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TECHNICAL GUIDELINE

**TRANSBOUNDARY ENVIRONMENTAL ISSUES
AFFECTING BIODIVERSITY IN SHARED
FRESHWATER ECOSYSTEMS IN AFRICA:**

*A Mechanism for Development of Harmonized Framework for
Conservation of Aquatic Biodiversity in Africa*



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I. Introduction and Background

The African Union Inter-African Bureau for Animal Resources (AU-IBAR), a specialized technical office of the Department of Agriculture, Rural Development, Blue Economy and Sustainable Environment (DARBE) of the African Union Commission (AUC), is mandated to support and coordinate the utilization of livestock, fisheries, aquaculture and wildlife as resources for both human wellbeing and economic development in the Member States of the African Union. Recently the scope of this mandate has been expanded to include technical support to Implementation of Blue Economy related activities in Africa.

Within the framework of the African Union 2063, the Africa Blue Economy Strategy (ABES) was developed to guide the development of an inclusive and sustainable Blue Economy that becomes a significant contributor to Continental transformation and growth. It is within this context that AU-IBAR, with support from the Swedish International Development Cooperation Agency (SIDA), is implementing a three-year project on “Conserving Aquatic Biodiversity and Ecosystems in the Context of the African Blue Economy”. The overall objective of the project is to enhance the Policy environment, Regulatory Frameworks and institutional capacities of African Union Member States (AU MS) and Regional Economic Communities (RECs) to sustainably utilize and conserve aquatic biodiversity and ecosystems. Accordingly, AU-IBAR, commission a study to ASSESS TRANSBOUNDARY ENVIRONMENTAL ISSUES AFFECTING BIODIVERSITY IN SHARED MARINE ECOSYSTEMS – Towards the formulation of a harmonized regional frameworks for conservation of Aquatic Biodiversity in Shared Freshwater Ecosystems.

Transboundary freshwater basins account for about 60% of the Global freshwater flow and affects more than 150 Countries, covers 46% of the World’s land area and serves about 42% of the World’s population. Of all the Continents, the African Continent has the largest number of transboundary basins and these support a population of over 800 million people.

Freshwater scarcity related to both water quantity and quality is increasing on a Global scale. The main determinant of this scarcity is increasing water use by a steadily increasing World population. Growing literature suggest that conflicts around water resources will increase dramatically in the years to come and may even lead to war (Renner 1996). The Africa Blue Economy Strategy which is recognized at the highest political level of the continent incorporates key critical vectors for promoting Blue Economy development of the Continent, including fisheries, aquaculture, and ecosystem conservation; shipping, maritime safety and trade; climate change, environmental sustainability and ecotourism; sustainable energy and extractive mineral resources; governance, institutions and job creation.

Of all the Continents, the African Continent is reported to have the highest number of transboundary Rivers basins (About 63 River basins, covering 64% of the Continent’s land area (Figure I-1) and serving several millions of people.

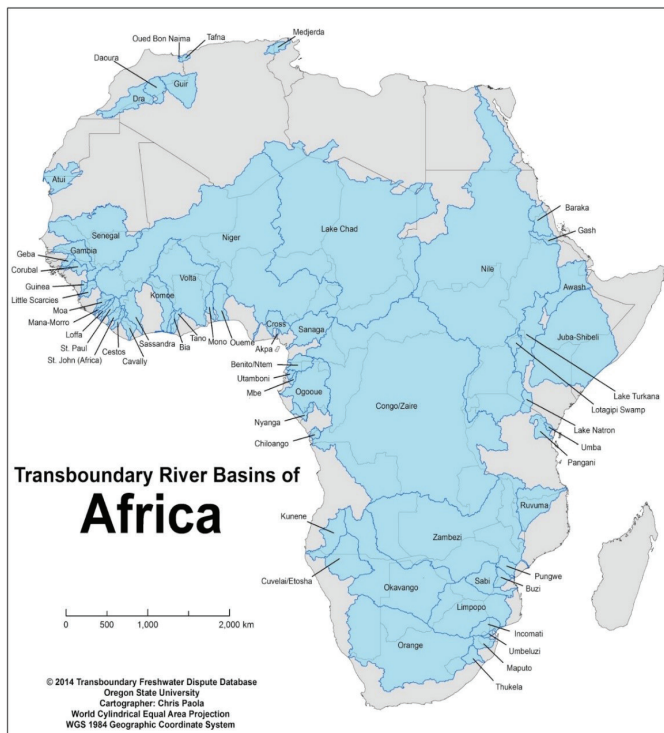


Figure 1: Transboundary River Basins of Africa (Transboundary Freshwater Dispute Database, 2014)

Key environmental stressors identified from the study results were Illegal, Unreported and Unregulated fishing (IUU), changing climate, over-exploitation of freshwater resources, pollution from point and non-point sources, destruction of habitats, invasion of exotic species and emergence of diseases that affect freshwater biota especially fish among others.

There were however some environmental monitoring activities being undertaken in selected basins and this included rehabilitation and strengthening the resilience of socio-ecological synthesis of the Lake Chad Basin and reversing ecosystem and water degradation in the Volta Basin.

Rationale:

Shared ecosystems face major threats, which include depletion of natural resources due to the rising population pressure, expansion in human activities, over-exploitation, unsustainable agricultural practices, over-fishing, pollution, rampant conversion, and destruction of wetlands in ecosystems. These threats, if not managed, may have significant negative

ecological, environmental, and social impacts. This complicates management and development of these resources. Meeting the increasing demand will be further hampered by reduced water availability, due to unsustainable use, pollution, and climate change. People living in poverty, especially women and girls, are disproportionately affected by water stress through reduced access to water and unstable energy and food prices. These pose a major threat to sustainability of aquatic ecosystems, biodiversity management, conservation of aquatic resources and fair distribution of water resources in Africa. As part of the Blue Economy Agenda, AU-IBAR commissioned this study to develop assist to Regional Institutions and AU Member States to towards development of harmonized frameworks of strategies for management of transboundary freshwater ecosystems for the conservation of aquatic biodiversity and the environmental sustainability.

Identified transboundary issues that are threats to conservation of aquatic biodiversity in shared freshwater ecosystems

The study identified changing climate, over-exploitation of freshwater resources, water pollution, flow modification (water obstruction and reduced flows), destruction/degradation of habitats, invasion of exotic/alien species (animals and plants) and emergence of diseases that affect freshwater biota especially fish as major threats affecting sustainability of freshwater resources and biodiversity conservation in transboundary basins in Africa.

A review of these threats are outline below:

Changing climate:

Climate change was identified as a major threat to biodiversity in all in the respective freshwater basins. Africa already experiences high levels of climate variability and is widely recognized as the Continent most vulnerable to climate change under all climate scenarios above 1.5 °C. The warming is expected to have severe impacts on human well-being, aquatic ecosystems, associated biodiversity and on economic development. Climate change is cited as being a major cause for the decline of fish production in Lake Kariba and Lake Tanganyika. In relation to Lake Volta, most climate predictions point to reduction in water availability and higher temperatures with increased evapo-transpiration. These factors alone have the potential to negatively affect water availability for energy production and agriculture now and in the foreseeable future.

Water pollution

Pollution from agricultural, industrial, illegal mining of sand and minerals and urbanization were identified to be major sources of pollution to transboundary water bodies. Freshwater pollution negatively alters the physical, biological and chemical characteristics of water in these basins, and this affects the abundance and diversity of inhabiting aquatic flora and fauna. Wastes from agriculture, industry, urbanization and mining include pesticides, toxic chemicals and agrochemicals. High sedimentation and toxic chemicals have also been attributed to illegal small-scale mining operations in Ghana and Cameroon.

Habitat degradation

Habitat destructions were listed among the environmental stressors affecting aquatic biodiversity in Lake Victoria in Uganda, Lake Malawi in Malawi, Lake Chad in Cameroon, Nile Basin in Sudan, Lomati in Eswatini and Volta Basin in Ghana. Degradation of riparian vegetations, shoreline erosion and clogging

of river bottoms or floodplain aggradation occurs which alters the entire aquatic ecosystem thereby affecting the existence of most aquatic flora and fauna. The conversion of lentic systems into lotic systems for hydropower generation also affect ecosystem balance which threatens freshwater biodiversity.

Overexploitation:

Illegal, Unreported and Unregulated fishing was identified as a threat to biodiversity in Lake Victoria, the Blue Nile, Lake Malawi and Lomati River Basins. Lake Malawi in the Zambezi River Basin has the highest diversity of fish species in the World but ninety percent of these are reported to be endemic. Commercial fish stock has reduced by 20%. The freshwater basins are overfished due to increase in economic activity because for many riparian communities, fishing is a major source of income/livelihood and its over exploitation was attributed to poverty and unemployment and gradual increase in fishing effort. Decline of fisheries due to loss of biodiversity in Lake Tanganyika and Lake Victoria have also attributed to overfishing among other factors.

Invasive species

Invasive species were identified as threat to biodiversity in the Lower Volta Basin, Lake Victoria, Lake Tanganyika, Lake Chad and Lake Lomati. Freshwater invasive species are plants and animal organisms that are not native to a particular ecosystem but often occupy larger surface area because of their prolific nature and their ability to easily adapt to new environments. For instance, in Lake Victoria, Uganda, the population of water hyacinth is reported to have increased tremendously such that canoes and boats could not get access to most parts of the waterbody which affected the state of fishery in the area. Fish populations reduced due to insufficient sunlight to support primary production. Nile tilapia, *Oreochromis niloticus*, has

been introduced both for aquaculture and fisheries in many parts of Africa where they have shown negative impacts on indigenous fish fauna

Currently 90% of national electricity generation in Ethiopia, Malawi, Mozambique, Namibia and Zambia comes from hydropower. Hydrological alterations of freshwater ecosystems are therefore anthropogenic activity that changes the magnitude and quantity of natural river flows which threatens the sustainability of most aquatic plants and animals.

Hydrological Alterations

Hydropower represents a significant source of electricity production in Eastern and Southern Africa.

Harmonized framework for Conservation of Aquatic Biodiversity and environmental management in Shared Freshwater Ecosystems

Harmonized management strategies for conservation of aquatic biodiversity in shared freshwater ecosystems

Biodiversity Conservation Challenge	Management Objective	Priority Action	Outcomes/Deliverable
Climate Change	To improve knowledge and understanding of the concepts of climate change, how it can impact life in the aquatic ecosystem, to reduce vulnerability to climate change and institute mitigation measures	<ul style="list-style-type: none"> Promote the development and implementation of education and training programs, including strengthening of national human and institutional capacities on climate change; Develop strategies for the transfer, acquisition and adaptation of relevant technology to alleviate the pressure on fragile ecosystems and natural resources and contribute to mitigation of climate change; Formulate nationally determined prioritized actions, considering vulnerable people, places and ecosystems; Provide scaled-up financial resources for climate adaptation and mitigation, considering country-driven strategies, and the priorities and needs of Member States. Such funds could be from public or grant-based resources for adaptation; Strengthening climate change legislation, financing and management - (CCDA) through; Reviewing and updating of CC legislation to link with changing domestic and international legislation. Development of robust financial management systems to integrate climate finance with work of key sectors; Support to development of capacity within CC institutions to effectively support and coordinate action on CC across sectors, levels of government and stakeholder groups; Strengthening capacity of Member States to enforce legislation through review of resources and support to development of management systems; and, 	Integrated strategies for sustainable operationalized at Country level; Risk management framework developed, harmonised and operationalised; and, Improved financing for climate change studies, mitigation and adaptation measures.

Biodiversity Conservation Challenge	Management Objective	Priority Action	Outcomes/Deliverable
		<ul style="list-style-type: none"> • Increase capacity of member states and training and research institutions to raise awareness of and operationalize improved approaches to time operations including legislation through support to universities, training colleges, government staff, communities. 	
Water pollution from domestic and industrial activities	To improve water quality and reduce discharge of untreated waste materials and enhance data collection	<ul style="list-style-type: none"> • Develop and harmonize common environmental standards and laws for the control of atmospheric, terrestrial and water pollution arising from urban, agricultural and industrial development activities; • Develop for riparian Countries common methods for determination of environmental standards reflecting the need for socio-economic development and protection of the environment and natural resources for the benefit of the peoples of the Community; and, • Facilitate data collection, monitoring and dissemination among Member States by setting up well equipped remote sensing centres for environmental data collection. 	Harmonized environmental standards and monitoring protocols across riparian states Equipped regional information database and dissemination hubs created
Over exploitation of freshwater resources	To manage and protect freshwater aquatic environments to minimize deleterious effects of any water and land use practice which might adversely affect aquatic habitats	<ul style="list-style-type: none"> • Undertake regular inventories of species of fauna and flora and prepare maps of their distribution and abundance • Conduct regular reviews to facilitate the monitoring of the status of such species and their habitats with a view to: • Identifying species that are threatened or may become so, and providing them appropriate protection, • Identify areas of critical importance for the survival of species of fauna and flora which are threatened and protect from public. 	Critical areas for freshwater biodiversity conservation identified and protected areas created in selected Basins Database of species status in selected basin established
Destruction or degradation of habitats	To secure and maintain the habitat conditions necessary to protect significant species, groups of species, biotic communities, or physical features of the environment where these require specific	<ul style="list-style-type: none"> • Enhance public education and appreciation of the characteristics of the habitats concerned and of the work of wildlife management; • Providing opportunities for public enjoyment through recreation and tourism appropriate in type and scale to the essential qualities of the areas; • Manage visitor use for inspirational, educational, cultural and recreational purposes at a level which will maintain the area in a natural or near natural state; to secure examples of the natural environment for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded; • Undertake research and other approved activities; for controlling fires and forest exploitation; 	Public knowledge on critical habitats enhanced Habitat management controls established

Biodiversity Conservation Challenge	Management Objective	Priority Action	Outcomes/Deliverable
		<ul style="list-style-type: none"> Reduce access that may lead to land clearing for cultivation, grazing by domestic and wild animals, and invasive species; Establish Forest reserves and carry out afforestation program. 	
Invasion by exotic species		<ul style="list-style-type: none"> Create mechanisms to coordinate national programs; Review relevant policies, legislation and institutions to identify gaps, inconsistencies and conflicts, and, as appropriate, adjust or develop policies, legislation and institutions; Enhance cooperation between the various sectors, including the private sector that might provide pathways or vectors for the unintended transfer of invasive alien species, in order to improve prevention, early detection, eradication and/or control of invasive alien species, and in particular, ensure communication between focal points of respective relevant International Instruments; Promote awareness of the threats to biological diversity and related ecosystem goods and services posed by invasive alien species and of the means to address such threats, among policy makers at all levels of government, and in the private sector; quarantine, customs and other border officials; and the general public; Collaborate with trading partners and neighbouring Countries, regionally, and with other Countries, as appropriate, to address threats of invasive alien species to biological diversity in ecosystems that cross International boundaries, to migratory species, and to address matters of common interest; Develop capacity to use risk assessment/analysis to address threats of invasive alien species to biological diversity, and incorporate such methodologies in environmental impact assessments, and strategic environmental assessments, as appropriate and relevant; and, Incorporate invasive alien species considerations into national biodiversity strategies and action plans and into sectoral and cross-sectoral policies, strategies and plans, considering the ecosystem approach. 	Coordination and cooperation of national and regional programs on invasion of exotic species among stakeholders

Biodiversity Conservation Challenge	Management Objective	Priority Action	Outcomes/Deliverable
Illegal Unreported Unregulated fishing	To minimise Illegal, Unreported and Unregulated (IUU) fishing of aquatic living resources that contravenes national, regional or International laws and frameworks to maintain a sustainable and healthy aquatic freshwater basin	<ul style="list-style-type: none"> Quantitative estimation of IUU fishing and its impact on resource sustainability in affected Member States; Strengthening national policy and legislative frameworks to combat IUU fishing; Strengthening Monitoring, Control, and Surveillance 	Improved enforcement actions against IUU fishing to enhance food and nutrition security

POLICY CONSIDERATION – Regional Cooperation for conservation aquatic biodiversity and environmental sustainability in transboundary freshwater ecosystems:

Poorly managed transboundary water supplies are projected to be potential sources of conflict and social strife among Countries. Transboundary water management is likely to be more complex than that at the national level since the water management regime, priorities and cultures usually differ more between than within Countries. Transboundary management of water resources therefore requires coordination across different political, legal, institutional, and technical settings.

Approaches for enhancing cooperation between Countries for the management of transboundary freshwater bodies and contributing basins to support the transition to sustainable development is therefore necessary. This assumes that shared water resources can provide the basis for cooperation and sharing of benefits, rather than conflict, provided that the threats to the international waters are objectively recognized and institutional structures for collaboration are created.

Successful collaborations on aquatic biodiversity conservation and environmental management across the Continent will require resources and building capacities of relevant institutions on the Continents

to serve as centres of excellence in biodiversity conservation thematic areas. Managing biodiversity and environment begins with managing the stressors underlining the biodiversity conservation challenges in transboundary freshwater ecosystems. The environmental stressors have been identified as Climate Change, Water pollution from domestic and industrial sources, over exploitation of freshwater resources, degradation of habitats from illegal mining and other activities such as overgrazing by livestock, Invasion of exotic species and Illegal Unreported Unregulated fishing. These can serve as the thematic area.

The harmonized frameworks of strategies for managing shared freshwater ecosystems would partly be underscored by International Conventions and Treaties on environment and natural resources such as Multilateral Environmental Agreements (MEAs) that are available under International law to provide framework for Countries to collaborate on a broad range of Global environmental challenges (regional groupings). The detailed report by AU-IBAR (2023) identified and provided a brief overview on existing Multilateral Environmental Agreements in selected shared freshwater bodies in Africa, including Lake Chad and the Volta Basin. Amongst the Global environmental issues that MEAs are designed to respond to include loss of biological diversity, adverse impacts of Climate Change, depletion of the ozone layer, hazardous waste,

organic pollutants, plastics, marine pollution, trade in endangered species, destruction of wetlands and critical habitats for significant number of biodiversity, among others.

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