artisanal fishers change to agriculture and small fish processing to live on when climate induced events make it difficult for them to catch fish.

***Chad -*** Lake Chad, the main threats of Climate change are the growing scarcity of freshwater, increased levels of salinity for coastal communities, possibility of worsening health from air pollution concentration (the projected increase in the number of inversions will trap pollutants in the atmosphere close to the ground), heat stress (the number of extremely hot days may increase), and increased flooding (rainfall events may become fewer but heavier).

***Lake Chad Basin (LCB)***

This basin coves about 8% of the African continent surface. Its surface has decreased from 25,000 km2 in 1960 to 4,800 km2 in 2014. The impact of climate change explains half of this reduction in surface.

***Okavango Internal Delta (OID)***

This delta, located in Northern Botswana, is one of the world's inland deltas and also one of the world's richest biodiversity hotspots with remarkable wetland flora and fauna, has an estimated surface area of 160 km2. The basin is vulnerable to the effects of climate change and local development and has seen the active cells shrinking to 90,000 km2 in the recent decades (AU-IBAR, 2022)

## Mitigating the impact of climate change in aquatic biodiversity hotspots

### *Mechanisms for integrating and enhancing ecosystem-based solutions*

#### *Mitigation mechanisms:*

Payment for ecosystem services such as carbon credits for mangrove conservation could benefit fisherfolk livelihoods while also promoting ecosystem restoration and conservation.

Implementation of conservation methods such as marine protected areas, season and aerial closures, marine spatial planning. Strong regulatory measures for sustainable coastal tourism, oil and gas exploration and mining activities for mining impact on aquatic biodiversity hotspots and ecosystems

#### *Adaptation mechanisms.*

Interventions in this field are very diversified. They include adaptation planning, community-based management, adaptive management, and government support. The innovative approach of Coastal spatial planning, incorporating participatory modalities, is intended to represent the interests of the coastal population living of the aquatic resources with those of other socio-economic sectors

#### *Inclusive Community based management and adaptive management*

Community-based management reduces the effects of Climate change impacts on the coastal populations' livelihoods such as ocean acidification, more frequent and intense precipitation floods, droughts, and sea-level rise Promoting inclusive gender-based measures for nature-based solutions in ecosystems restorations and degraded habitat

Adaptive management is made of a broad range of activities that improve the efficiency of the use of the aquatic ecosystems and biodiversity. The capacity to quickly adapt to changing natural capital through new harvesting techniques and tools plays a role in the evolution of aquatic systems-dependent livelihoods.

#### *Institutional strengthening*

Policies and regulatory measures that reduce fishing effort, overcapacity, and promote sector sustainability make fisheries and aquaculture-based livelihoods more resilient in face of climate change impacts and protection of fragile aquatic biodiversity and ecosystems

Also, the need to strengthening monitoring, control and surveillance for protection of aquatic biodiversity hots and ecosystems. Technologies are now available to perform the remote surveillance of the fishing and protected areas

Implementation of harmonized frameworks for regional management of transboundary aquatic ecosystems for protection of aquatic biodiversity hots and aquatic ecosystems. African states should establish bilateral and multilateral agreements to join forces and coordinate their action in the management of the shared transboundary aquatic ecosystems.

Policy recommendations on areas of intervention:

1. To develop continental strategy on mechanism for protection of aquatic biodiversity hotspots
2. To develop continental guidelines on nature-based solutions in conservation of aquatic biodiversity and ecosystems restorations

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