



## **POLICY NOTE**

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**NATURE-BASED SOLUTIONS TO STRENGTHEN CLIMATE CHANGE IMPACT MITIGATION EFFORTS THAT PROMOTE THE CONSERVATION OF AQUATIC BIODIVERSITY ECOSYSTEMS - A CASE STUDY OF GAZI BAY, KENYA**

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## 1. Background and Context

The African Union Inter-African Bureau for Animal Resources (AU-IBAR) is implementing a three-year project on “**Conserving Aquatic Biodiversity and Ecosystems in the Context of African Blue Economy Strategy**’ within the framework of the African Blue Economy Strategy (ABES) and with support from the Swedish International Development Cooperation Agency (SIDA) (AU-IBAR, 2019).

The overall objective of the project is to enhance the Policy Environment, Regulatory Frameworks, and Institutional capacities of AU Member States and Regional Economic Communities to sustainably utilize and conserve aquatic biodiversity and ecosystems. One of the activities envisioned within this key objective is to support ongoing initiatives on ecosystem restoration (mangroves, sea grass, seaweed), strengthening conservation and climate change mitigation efforts, and promoting sustainable economic activities and livelihoods for AU member states (AU, 2015). Consequently, AU-IBAR commissioned studies to document the negative impacts of climate change on aquatic biodiversity and ecosystems in Africa and to recommend mitigation strategies. A follow-up action based on the recommendations of the study report was to support selected ongoing initiatives to strengthen conservation and climate change efforts mainly by utilizing nature-based solutions for ecosystem restoration.

### *Strategy*

The project is therefore implementing Nature Based Solutions (NbS) for mangrove restorations in Gazi Bay, along the Indian Ocean Coastline of Kenya. These solutions include; purchasing seedlings; tree planting; fencing protected sites; reducing soil erosion for combating climate change; payment of ecosystem services mainly involving women and youth and strengthening regulatory frameworks for conserving mangroves/coral reefs (AU-IBAR, 2022).

## 2. Case Study: Gazi Bay, Kenya

In March 2023, the AU-IBAR and the Kenya Marine Fisheries and Research Institute (KMFRI) initiated a collaboration to identify ongoing climate change mitigation initiatives in Gazi Bay, Kenya that could be supported through AU-IBAR’s assistance. This collaboration leveraged AU-IBAR’s project on “Conserving Aquatic Biodiversity and Ecosystems in the African Blue Economy,” which provided a foundation for KMFRI’s initiative in Gazi Bay, “Enhancing Conservation and Restoration of Blue Carbon Ecosystems for Community Advantages and Environmental Sustainability”.

Focusing on Gazi Bay, this specific KMFRI project targets the restoration and protection of Kenya’s blue carbon ecosystems, therefore promoting climate resilience, community well-being, and biodiversity. The project entails training 50 individuals in mangrove restoration techniques, planting 10,000 fast-growing trees and 1,000 fruit trees and replanting 10,000 mangrove seedlings in degraded areas of Gazi Bay.

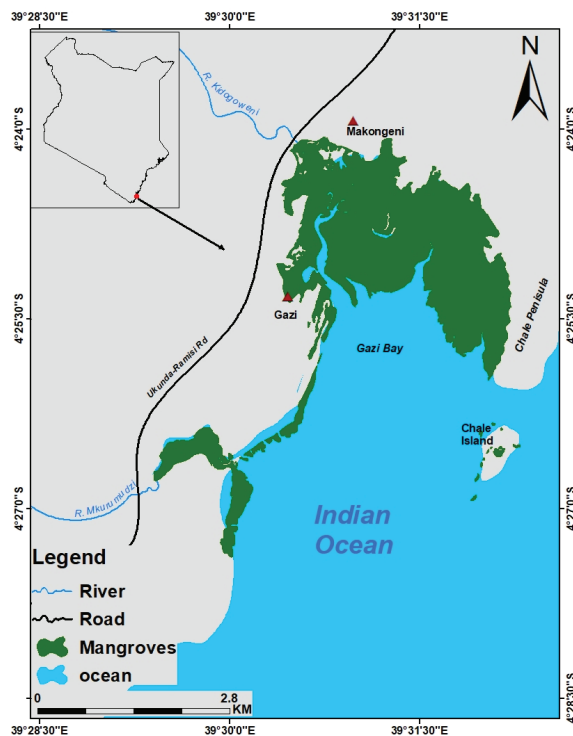


Figure 1: Locational map showing the distribution of mangroves within Gazi Bay  
Source: (Kairo et al., 2021)

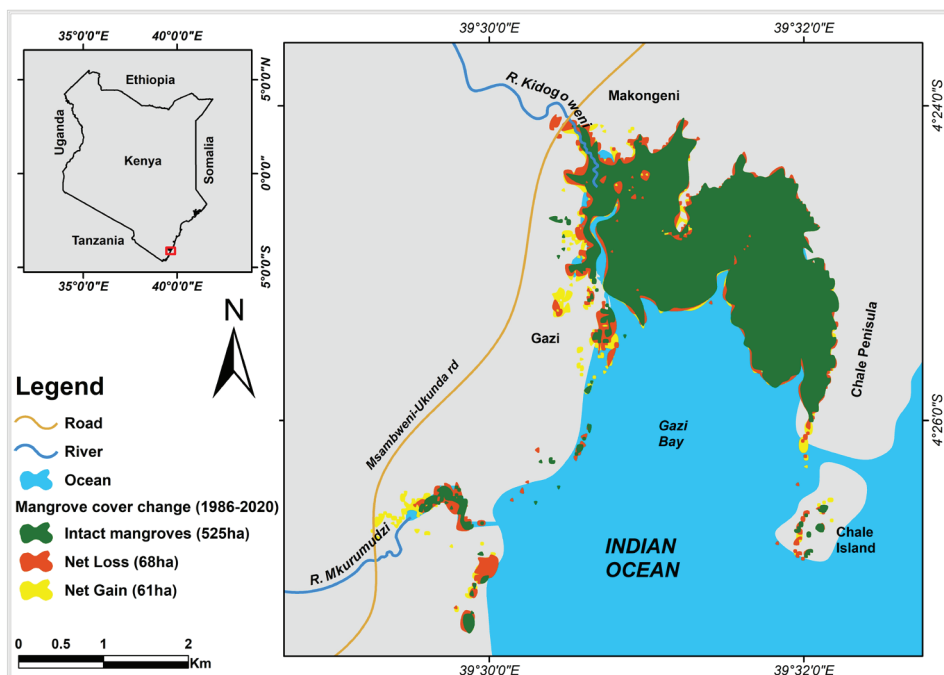


Figure 2: Areas of both decrease and increase in mangrove forest cover from 1986 - 2020  
Source: (Kairo et al., 2021)

Gazi Bay's mangroves are essential components of the Kenya-Tanzania Transboundary Conservation Areas, supporting biodiversity and sustaining local livelihoods (Dahdouh-Guebas *et al.*, 2004; Polidoro *et al.*, 2010; UNEP, 2009). Acknowledged by organizations like the World Wide Fund for Nature (WWF) and the International Union for the Conservation of Nature (IUCN), this region is globally recognized for its biodiversity and socio-economic significance to coastal communities.

### *Summary of Key Activities and Outcomes*

Community Training: with support from AU-IBAR, KMFRI conducted a community training in Gazi Bay from the 22<sup>nd</sup> to 23<sup>rd</sup> August 2023. The training focused on nature-based enterprises as alternative livelihoods to reduce overreliance on mangrove resources. Participants explored options like ecological restoration techniques, carbon trading, mangrove ecotourism, aquaculture farming and beekeeping. Additionally, the training identified areas for fencing, mangrove restoration in degraded areas, community woodlots establishment and orchid cultivation. The collaboration has since supported mangrove restoration activities in the Gazi Bay - South Coast of Kenya in Kwale County (County Government of Kwale, 2013).

## 3. Rationale and Justification

Kenya possesses approximately 61,000 hectares of mangroves, a crucial carbon sink, effectively absorbing and retaining significant amounts of carbon dioxide from the atmosphere, thereby mitigating global warming and climate change. However, threats such as excessive harvesting, habitat alteration and pollution jeopardize their ability to combat climate change effectively (Bosire *et al.*, 2014; Lang'at *et al.*, 2014). From 1990 to 2015, the country experienced a 40% reduction in mangrove coverage, attributed to factors like population growth, poverty, inequality, lack of education and awareness as well as governance issues (Richards & Friess, 2016).

The collaborative project between AU-IBAR and KMFRI helps to enhance climate change impact mitigation efforts that promote the conservation of aquatic biodiversity ecosystems and a sustainable blue economy.

## 4. Focus and Target Beneficiaries

The project aimed to empower the local communities in Gazi Bay, especially women and youth reliant on mangrove resources. This empowerment, in turn, would enhance conservation efforts and promote environmental sustainability.

The key intervention mechanisms include the following:

- Documentation of climate change impacts on aquatic biodiversity and ecosystems.
- Recommendation of climate change mitigation strategies based on study findings.
- Support for ongoing conservation and climate change mitigation initiatives, focusing on nature-based solutions.
- Collaboration with KMFRI to implement mangrove restoration activities in Gazi Bay, contributing to climate change mitigation efforts and promoting a sustainable blue economy.

## 5. Insights and best practices on Nature-based Solutions for mangrove restoration in Gazi Bay

Under the AU-IBAR/KMFRI collaboration, several activities have been planned to strengthen community benefits and promote environmental sustainability through nature-based solutions, these include;

1. Community members of Gazi Bay in Kwale County of Kenya were trained on Nature-based enterprises as part of activities being implemented under the collaboration with KMFRI on “Strengthening Restoration and Protection of Blue Carbon Ecosystems for Community Benefits and Environmental Sustainability”. The communities were equipped with knowledge and skills in nature-based enterprises including, carbon trading, mangrove ecotourism, aquaculture farming, and beekeeping, to develop alternative livelihoods and to reduce overdependence on mangrove resources.
2. Gazi Bay communities were trained on nature-based enterprises through a study tour to Kilifi County (in Kenya). During this visit, the communities learned valuable lessons and best practices for establishing nature-based solutions and enterprises (including tourism) that contribute to climate change mitigation, ecosystem restoration, and aquatic biodiversity conservation. The knowledge and capacity gained through the exchange visit and information sharing sessions enhanced the community’s understanding of the true value of mangrove forests in biodiversity conservation and ecosystem health, and hence the need to restore them. Building the capacity in NbS for aquatic ecosystem restoration and biodiversity would result in enhanced food security and the generation of additional income to the communities that entirely depend on the mangrove ecosystem; thus, responding to the global sustainable goals.

The next intervention is engaging the Gazi Bay Community for Ecological Restoration: A follow-up capacity-building workshop for practical training and orientation of the community members on advanced ecological restoration techniques. The workshop will include practical sessions on planting,

and nurturing mangroves in degraded areas, maintaining woodlots and enhancing biodiversity.

Engaging the community to conduct fencing and tree planting on identified degraded woodlots in Gazi Bay. The community woodlots identified will be fenced to protect young trees from grazing and human interference. In addition, more tree seedlings, including both fruit and fast-growing trees will be planted to diversify flora and provide alternative resources (i.e. fuel) for the community.

The ongoing collaboration with KMFRI can provide insights into NbS that would assist African Union Member States (AU-MS) in the implementation of NbS in their efforts towards enhancing the conservation and restoration of Blue Carbon Ecosystems while engaging coastal communities.

The contextual knowledge and capacity built through the exchange visit and information sharing sessions would enhance the community's understanding of the true value of mangroves forests and the need to restore them for biodiversity conservation and ecosystem integrity. The restored habitats would result in enhanced food security and additional income to the communities that entirely depend on the mangrove ecosystem; thus, responding to global sustainability.

## 6. Contextualizing Nature-Based Solutions for Aquatic Ecosystems Restoration:

- i. Replanting mangrove seedlings in degraded areas* will help to restore damaged forests (Kairo, Lang'at, Dahdouh-Guebas, Bosire & Karachi, 2008).
- ii. Communities* can be trained on how to use natural materials to stabilize shorelines, prevent erosion and protect mangrove habitats (Bosire, Dahdouh-Guebas, Kairo, Wartel, Kazungu & Koedam, 2016).
- iii. Seagrass and seaweed restoration* as well as farming in degraded areas can provide a nursery habitat for marine life, and contribute to sustainable livelihoods as well as improve water quality and sequester carbon.
- iv. Payment for Ecosystem Services (PES)* i.e., through carbon trading and ecosystem services payment. Carbon offset projects will help the local communities receive compensation for contributing towards services of mangrove/biodiversity conservation and restoration, water purification and flood control.
- v. Fisheries Co-management:* The project can engage the local fishermen in the co-management of marine resources to ensure sustainable fishing practices and to reduce overfishing.



**vi. Agroforestry systems:** Integrating tree planting with agricultural practices will help to enhance soil fertility, increase crop yields, and provide additional sources of income (Dahdouh-Guebas, Mathenge, Kairo & Koedam, 2000).

**vii. Alternative Livelihood Programs**

- *Eco-tourism Development:* Developing eco-tourism initiatives, such as guided tours of mangrove forests and seagrass meadows, to generate income for local communities while promoting conservation awareness.
- *Aquaculture:* Introducing sustainable aquaculture practices, including fish farming and shellfish cultivation, to diversify livelihoods and reduce dependence on mangrove ecosystems.

**viii. Improving Water Quality**

- *Constructed Wetlands:* Creating constructed wetlands to treat wastewater and runoff, thereby improving water quality and providing additional habitat for aquatic biodiversity.
- *Riparian Buffers:* Establishing riparian buffer zones along waterways to filter pollutants, reduce sedimentation and enhance habitat connectivity.

**Some policy considerations and recommendations:**

AU-MS can develop and implement strategic policies and legal frameworks that support mangrove conservation and protect it from destructive activities such as deforestation, overexploitation, and pollution.

1. Capacity building in AU Member States and coastal communities on Nature-based Solutions in ecosystem solutions and protection of aquatic biodiversity.
2. Awareness enhancement and exposure to nature-based enterprises as livelihood options for the protection of fragile ecosystem systems and threatened biodiversity.
3. **The imperative need for Institutional Frameworks and Support:** This will require the need to enhance the institutional capacities of relevant NGOs, governments, multi-lateral institutions, business and private sectors, and research institutions through dedicated bodies that implement blue carbon ecosystem projects. These institutions should have clear mandates, adequate funding and the authority to enforce conservation regulations (Herr, Pidgeon & Laffoley, 2012).
4. **Marine Protected Areas (MPA) and Marine Spatial Planning (MSP):** Establishing MPAs in the Gazi Bay can help safeguard biodiversity and restore the ecosystem. Marine Spatial Planning (MSP) can concurrently be adopted to manage marine resources effectively to balance ecological protection with sustainable use (Dan, Chen, Chiang & Ogawa, 2016; Hamilton & Casey, 2016; Kirui et al., 2012).
5. **Monitoring and Evaluation (M&E):** A robust monitoring and evaluation framework will help to track the progress of the restoration activities. In addition, regular assessments will help

to adapt the strategies as required and ensure the long-term success and sustainability of the projects.

By implementing these nature-based solutions, similar climate change mitigation interventions in African Union Member States and beyond can achieve their goals of enhancing conservation and restoration of blue carbon ecosystems, while also providing significant benefits to the local communities, especially women and youth.

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