

Review of Existing Marine Protected Areas (MPAs), Lessons, Best Practices and Guidelines for their Sustainable Implementation and Governance in Conservation of Aquatic Biodiversity Resources in the East and Southern African Regions



©Nathalie Maisonneuve

Prepared by: Ms. Nathalie Maisonneuve – Wilderness Consulting Firm

Edited by: Joel Mokenye and Mohamed Seisay

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Requests for such permission should be addressed to:

The Director
African Union – Interafrican Bureau for Animal Resources (AU-IBAR)
Kenindia Business Park
Museum Hill, Westlands Road
P.O. Box 30786
00100, Nairobi, KENYA
Or by e-mail to: ibar.office@au-ibar.org

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Table of Contents

Acronyms and Abbreviations	iv
Introduction	1
I - Brief description of the regional and transboundary MPAs	3
II - Synthesis of institutional framework and governance management systems	6
I-a. The institutional framework	6
I-b. The Governance Management system	8
III - Report on review and classification of the existing MPAs in AU-MS and regional levels according to IUCN categories for Marine Protected Areas (MPAs)	12
IV - Report on MPAs with endemic biodiversity hotspots with brief description	17
V - Document Lessons learnt and best practices in the management of identified MPAs within AU-MS and transboundary MPAs	21
VI - Detailed note on a range of goods and services within the existing select MPAs in AU-MS and regional levels	25
VII - Gaps or weaknesses (SWOT analysis) including institutional capacity for the management of MPAs that need to be addressed	30
VIII - Develop guidelines on mechanisms and priority actions for intervention by the project to support strengthening of implementation and effective governance of identified MPAs for the conservation of aquatic biodiversity in AU member states and at regional levels for transboundary MPAs.	31
The findings from the study	31
IX - Note on additional activities/best practices that need to be undertaken in the management of MPAs with the AU-MS and at regional levels for transboundary MPAs	36
Support Research and monitoring programmes at the large scale	36
Development of Additional and alternative Livelihoods for communities	36
Conclusion	40
Literature Review	42
Annexes	44
Annex 1: Matrix of data compiled: model of ZANZIBAR MPAs	44
Annex 2: List of contacts	46

ACRONYMS AND ABBREVIATIONS

ANGAP	National Association for the Management of Protected Areas
CBO	Community-Based Organization
CFMA	Collaborative Fisheries Management Areas
CHICOP	Chumbe Island Coral Park
CITES	International Convention on the Trade in Endangered Species
CMS	Convention on the Conservation of Migratory Species of Wild Animals (also known as Bonn Convention)
COAP	Protected Area Code
CORDIO	Coral Reef Degradation in the Indian Ocean
DEFF	The Department of Environment, Forestry and Fisheries (DEFF)
DFDMR	Department of Fisheries Development and Marine Resources
DFNR	Department of Forestry and Non-renewable Natural Resources
EAME	Eastern Africa Marine Ecoregion
EIA	Environmental Impact Assessment
EN	Endangered
EU	European Union
FAPBM	Fondation pour les aires protégées et la biodiversité de Madagascar
FAO	Food and Agricultural Organisation of the United Nations
GEF	Global Environment Facility
GMP	General Management Plan
IBA	Important Bird Area
ICAM	Integrated Coastal Area Management
ICM	Integrated Coastal Management
IMMA	Important Marine Mammal Area
IOC	The Indian Ocean Commission
IUCN	International Union for Conservation of Nature
KES	Key Ecosystem Service
KFS	Kenya Fisheries Service
KWS	Kenya Wildlife Service
MAB	Man and Biosphere Reserve
MCU	Marine Conservation Unit
MICOA	Ministerio para a Coordenacao da Accao Ambiental
MNP	Marine National Park
MPA	Marine Protected Area
MRPU	Tanzania Marine Parks and Reserves
NGO	Non-Governmental Organization
NP	National Park
RSNC	Royal Society for Nature Conservation
SANPARKS	South African National Parks (SANParks)
SFA	Seychelles Fishing Authority

SIF	Seychelles Island Foundation
SNPA	Seychelles National Park Authority
SR	Special Reserve
UNCLOS	United Nation Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education Science and Cultural Organisation
USAID	United States Agency for International Development
VMA	Voluntary Managed Areas
WCS	Wildlife Conservation Society
WIOMSA	Western Indian Ocean Marine Science Association
WWF	World Wide Fund for Nature

Introduction

The African continent is adjacent to some of the highly productive marine ecosystems that include the seven African Large Marine Ecosystems (LMEs): viz., Agulhas Current LME, Benguela Current LME, Guinea Current LME, Canary current LME, Mediterranean Sea LME, Red Sea LME and Somali Current LME. These African marine ecosystems inhabit living and non-living resources; however, the unsustainable exploitation of these resources is threatening the biodiversity, resources and environmental sustainability. Several factors are threatening aquatic biodiversity in Africa marine ecosystems. These include overexploitation of living species, pollutions from several sources (land-based municipal and agricultural activities), dumping of toxic wastes, mining activities, gas exploration, tourism development etc. Consequently, important aquatic resources are becoming increasingly susceptible to both natural and artificial environmental changes. Thus, conservation strategies to protect and conserve aquatic life are necessary to maintain the balance of nature and support the availability of resources for future generations.

Therefore, AU-IBAR, with support from the Swedish International Development Cooperation Agency (SIDA), is implementing a 3-year project on “Conserving Aquatic Biodiversity in African Blue Economy” whose overall objective 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.

In this context, AU-IBAR selected a short-term consultant to formulate MPA guidelines, develop mechanism or priority areas for strengthening the sustainable implementation and governance of identified MPAs for conservation of aquatic biodiversity resources within the African Union member states and regional levels in the Eastern and Southern Regions of the African continent. This study has been therefore conducted in Eastern and Southern African countries.

A field mission was done for a week in some of the MPAs located along the coast of Mombasa in Kenya, and in Zanzibar. The rest of the study was conducted online through a matrix sent to a list of key contacts persons.

Therefore, the different parts of the report will be exposed as follows:

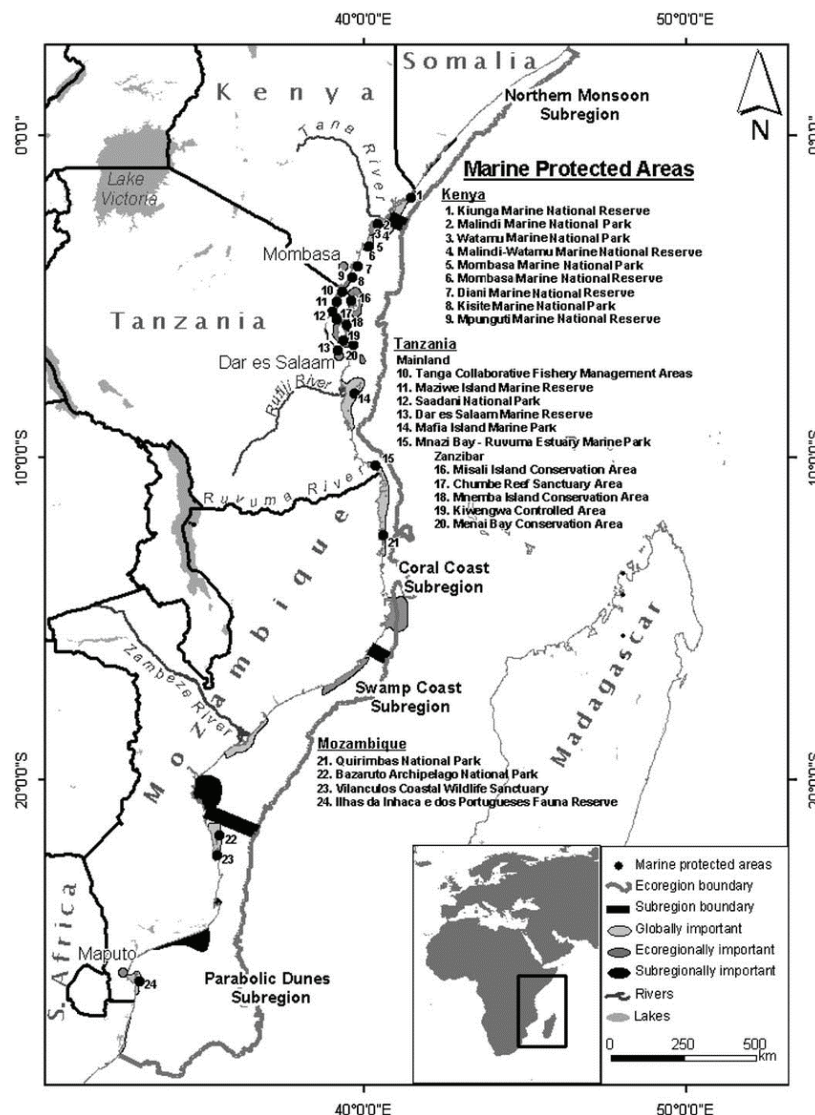
- Synthesis of institutional framework and governance management systems, arrangement of identified MPAs within AU member states and at regional levels (for transboundary MPAs);
- Report on review and classification of the existing MPAs in AU-MS and regional levels according to IUCN categories for Marine Protected Areas (MPAs)
- Report on MPAs with endemic biodiversity hotspots with brief descriptions;
- Document Lessons learnt and best practices in the management of identified MPAs within AU-MS and transboundary MPAs;
- Detailed note on a range of goods and services within the existing select MPAs in AU-MS and regional levels;
- Gaps or weaknesses (SWOT analysis) including institutional capacity for the management of MPAs that need to be addressed;

- Develop guidelines on mechanisms and priority actions for intervention by the project to support strengthening of implementation and effective governance of identified MPAs for the conservation of aquatic biodiversity in AU member states and at regional levels for transboundary MPAs.
- Note on additional activities/best practices that need to be undertaken in the management of MPAs with the AU-MS and at regional levels for transboundary MPAs.

I - Brief description of the regional and transboundary MPAs

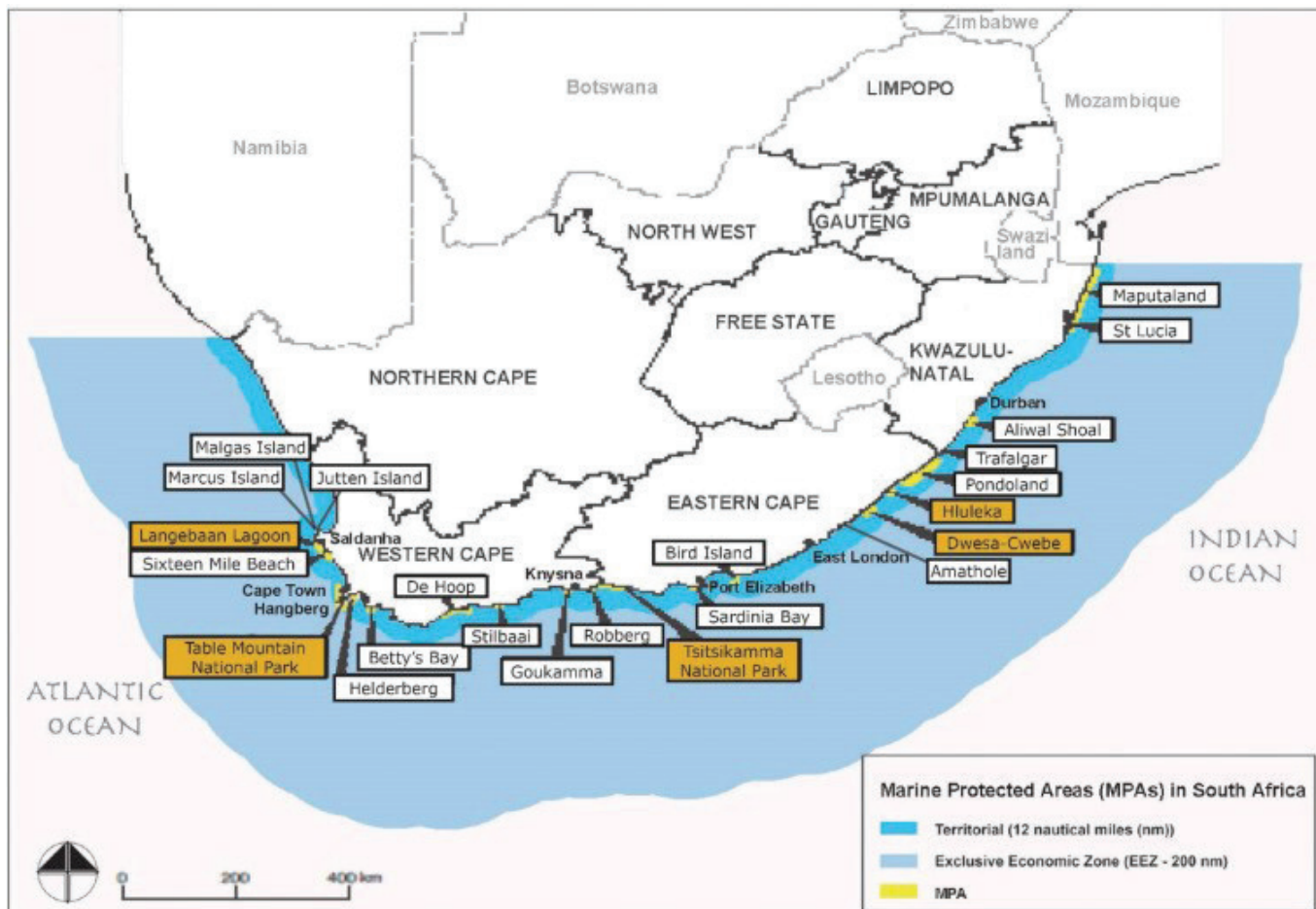
The area covered in this consultancy is focussed on the MPAs located on the Eastern coast of Africa, from the Northern Coast of Kenya down to South Africa, including the MPAs located in the various islands and territories in the Western Indian Ocean: the Comoros, Seychelles, Madagascar, Reunion Island and Mayotte, Mauritius and Rodrigues. It represents what we call the WIOMER – Western Indian Ocean Islands Marine Ecoregion.

Protection of the marine resources across the region is afforded in many ways; primarily through the formal legal proclamation of MPAs, but also, and increasingly, through the establishment of Locally Managed Marine Areas (LMMAs), in some countries known as Voluntary Managed Areas (VMAs). LMMAs are essentially areas of coastal waters recognised by local fishing communities as being in need of protection, or containing resources that are under threat of over-exploitation. These communities often partner with non-governmental organisations (NGOs) and others including government departments to develop and enforce rules and regulations for resource use within the areas. There are now over 200 LMMAs in Madagascar alone, with increasing numbers being established in Kenya and Tanzania in particular.



Source: Neil D. Burgess, *Ocean and Coastal Management* – December 2007

Map I: Location of MPAs and East Africa Marine Ecoregion priority seascapes along the coast of Eastern Africa



Source: Science Direct

Map 2: Location of the different MPAs in South Africa



Source: Pierre Failler, Climate change and sustainable management of natural resources, Dec. 2017

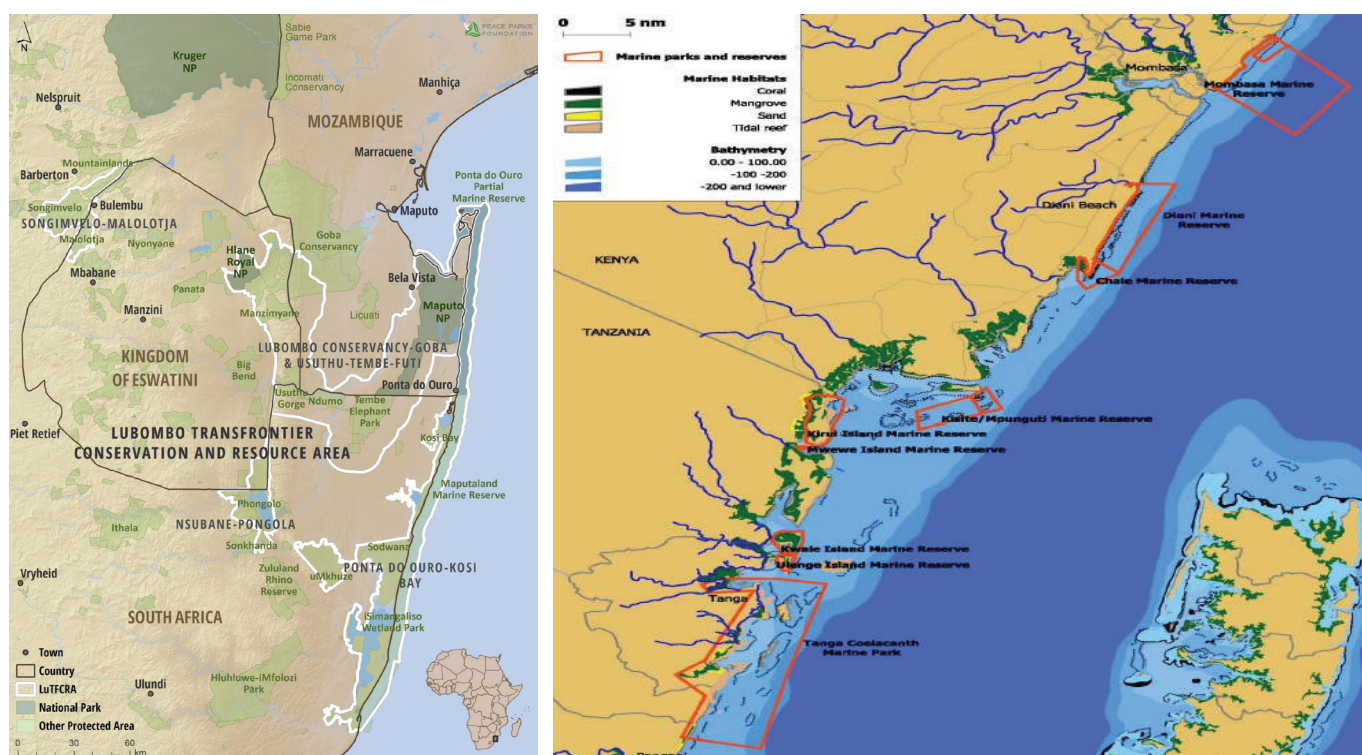
Map 3: Location of the MPAs in Madagascar, Comoros and Mascarenes Island

Marine conservation in the region, as elsewhere, is primarily conducted as a national competence, under various national laws, and indeed many MPAs within countries are managed as individual, unconnected entities. However, there is increasing recognition of the essential transboundary nature of marine ecosystems and associated biodiversity, and therefore of the major benefits of increased connectivity between sites and between countries, and the need for stronger networking between governments and conservation agencies.

There are two main transboundary projects in the WIO region we will analyse in this report:

- The Lubombo Transfrontier Conservation Area (TFCA) established in June 2000 between Mozambique and South Africa. The Ponta do Ouro-Kosi Bay TFCA, is the first marine TFCA in Africa, and integrates the Ponta do Ouro Partial Marine Reserve and the iSimangaliso Wetland Park. It forms part of the larger Lubombo TFCA ;
- The Transboundary Marine Conservation Area (TBCA) initiative between Kenya and Tanzania. The proposed TBCA is situated from the northern boundary of the Diani-Chale Marine Reserve in Kenya to the southern boundary of Mkinga District in Tanzania between Ulenge and Kwale Islands Marine Reserves.)

The area between Diani in Kenya and Pangani in Tanzania was earlier identified as a seascape of eco-regional importance and identified as the Msambweni-Tanga ecoregion¹. The coastline between Diani and Tanzania includes important biodiversity sites such as the mangrove stands and seagrass beds of Gazi and Funzi Bay, and the Ramisi River Estuary and is an important tourist destination with many sandy beaches, providing good revenues since the 1970s. The proposed TBCA encompasses existing MPAs and several LMMAs. Under the proposed transboundary conservation initiative, it is envisioned that systems of co-management will play an important role in adaptive governance of the transboundary-marine ecosystem.



Source: KWS, The Marine Parks and Reserves Unit, United Republic of Tanzania, and the Kenya Wildlife Service, Republic of Kenya

Map 4: Location of the two transboundary MPAs initiatives in the region

¹ WWF-EAME, 2004

II - Synthesis of institutional framework and governance management systems

I-A. The institutional framework

The institutional framework is usually set up by the Ministry of the Fisheries (Kenya/ Tanzania) and/ or the Ministry of Land, Environment (Mozambique) through a National Conservation Administration of Protected Areas (ANAC in Mozambique ; KWS in Kenya).

The institutional framework is globally made on the same way for all the MPAs in the region (there is a common umbrella) then, each country and each complex of MPAs or MPA itself will have their own institutional and governance management systems.

- In Kenya, the MPAs are managed under a co-management arrangement between KWS and the KFS. The MPAs are under the jurisdiction of the KWS who are responsible for planning and management decisions. Then, MPAs are also supported by NGOs - Like in the Malindi and Watamu MPAs. These include the Watamu Marine Association (WMA), a local NGO whose members are drawn from the community, tourism and environment sectors. WMA supports the MPA through different activities including education and awareness programmes, waste management and advocacy. The Local Ocean Trust and Watamu Turtle Watch support the MPA in activities related to the protection of turtles and turtle nesting areas. Community groups including community boat operators, also undertake tourism and visitor management activities in the MPA.
- In Tanzania mainland, the MPAs are legally mandated; managed by government (MPRU) in collaboration with local communities and other key stakeholders. The governance structure including statutory organs/authorities for MPRU has been defined in the MPRs Act No. 29 (URT, 1994). The main function of the mandated authorities is to oversee implementation of various activities of MPAs management. These authorities are as follows:
 - Ministry of Livestock and Fisheries Development
 - Board of Trustees for Marine Parks and Reserves
 - Marine Parks and Reserves Unit, under the Unit Manager
 - Advisory Committees of individual Marine Parks
 - District Council and Village Liaison Committees
 - Park management of individual Marine Parks under the Warden in-Charge

The relationship and interactions of these authorities is described in the MPRU management structure:

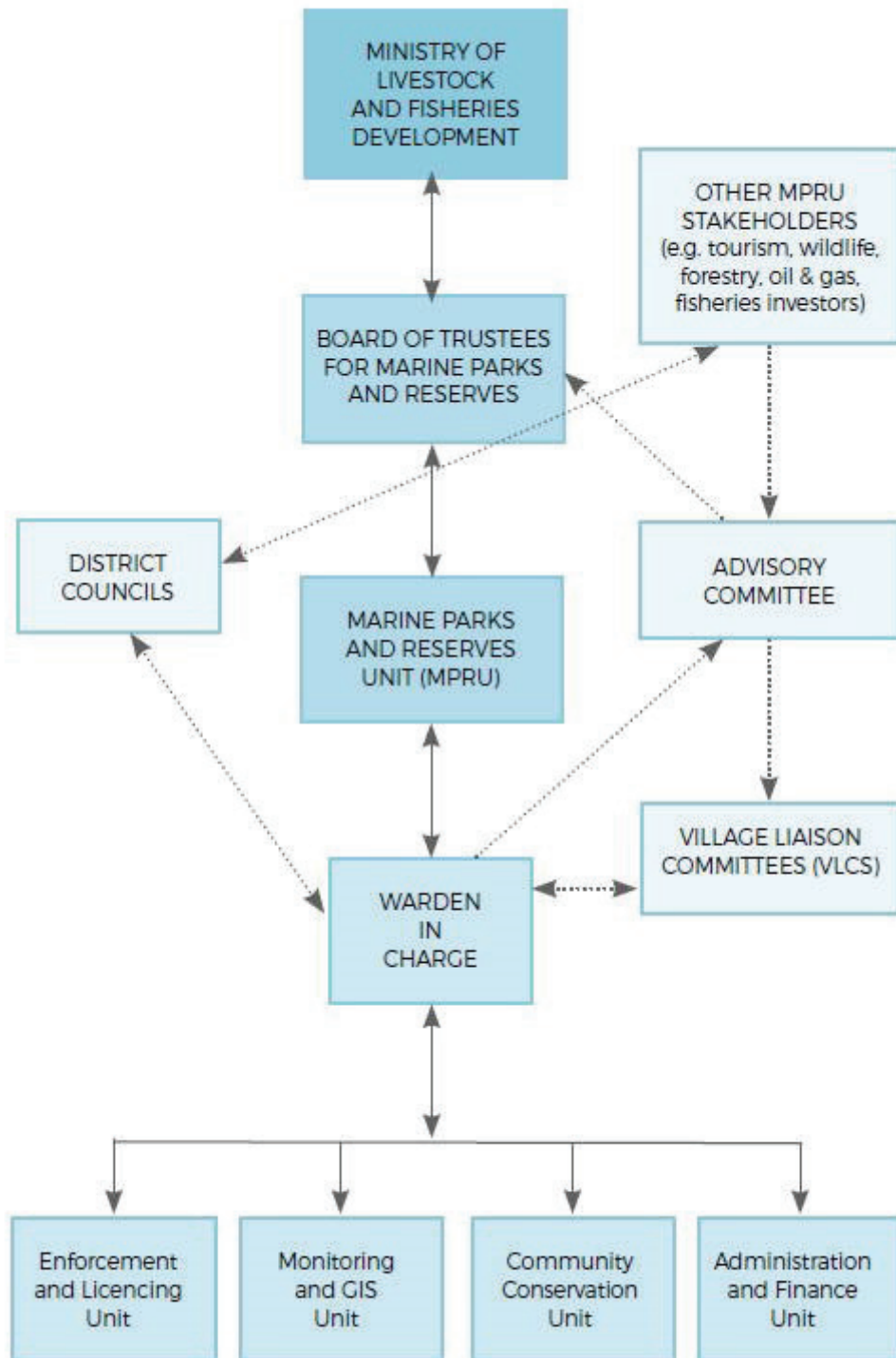


Figure n°1: Organogram of the Marine Parks and Reserves Unit management structure (source: URT, 2005).

- In Zanzibar, the Marine Conservation Unit (MCU) was established in November 2005 by the Department of Fisheries and Marine Resources Zanzibar (now the DFDMR) and was legally enabled through the Fisheries Act No. 7 of 2010, which gives the Director responsible for fisheries the power to establish marine parks and sanctuaries. The MCU has now (as of mid-2021) developed into the Department of Marine Conservation. The primary legal tool for managing marine protected areas (MPAs) in Zanzibar is currently the MCU Regulations of 2014.

The MPAs in Zanzibar are classified as Marine Conservation Areas (MCAs) and are designed to enable the comprehensive integration of communities in their decision-making structures.

As a result of a sectoral management approach, there are different legislative instruments that influence coastal resource management in Zanzibar. These include: the MCU regulations; the Fisheries Act No. 7 of 2010; the Environmental Management Act No. 3 of 2015; the Zanzibar Forest Act No. 10 of 1996 (which deals with the conservation of mangroves and the flora and fauna found therein). The Department of Marine Conservation was established as the entity responsible for coordinating the management of all marine conservation areas in Zanzibar and also for fulfilling a coordination role with other types of Marine Managed Areas (MMAs) such as privately managed sanctuaries. Additionally, there are coastal protected areas (mainly composed of mangrove and terrestrial forests) that do not fall under the MCU Regulations and these are under the Department of Forestry and Non-renewable Natural Resources (DFNR).

- The legislation and governance framework for MPAs are in place in many countries of the studied area.
- The institutional framework is complicated as there are different authorities having jurisdiction over marine and coastal protected areas. It has negative effects on their management and recognition. (like in Kenya where the institutional framework needs to be renewed. But like any kind of reform, it'll take time to be restructured). Many countries have started to move to reduce the complications in MPA management caused by conflicting laws and ministerial mandates, which in the past have resulted in anomalies such as the issuing of permits under one law, administered by one government department, established and managed under another law administered by another government department.

I-b. The Governance Management system

In practice there is a wide range of management systems of MPAs. They include MPAs which are²:

- Set up under customary tenure (e.g. in the Pacific region; VELONDRIAKE MPA, Madagascar);
- Managed on a voluntary basis (e.g. in the UK);
- Developed and operated by the private sector (e.g. Chumbe, Zanzibar, Tanzania ; NOSY ANTSOHA MPA, Madagascar);
- Based and run by a local community (e.g. Philippine fishing villages); LMMAs in Madagascar ;
- Set up and operated under collaborative management systems (e.g. Inuit communities in Canada ; co-managed MPAs in Zanzibar); and
- Run by government agencies.

The governance management systems are changing over the years. The MPAs were initially almost strictly managed by local governments so, public management. And in the last decades, we see more and more PPP – Public Private Partnership – like in Mozambique where a management agreement has recently been signed with African Parks, an international non-profit conservation organisation (effective March 2018), which will manage Bazaruto Archipelago National Park for the next 25 years. The communities are also more involved in the MPA governance system. MPAs are co-managed like in Madagascar where the governance system is a collaborative management system between Madagascar National Parks COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee).

- In Mauritius, the MPAs are managed by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping (Fisheries Division).

² Guidelines for Protected Area Management Categories. IUCN, 1994

- In South Africa, after decades of institutional arrangements reforms, the Department of Environment, Forestry and Fisheries (DEFF) is now the legally mandated management authority for all MPAs. The current contracted management authorities are: South African National Parks (SANParks); CapeNature in the Western Cape; Eastern Cape Parks and Tourism Agency (ECPTA) in the Eastern Cape; Ezemvelo KwaZulu-Natal Wildlife (EKZNW) in KwaZulu-Natal; Nelson Mandela Bay Municipality (NMBM) in the Eastern Cape; the City of Cape Town (CoCT) in the Western Cape; and iSimangaliso Wetland Park Authority (IWPA) in KwaZulu-Natal. DEFF and the French Government jointly manage the mid-ocean PEI MPA. Many of the South African MPA's are adjacent to a terrestrial National or Provincial Park or Nature Reserve and the Nature Reserve Management Authority generally also manages the adjacent MPA.

For example, in Addo Elephant National Park MPA, SANParks manages the MPA (and Addo Elephant National Park [AENP]) by contractual agreement with DEFF. AENP engages with the community in many ways to further local economic development.

In the Eastern and Southern Region, the MPAs are usually managed by the government or co-managed, including the communities.

- In Kenya, the MPAs are usually managed by the government (KWS/ KFS). No co-management system was set up at their gazettelement; therefore, conflicts can appear between KWS and the communities. Like in Diani-Chale Marine national Reserve where active management of the MPA failed because of intense conflict between the KWS and local communities over benefit sharing. Mistrust between communities and KWS still persists. Different options are being pursued to find ways of making the reserve operational. For example, KWS undertook a number of community-targeted resource management programmes and training sessions through the KWS/Netherlands Wetland Conservation and Training Programme.
- In Tanzania mainland, MPAs are basically managed by government (MPRU) in collaboration with local communities and other key stakeholders. They are two main different categories: marine parks and marine reserves. Marine Parks are multiple use areas, where people are allowed to remain and can conduct their normal activities provided they comply with existing regulations. Marine Reserves are no-take areas where extractive use of resources is strictly prohibited.

Since 2005, national fisheries authorities in Tanzania, in collaboration with selected district authorities and NGO partners (principally WWF), have developed and piloted the concept of CFMAs. CFMAs involve the organization of a number of BMUs sharing a common fishing ground (networking) and designation of a common fisheries management area with a dedicated management plan. The institutional context includes agreement of roles, responsibilities and operational procedures and the development of plans and guidance for monitoring, evaluation and reporting, all of which are guided by the National Guidelines for Establishment of CFMAs of 2010. Regarding the governance structure, there are stipulated roles and responsibilities laid out for each of the different stakeholders including village government, local government (District Councils), central government (Fisheries Division), NGOs, CBOs and the private sector. Management of the resources involves a group of stakeholders within a fishing community whose main function is the management, conservation and protection of fish in their locality in collaboration with the government.

- In Zanzibar, all the MPAs are co-managed (apart in Chumbe Island where it's privately managed). For example, in Pemba Channel Conservation Area, management is effected through collaboration with the community, with Village Fishing Committees/Shehia Fishermen's Committees (VFCs/SFCs) playing a significant role at ground level. In Menai Bay Conservation Area, management falls under the Department of Marine Conservation, with management partners. These include the MBCA Management Unit, 27 Village Fishing Committees and four mangrove conservation committees, from Unguja Ukuu, Mungoni, Kisakasaka and Nyamanzi.
- In Mozambique, most of the MPAs are managed by the Government. But PPP (Public Private Partnerships) have been set up in some MPAs – like recently in Bazaruto Archipelago where a convention has been signed with African Parks Network for the management of the MPA.
- In Madagascar, the management system is complex and unclear. There is no one organisation recognized as a formal management entity. The MPAs are usually collaboratively managed by the Government (Madagascar National Parks) with associations, conservation NGOs, communities: WCS (ANKIVONJY MPA), national association Asity (MAHAVAVY KINKONY MPA), The Peregrine Fund, Durrell Wildlife Trust, ...and COSAP (Protected Area Orientation and Monitoring Committee) and CLP (Park Local Committee). Whereas some others include collaborative management between the local community association and NGOs (like Wildlife Conservation Society).

Protection of the marine resources across the region is afforded and increasingly, through the establishment of Locally Managed Marine Areas (LMMAs), in some countries known as Voluntary Managed Areas (VMAs). LMMAs are essentially areas of coastal waters recognised by local fishing communities as being in need of protection, or containing resources that are under threat of over-exploitation. These communities often partner with non-governmental organisations (NGOs) and others including government departments to develop and enforce rules and regulations for resource use within the areas. There are now over 200 LMMAs in Madagascar alone, with increasing numbers being established in Kenya and Tanzania in particular.

- Co-management MPAs is a key success for an effective management. As we saw in this paragraph, if MPAs are managed by the government itself without including the communities from the beginning, it will generate conflicts and the MPA management will be unsuccessful. They have to be part of the process from the beginning.
- We have noticed a shift in the management authorities, the governance regimes adopted, in some countries. While overall government-managed MPAs accounts for 86,7% percent of all sites in the region³, privately managed, collaboratively managed between communities and NGOs (particularly in Madagascar), and exclusively NGO managed site are beginning to make their presence. The change in approach from local community exclusion to involvement may be an inevitable response to the sheer magnitude of the increase in coastal populations in some countries, coupled with legislative developments making participation mandatory in public decision making and empowerment of communities, most markedly in Kenya, Tanzania (including Zanzibar), Mozambique, Madagascar and South Africa. While government agencies continue to play the lead role in managing MPAs, there is an encouraging move towards more open and collaborative forms of governance involving multiple stakeholders including coastal communities affected by the existence of MPAs in their area and the tourism operators and others benefitting from the MPAs. In Madagascar, the previous small network of

³ Source :WIO MARINE PROTECTED AREAS OUTLOOK: Towards achievement of the Global Biodiversity Framework Targets

strict, centrally-governed MPAs expanded to include sites characterized by multiple-use management models, shared governance arrangements involving local community associations assisted by NGOs and, an emphasis on livelihood-based approaches and social safeguards.

- Without the active cooperation of the various stakeholders, there will be a bleak future for MPAs, thus making the case that governments cannot do it alone;
- The transboundary MPAs initiatives, even if they are very much in their nascent stages, they may prove that cooperation between countries in the management of MPAs is more efficient at delivering management objectives than individual efforts, especially when the main threats and challenges are common to both sides of the border.

III - Report on review and classification of the existing MPAs in AU-MS and regional levels according to IUCN categories for Marine Protected Areas (MPAs)

According to IUCN, Protected Areas are divided into six types, depending on their objectives:

Category I – Protected area managed mainly for science or wilderness protection (Strict Nature Reserve/Wilderness Area);

Category II – Protected area managed mainly for ecosystem protection and recreation (National Park);

Category III – Protected area managed mainly for conservation of specific natural features (Natural Monument); Category IV – Protected area managed mainly for conservation through management intervention (Habitat/Species Management Area);

Category V – Protected area managed mainly for landscape/seascape conservation and recreation (Protected Landscape/Seascape);

Category VI – Protected area managed mainly for the sustainable use of natural ecosystems (Managed Resource Protected Area).

It is important to precise the role and objectives of each IUCN category to understand the impact of the category in terms of conservation and development.

According to IUCN in the “Guidelines for applying the IUCN protected area management categories to marine protected areas”

IUCN Category	Definition	Primary objective	Permitted activities	Prohibited activities
Ia	Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring	To conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact.	Scientific research involving collection may be permitted if that collection cannot be conducted elsewhere and if the collection activity is minimised to that which is absolutely necessary to achieve the scientific goals of the study. Extraction to control invasive species is also permitted in some category Ia MPAs	Removal of species or modification, extraction or collection of resources (e.g. through any form of fishing, harvesting, dredging) is considered to be incompatible with this category. Anchoring, which can damage bottom habitat, should not be permitted. If necessary for research, mooring buoys may be an alternative

IUCN Category	Definition	Primary objective	Permitted activities	Prohibited activities
Ib (ALDABRA SPECIAL RESERVE, SEYCHELLES)	Category Ib protected areas are usually large, unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.	To protect the long-term ecological integrity of natural areas that are undisturbed by significant human activity, free of modern infrastructure and where natural forces and processes predominate, so that current and future generations have the opportunity to experience such areas.	Same as Ia and in some circumstances, sustainable resource use by indigenous people to conserve their traditional, spiritual and cultural values, provided this is done in accordance with cultural tradition.	As with Category Ia, removal of species or modification, extraction or collection of resources (e.g. through fishing, harvesting or dredging) is not considered compatible with this category.
II (like Kwale Island Marine Reserve, TANZANIA)	Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities	To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.	As with category Ib. This category should also provide for visitation, non-extractive recreational activities and nature tourism (e.g. snorkelling, diving, swimming, boating, etc.) and approved research, provided that research cannot be done elsewhere.	Extractive use (of living or dead material) is not considered consistent with the objectives of category II (e.g. all types of fishing, including recreational, are not compatible), other than for approved research which cannot be done elsewhere.
III	Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine caverns, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.	To protect specific outstanding natural features and their associated biodiversity and habitats.	Same as category II	Extractive use (of living or dead material) is not considered consistent with the objectives of category III (e.g. all types of fishing, including recreational, are not compatible), other than for approved research which cannot be done elsewhere. All other activities which have the potential to impact the specific natural monument (e.g. aquaculture, waste discharge, habitation, etc) are also prohibited.

IUCN Category	Definition	Primary objective	Permitted activities	Prohibited activities
IV (like KIUNGA MARINE NATIONAL RESERVE, KENYA)	Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category	To maintain, conserve and restore species and habitats.	Unlike categories Ia – III, within category IV MPAs extractive research is permitted, as is renewable energy generation and restoration/enhancement for other reasons (e.g. beach replenishment, fish aggregation, artificial reefs). Long-term and sustainable local fishing practices, small-scale aquaculture and works (e.g. harbours, ports, dredging) are all permitted so long as the activity can be managed in such a way that it is compatible with the MPA's objectives.	Industrial fishing, industrial-scale aquaculture, untreated waste discharge, mining and habitation not permitted.
V (Vohémar, Sava Region, MADAGASCAR)	Category V protected areas are where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.	To protect and sustain important landscapes/seascapes and the associated nature conservation and other values created by interactions with humans through traditional management practices	Local communities living within and sustainably using the seascape is allowed, and long-term and sustainable local fishing practices or small-scale aquaculture are permitted. However, the primary objective of the area remains the sustainable interaction of people and nature over time. Works (e.g. harbours, ports, dredging) may also be permitted, provided they or any associated activities (e.g. waste discharge, sea dumping) do not cause adverse impacts on the ecological, biological, cultural or scenic values of the area.	Industrial fishing, industrial-scale aquaculture, untreated waste discharge and mining not permitted.

IUCN Category	Definition	Primary objective	Permitted activities	Prohibited activities
VI	Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area	To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.	Long-term and sustainable local fishing practices, small-scale aquaculture and small-scale sustainable collection of some species (e.g. food species, ornamental coral or shells) are permitted. Works (e.g. harbours, ports, dredging) may also be permitted, provided they or any associated activities (e.g. waste discharge, sea dumping) do not cause adverse impacts on the ecological, biological, cultural or scenic values of the area	Industrial fishing, industrial-scale aquaculture, untreated waste discharge, mining and habitation not permitted.

In the region studied, the MPAs are classified mainly in IUCN categories II, IV, V and VI. (cf. the matrix in appendix for the synthesis of the classification).

Synthesis of the IUCN categories per MPA :

Tanzania mainland	Cat II, IV
Zanzibar	Cat VI (TUMBATU MARINE CONSERVATION AREA, MNEMBA ISLAND MARINE CONSERVATION AREA, MENAI BAY CONSERVATION AREA, CHANGUU BAWE MARINE CONSERVATION AREA, PEMBA CHANNEL CONSERVATION AREA)
Kenya	Cat II (MOMBASA MARINE NP & RESERVE), IV (KIUNGA MARINE NATIONAL RESERVE), V (WATAMU MARINE NP & RESERVE, MALINDI MARINE NP & RESERVE)
Seychelles	Cat Ib (ALDABRA SPECIAL RESERVE), II (SILHOUETTE MARINE NATIONAL PARK, ILE COCOS, ILE LA FOUCHE, ILOT PLATTE MARINE NATIONAL PARK, NORTH EAST POINT SHELL RESERVE), IV (ANSE FAURE SHELL RESERVE, POINTE ZANGUILLES SHELL RESERVE, LA DIGUE SHELL RESERVE), undetermined (AFRICAN BANKS AND SURROUNDING REEFS PROTECTED AREA, AMIRANTES TO FORTUNE BANK AREA OF OUTSTANDING NATURAL BEAUTY)
Mauritius	Cat II (Blue Bay Marine Park, BalACLava Marine Park), Cat IV (South East Marine Protected Area (SEMPA))
South Africa	As to be determined
Madagascar	Cat II (NOSY HARA NATIONAL PARK, ANKAREA MPA, LOKOBE NATIONAL PARK, NOSY TANIKELY NATIONAL PARK, SAHAMALAZA ILES RADAMA NATIONAL PARK, NOSY MANGABE NATIONAL PARK, KIRINDY MITE NATIONAL PARK, NOSYVE ANDROKA MARINE NATIONAL PARK), V (VELONDRIAKE MPA, MENABE ANTIMENA PROTECTED AREA, TSIMEMBO MANAMBOLOMATY, MAHAVAVY KINKONY, LOKY MANAMBATO MPA, ANKIVONJY MPA, NOSY ANTISOHA MPA, AMBODIVAHIBE MPA), VI (ANTREMA, SOARIAKE MPA)
Mozambique	Cat II (Marromeu National Reserve), V (QUIRIMBAS NP, Primeiras and Segundas Environmental Protection Area, Bazaruto National Park, Pomene National Reserve) , VI (Cabo de São Sebastião Total Protection zone)

If we focus firstly on the MPAs visited during the field mission, we see that all the MPAs in Zanzibar are classified in category VI, whereas most of the MPAs are classified in category II in Tanzania mainland, no take areas. Some are classified in category IV, zoned multiple use area.

In Zanzibar, the MPAs are mainly co-managed between Government and communities. Conservation is always associated with cultural values and traditional natural resources management systems. In Tanzania, the objectives of the MPAs are a mix between conservation and education – which explain the category II. Non-extractive recreational activities and nature tourism for visitation are fully developed. In Kenya, the MPAs are classified in Category V and VI. They are also an interaction between conservation and cultural values.

If we have a quite look at the rest of the MPAs of the region, we can see the categories are quite different either between the countries themselves or between the MPAs in a same country. However, rare are the MPAs classified in category Ia or Ib. We find some only in Seychelles, category Ib like in the Aldabra Special Reserve. Aldabra is mostly no-take and restricted access but with limited tourism and recreation and food security zones for staff.

In South Africa, even though the national MPAs are numerous, the IUCN category hasn't been defined yet for any of them.

IV - Report on MPAs with endemic biodiversity hotspots with brief description

If these MPAs have been designated, it's mainly because The Western Indian Ocean (WIO) is renowned for the richness of its marine biodiversity, especially that associated.

The mangroves, seagrasses, rocky and sandy shorelines with associated dune systems and coastal forests, and the deep-sea features such as seamounts, ridges and abyssal plains also contribute substantially to the biodiversity of the region. The innumerable islets and atolls scattered across the WIO also support extraordinary biodiversity, including vast numbers of often rare, endemic and endangered marine species including the following:

- **The Dugong (*Dugong dugong*)**



Source : IUCN

The Dugong is one of four living species of the order Sirenia, which also includes three species of manatees. It is largely dependent on seagrass communities for subsistence and is thus restricted to the coastal habitats which support seagrass meadows with the largest dugong concentrations typically occurring in wide, shallow, protected areas such as bays, mangrove channels, the waters of large inshore islands and inter-reefal waters. The dugong is considered endangered (classified as vulnerable by IUCN) in Eastern Africa with the last remaining viable population (>300) found in the Bazaruto Archipelago and Cabo de São Sebastião in Mozambique. The dugong once ranged from Somalia to Mozambique and across to western Madagascar (WWF, 2004), but numbers have plummeted since the 1960s as it is fished for its meat and is the accidental victim of seine, gillnet and trawl fishing. Habitat destruction and human encroachment have also contributed to its decline. With its long lifespan of 70 years or more, and slow rate of reproduction, the dugong is especially vulnerable to extinction.

The dugong's current distribution is fragmented... and despite being legally protected in many countries (dugongs are protected in both Kenya and Tanzania) yet their numbers continue to decline. In northern Tanzania Dugongs were known to inhabit seagrass beds off the Tanga coast. Today sightings are highly irregular with one caught in 2000 at Buyuni near Pangani and another sighted in May 2006 by divers at 10m depth near Kigombe. It is believed that a small population might still exist near the Kenyan border at Mbaya/Kigomeni. In Kenya, it is believed that dugongs may now remain only in very small numbers in the Lamu-Kiunga region and in Funzi Bay in the south of the country. There has been only one recent sighting in the northern area of Lamu-Kiunga. One dugong has been sighted each year (2007–2009) in Funzi Bay in southern Kenya. There have been two sightings off Kisite-Mpunguti Marine Reserve further south (2015).

- **The Giant Manta rays (*Mobula birostris*)**



Source : IUCN

The giant manta ray is a species of ray in the family Mobulidae, and the largest type of ray in the world. It is circumglobal and is typically found in tropical and subtropical waters. The giant oceanic manta ray can grow up to 9m in maximum length and to a disc size of 7m across with a weight of about 3,000 kg but average size commonly observed is 4,5m.

The oceanic manta ray is considered to be endangered by the IUCN's Red List of Endangered Species because its population has decreased drastically over the last twenty years due to overfishing.

Because *M. birostris* feeds in shallow waters, there is a higher risk of them getting caught in fishing equipment, especially in surface drift gillnets and bottom set nets. Rays are usually caught by local gill net fishermen, who salt their catch and sell it. In Tanga, Tanzania, rays comprise 72% of the catch from gill nets. This unsophisticated method has been popular in the region for decades. There is also the threat of microplastics in the diets of oceanic manta rays.

Southern Mozambique is a global center of abundance for manta rays, the largest of the devil ray species. Over the last 20 years, MMF (Marine Megafauna Foundation) have documented the largest identified populations of both giant and reef manta rays in Africa. Both species aggregate in the south of the country, with the highest sightings recorded along the coast of the Inhambane Province.

MMF researchers have noted up to a 98% decline in sightings of manta and devil ray species over the past decade, highlighting the urgent need for targeted management strategies.

Several rays also occur in the proposed TBCA, including Manta ray, *Manta alfredi*.

- **The humpback whale:**

The humpback whale (*Megaptera novaeangliae*) is a rorqual (a member of the family Balaenopteridae) and is the only species in the genus *Megaptera*. Adults range in length from 14–17m (46–56ft) and weigh up to 40 metric tons (44 short tons). Humpback whales typically migrate up to 16,000km (9,900 mi) each year. They feed in polar waters and migrate to tropical or subtropical waters to breed and give birth. Their diet consists mostly of krill and small fish. Even if the species is classified as “Least concern” by IUCN, entanglement in fishing gear, collisions with ships, and noise pollution continue to affect the species. They are so impressive that they're an objective in themselves for many visitors.

They are present in the Western Indian Ocean, along the East Coast from Mozambique to South Africa (in KwaZulu-Natal from the South Africa-Mozambique border in the north to Cape St Lucia South coast (ISIMANGALISO MPA). They were also observed in HLULEKA or in DWESA-CWEBE. They are present in the different islands of the Indian Ocean: Reunion Island, Mayotte, Comoros, Madagascar in the Western coast (Nosy Be) and in the Eastern one (Sainte Marie).

- **The Madagascar endemic big-headed turtle**

Erymnochelys madagascariensis is found in Menabe Antimena Protected Area, Madagascar. The Madagascar big-headed turtle is a turtle native to the waters of permanent slow-moving rivers and lakes in western Madagascar. These turtles are critically endangered and have been evaluated to be the most endangered turtle in the world by a 2018 review. Despite their vulnerability to extinction, they are commonly eaten for food and they are still commonly shipped from Madagascar to Asia to help meet the demand of Asia's traditional medicine market.

- **Seabirds**

Important Bird Areas – IBA - are numerous in the region – like in Zanzibar where all the MPAs are essential spots for birds. Among them, we find: *Nectarinia olivacea granti* and *Cercotrichas quadrivirgata greenwayi*, *Tauraco fischeri zanzibaricus*, *Andropadus virens zanzibaricus* and *Nectarinia veronii zanzibarica*. In Madagascar, we find some aquatic birds living in mangroves: *Anas bernieri* (EN), *Haliaeetus vociferoides* (CR), *Ardea humbloti* (EN), *Threskiornis bernieri* (EN). ADDO ELEPHANT NATIONAL PARK MPA, in South Africa, is crucial for seabirds breeding.

- **Some endemic reef fish species (sparids):**

They are present in some MPAs like in HLULEKA or in DWESA-CWEBE

- **The Coelacanth**

One of the most notable fish in the region is the coelacanth, *Latimeria chalumnae*. Often referred to as a “living fossil fish”, its conservation status is considered endangered (CITES - Annex I species), and critically endangered (IUCN Red List). The coelacanth is the sole known remaining representative of a once widespread family of sarcopterygian (fleshy-finned) fish that were thought to have become extinct 70 million years ago. Two species of coelacanth are extant: the WIO species *Latimeria chalumnae*, and an Indonesian species, *L. menadoensis*, which is less widely distributed. Coelacanths are commonly found on sloping continental shelves. Initial reports suggested they occurred at depths of 300–400 m in sheltering caves and canyons that provided habitat for their prey. They have been sighted in the submarine canyons of the east and west coasts of the Mozambique Channel; the steep volcanic slopes of Comoros; areas off the northern Mozambique coastline; and off the coast of northern South Africa. More recently they have been seen in much shallower depths of 75–100 m on the upper slopes of Pemba Channel canyons around Tanga.

- **The whale sharks**

Whale sharks, *Rhincodon typus*, are widely distributed off the eastern African coast. This is a planktivorous, broad-ranging species. Their seasonal migration patterns cover thousands of kilometres. They can also be resident year-round in equatorial zones. They are found in many areas with surface seawater temperatures of 18–30°C and range across the entire Indian Ocean, as well as in the waters of the proposed TBCA. These sharks are considered Vulnerable under the IUCN Red List, and several other international instruments refer to them including those of CITES, UNCLOS, and the FAO.

The numbers of these sharks appear to have increased on the southern coast of Kenya in recent years, particularly around Diani, Galu and Chale Island. In 2011, an average of 20 whale sharks was spotted daily

whereas the previous average had been 20 in a year. There has been speculation that the increase in shark numbers is linked to greater volumes of mantis shrimp. It may also be related to better monitoring as a result of greater interest in this species.

- **The Coconut crab (*Birgus latro*)**



Source : IUCN

This crab is endemic to the lower Mpunguti Island, having previously been more widespread. Coconut crab is the only member of the genus *Birgus* and is the largest land-living arthropod.

It is found on islands across the Indian Ocean, similar to the distribution of the coconut palm; it has been extirpated from most areas with a significant human population, including mainland Madagascar. Coconut crabs also live off the coast of Africa near Zanzibar. In Chumbe Island, CHICOP leads a research and monitoring programme specific on the coconut crab. The organisation welcomes volunteers to support their scientific team on the research.

V - Document Lessons learnt and best practices in the management of identified MPAs within AU-MS and transboundary MPAs

- **Strategic Adaptive Management (SAM) in Kenya and Tanzania**

Adaptive management has been put forward as a way of managing natural resources through “learning-by-doing”. The goal is to learn from experience and constantly improve MPA management practices over time. This requires ongoing monitoring of MPA systems to assess progress towards management targets and objectives. MPA managers and scientists have worked together to identify ecological and socio-economic indicators that are monitored through systematic collection of data. MPA managers in both Kenya and Tanzania are now able to evaluate past management actions and to make mid-course adjustments to MPA plans as part of necessary adaptive management.

The implementation of SAM has also improved the capacity of MPA managers to address the external human and environmental drivers that influence ecological or other associated outcomes in MPAs.

- Even if there still remain considerable challenges in fully integrating monitoring outcomes into management planning and in developing institutional mechanisms to ensure that knowledge gained is effectively applied in adaptive management, notable improvements in MPA objective setting and monitoring since the introduction of SAM in Kenya and Tanzania.

- **Sustainable funding mechanism in Kenya and Tanzania**

Management effectiveness improved in all MPAs over time following concerted financial support.

Kenya Wildlife Service (KWS) received funding from the World Bank and the Global Environment Facility (GEF), through the Kenya Coast Development Project (KCDP) that supported MPA infrastructural development after the first Management Effectiveness Tracking Tool (METT) assessment revealed major shortfalls in MPA inputs. The KCDP funding supported improvement of tourism infrastructure and MPA equipment (boats, mooring buoys etc.). In addition, the Western Indian Ocean Marine Science Association (WIOMSA) also funded KWS MPAs to enhance their adaptive capacity.

In Tanzania, the increase in management effectiveness has been paralleled by major donor investment, through WWF, IUCN, the World Bank and several bilateral.

Funding through WWF alone to Kenya, Tanzania and Mozambique has increased from \$18,000 in 1992 to the current investment of over \$1,500,000 per annum⁴

- Management effectiveness in Tanzanian MPAs has increased from essentially zero at the beginning of the 1990s, to the current situation where most sites have staffing and budgets (supported by donor funding) and some have management plans.

⁴ S. Wells et al. / *Ocean & Coastal Management* 50 (2007)

- The allocation of dedicated, secure and adequate budgets needs to be prioritized for MPA management.

- **Evolution in terms of size: from larger MPAs to transboundary ones**

This change has an effect on the management effectiveness. MPAs range in size from small (e.g. 0.15km²) to large (e.g. 1522km²).

The proposed TBCA between Kenya and Tanzania provides an opportunity to enhance cooperation between two neighbouring states that share common environments, from both a biophysical, socioeconomic and cultural perspective in the coastal areas near the border between the two countries.

The peace park:

The idea was and remains compelling: an opportunity to think beyond political boundaries to accommodate gene pools, water flow, wildlife movement and the propagation of plant species; an opportunity to unlock regional economic development, share the conservation of biodiversity and promote regional peace and stability by demonstrating the benefits of cooperation.

In the years since, it has been the political will of leaders in southern Africa, and the efforts of an organisation set up to champion the peace parks concept, that has seen the vision of peace parks taking shape on the subcontinent.

- **The concept of the region's peace parks is as glorious as it is audacious:** vast conservation areas that straddle national borders, of sufficient extent to incorporate entire biomes; of sufficient integrity to restore the ancient patterns of diverse ecological communities, and of sufficient vision to reconnect the shared cultures of tribal peoples, dislocated when colonial rulers arbitrarily imposed Africa's borders and cut through some 190 culture groups (www.peaceparks.org).

- **Zoning**

Well enforced no-take sites can have a positive impact on reef fish.

The no-take MPAs of Chumbe (Zanzibar) and Kisite (Kenya) have larger fish and a high diversity of fish species (sometimes 3.5 times more biomass) than reefs that were being fished off Dar es Salaam and in Tanga region.

- Zoning is one of the most important issues facing most MPAs and is usually the best way to reconcile an array of different uses of an MPA.

- **Communities' involvement; livelihood development**

Wherever the different local stakeholders have been involved from the beginning of the MPA implementation, the impacts are positive on marine conservation and development.

Indeed, they are part of the process and thus, they are ready to work together with the government and the conservation staff of the MPA to contribute to the marine conservation.

They contribute to the zoning plan to define the different use in the MPA; they are ready to move from their traditional fishing activities to other alternative livelihoods.

It is very important to work both on conservation and development programmes in parallel. Where Livelihood have been developed, like ecotourism, useful thanks to the support of donor agencies, marine biodiversity has recovered faster than it other MPAs with no implication of the communities.

- Communities in Kenya are benefiting from employment opportunities generated by tourism related to the MPAs (e.g. providing boat services, managing tourist attractions such as boardwalks)
- In Mozambique, an estimated 25% of local communities benefit from the tourism generated by Bazaruto Archipelago Marine Park and, at several of the new MPAs in the country, systems are being set up to ensure that some of the revenue generated goes directly to community development projects. Similar schemes are in place or being established at community-managed and privately operated MPAs on Zanzibar, and are planned or in place for the government sites on the mainland of Tanzania.

- **Privately managed MPA:**

The case of CHICOP in Zanzibar: model of financially and ecologically sustained park management.

Chumbe Island Coral Park Ltd. (CHICOP) is an award-winning private nature reserve that was developed from 1991 for the conservation and sustainable management of uninhabited Chumbe Island off Zanzibar.

The reserve includes a fully protected Coral Reef Sanctuary and Forest Reserve that harbour rare wildlife, a Visitor and Education centre, a small eco-lodge, nature walks and historical monuments. All buildings and operations are based on state-of-the-art eco-technology aiming at zero impact on the environment (rainwater catchment, photovoltaic energy and solar water heating, composting toilets, vegetative greywater filtration etc.).

The overall aim of CHICOP is to create a model of financially and ecologically sustainable park management, where ecotourism supports conservation, research and comprehensive Environmental Education programs for local schools and other benefits for local people.

In 2011, Chumbe Island became the first Global Ecosphere Retreat (GER) certified Long-Run Destination through the Jochen Zeitz Foundation which means that Chumbe strives for the highest standards in sustainability through the balance of conservation and commerce, whilst fostering community development and cultural stewardship.

Chumbe's sustainable management and promotion of key ecosystem services for the region has since been recognized on many levels, including being mentioned in the UN Secretary General's Report to the General Assembly on protection of coral reefs for sustainable livelihoods and development, which states:

“A noted example for PES (Payment for Ecosystem Services) within the context of coral reefs habitat is the private, non-profit Chumbe Island Coral Park Ltd (CHICOP) in Tanzania (2012).

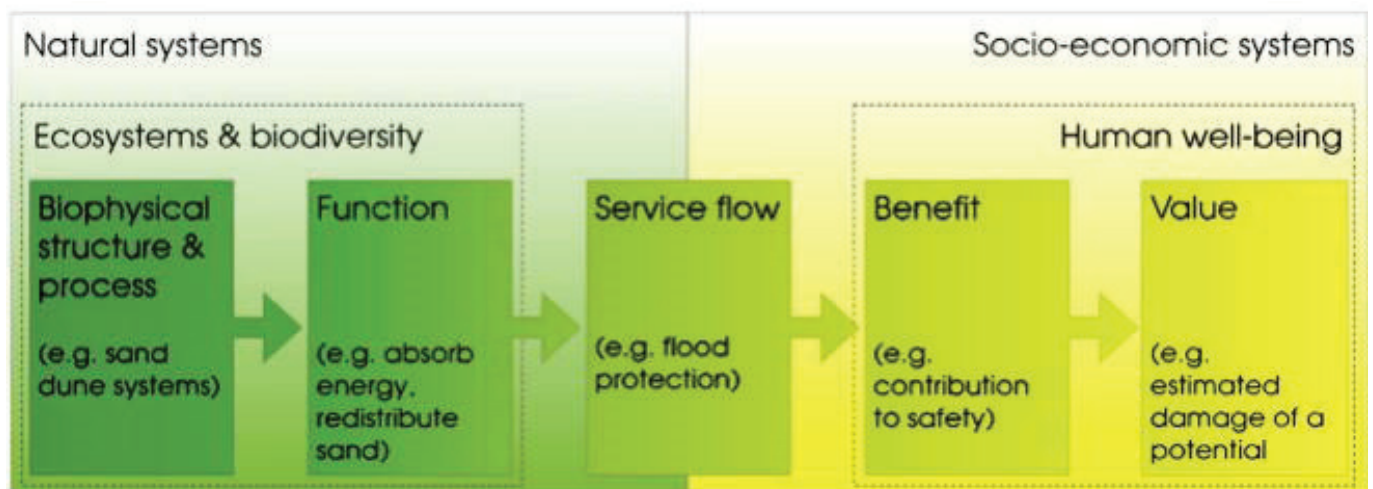
Community-involvement: Rather than sourcing products and services from abroad like many large-scale resorts in Zanzibar, Chumbe works with local craftsmen, artisans, fisher, and other workers to supply furniture, art, yogurt, soaps and other products and services for the island. Sourcing products and services locally both support the local economy and help garner community support for our environmental conservation projects.

Research & monitoring: The research programs have been designed to be fully sustainable, to provide useful information to support the protection and management of the reserve, and to identify early warnings of stress. The following projects are being conducted: coral reef monitoring, seagrass monitoring, sea surface temperature logging, coral reef monitoring,

VI - Detailed note on a range of goods and services within the existing select MPAs in AU-MS and regional levels

Marine protected areas (MPAs) are globally important environmental management tools that provide protection from the effects of human exploitation and activities, supporting the conservation of marine biological diversity, habitats, ecosystems and the processes they host, as well as resources in a broad sense. Consequently, they are also expected to manage and enhance marine ecosystem services and material, non-material, consumptive and non-consumptive goods, and benefits for humans. There is however certain confusion on what constitutes an ecosystem service, and it is not always easy to distinguish between them and societal benefits. The main nuance is that an ecosystem service is the aptitude an ecosystem has or develops naturally or as consequence of a management action, and that manifests through its own properties (productivity, diversity, stability, quality of its key parameters, etc.), while a societal benefit is the economic or other profitability (emotional, educational, scientific, etc.) that humans obtain from said service or quality.

A conceptual model that represents those different interactions is a cascade linking the biophysical structure and processes with the benefit that people eventually derive. It highlights not only that ecosystems provide services but also that services do not exist in isolation from people's needs.



Source: Liqueste et al. (2013) - *In the Wild: Biodiversity and Ecosystem Service Conservation*

However, what does it mean exactly “services” and “goods”/ “benefits”?

Below is a table synthesising the definition of the effects of the ecological services and goods by MPAs:

Table 1: Terms and definitions related to the effects of protection, ecosystem services, and societal benefits provided by marine protected areas (MPAs) used in the literature.

Term	Definition
MPA effect	Any consequence of protecting a marine area from fishing and other human activities on the environment, habitat, biological assemblages, and ecological processes, and the indirect consequences on the services and benefits they provide
Ecosystem components	Species and habitats found in the area
Ecological process	Interaction among organisms
Ecosystem process	Changes in the stocks and/or flows of materials in an ecosystem, resulting from interactions among organisms and with their physical- chemical environment
Ecosystem attributes	Ecosystem biotic and abiotic components and features (geomorphological, climatological, hydrological, or biological) that an area has
Ecosystem processes and functioning	Interactive dynamic of the biotic and abiotic ecosystem components (geomorphological, climatological, hydrodynamical, or biological), involving the relationships between organisms and environment, leading to populations and biogeochemical cycles
Societal good	Things that people assign value to
Good	Objects from ecosystems that people value through experience, use or consumption, whether that value is expressed in economic, social, or personal terms
Goods	Ecosystem attributes that provide societal services, directly as a resource, or throughout the ecosystem processes. It would be equivalent to capital in economy
Ecosystem service	Benefits that ecosystems provide to people
Ecosystem service	Aspects of ecosystems utilized (actively or passively) to produce human well-being
Ecosystem service	Direct and indirect contributions of ecosystems to human well-being
Ecosystem service	Benefits that humans derive from ecosystems
Ecosystem service	Activity or function of an ecosystem that provides benefit (or occasionally disbenefit) to humans (including the whole pathway from ecological processes through final ecosystem services, goods, and values to humans)
Ecosystem service	Ecosystem outputs from which goods and benefits are derived
Ecosystem service	"Final ecosystem services": directly deliver welfare gains and/or losses to people through goods
Ecosystem service	"Final ecosystem services": an ecosystem service that directly underpins or gives rise to a good
Ecosystem service	"Intermediate ecosystem services": regulating and supporting services that contribute to the provision of final services.
Ecosystem service	Goods and services that are of value to people, provided wholly or in part by ecosystems
Ecosystem service	Direct and indirect contribution of ecosystems and natural capital to human well-being
Ecosystem service	Results, products or outputs from the interaction of the ecological attributes and processes on populations, ecosystems or the environment, that directly or indirectly favor the quality of life, health or human uses, and activities
Provisioning services	Material and energetic outputs from ecosystems from which goods and products are derived
Provisioning services	Material, unmaterial and energetic outputs from ecosystems that can be used or exploited as a resource (this includes space, time, refuge, food, nutrients, materials, etc.)
Regulating services	Ways in which ecosystems can mediate the environment in which people live or depend on in some way, and benefit from them in terms of their health or security, for example
Regulating services	Effects or outputs from ecological attributes and processes resulting in the control of environmental and biological parameters or processes within the limits that favor the ecosystem integrity, quality of life, health or human uses, and activities
Cultural services	Non- material characteristics of ecosystems that contribute to, or are important for people's mental or intellectual well-being
Cultural services	Effects or outputs from ecological attributes and processes resulting in the maintenance or development of scientific and cultural knowledge, education, historical memory, traditions, and in general, people's mental, or intellectual well-being
Societal benefit	Things that people assign value to
Societal benefit	The many ways that human well-being is enhanced through the processes and functions of ecosystems via ecosystem services
Societal benefit	Positive effect on human well-being; used interchangeably with value. Value denotes a quantitative, often monetary, measure, and depends on the preferences of individuals who receive the benefit
Societal benefit	"Direct use benefit": Benefit produced from direct interactions with the ecosystem and products of ecosystem processes; includes consumptive (e.g., food) and non-consumptive use (e.g., recreation). <i>Indirect use benefit</i> : Benefit produced from regulatory functions of ecosystems (e.g., nutrient cycling)
Societal benefit	The materialization of services on people well-being. That is, any economic activity or other profitability (emotional, educational, scientific, etc.) that man obtains active or passively, conscious or unconsciously from an ecosystem service

Source: Reviewing the Ecosystem Services, Societal Goods, and Benefits of Marine Protected Areas. *Sec. Marine Conservation and Sustainability*. June 2021

In our study, the main ecological services and goods listed by the wardens in charge of the MPAs were as follow:

- Human food
- Medicines

The example of Kiunga Marine National Reserve in Kenya:

The local coastal communities rely on small-scale agriculture and honey-harvesting; former hunter-gatherers, they still collect edible and medicinal plants from the Dodori and Boni Reserves. The MPA can support the honey production and conservation of medicinal plants.

- Carbon sequestration

The ecosystem service of carbon sequestration, understood as the process of capture and long-term storage of atmospheric carbon dioxide has been recognized for its contribution to climate change mitigation. The capacity of sequestering (capturing and storing) organic carbon is a regulating service, provided mainly by mangroves and seagrasses that gains importance as alternatives for mitigating global warming.

Enhancing MPAs' blue carbon potential could be a key contributor to drawing down carbon and could provide many additional benefits to the marine environment and human society, such as rebuilding biodiversity and sustaining food production.

- Storm protection
- Provision of fisheries

For fisheries, MPAs generally can be considered to provide four basic benefits:

- support for stock management, including:
 - protection of specific life stages (such as nursery grounds);
 - protection of critical functions (feeding grounds, spawning grounds);
 - provision of spillover of an exploited species; and
 - provision of dispersion centres for supply of larvae to a fishery
- improved socio-economic outcomes for local communities
- support for fishery stability; and
- ecological offsets
 - trade-off for ecosystem impacts; and
 - better understanding of impacts and options.
- Scientific research
- Ecotourism activities, recreation
- Cultural services

The services are both: economical and ecological. Among the other ecological related services, it includes climate, diseases, temperature regulation. The MPAs also support services such as beach formation and nutrient cycling.

Focus on the ecological services in Madagascar:

Importance of Ecosystem Services in Madagascar: The people of Madagascar, particularly its rural and poorer populations, are highly dependent on natural resources and have a strong relation to nature and environment (Kiefer et al. 2010). Natural ecosystems play a key role in food security, by providing wild sources of food (fisheries,). Mangroves are particularly important for making fishing traps, canoes, processing prawn and fish catch, and for domestic use including fencing, housing, and fuel for cooking. They also provide nurseries and hatcheries for fish. There is mounting evidence that mangroves may provide protection from storm surges generated by cyclones, the frequency and intensity of which are projected to increase in the future under climate change. Coral reefs provide critical sources of food and income that can help coastal populations cope with climate impacts. Madagascar's biodiversity and natural beauty is its largest draw for tourists, providing aesthetic and recreational values for the tourists themselves as well as a large portion of the country's overall economic activity.

A study on Key Ecosystem Services in Madagascar shows the services providing by MPAs:

Provisioning: food

Commercial Fisheries: Average Landed Values of Fish Catch

21 coastal/marine KBAs provide landed fish values. Certain KBAs in the northeast, northwest and west of Madagascar exhibited relatively higher values, including Antogil Bay, Barren Islands, Iranja-Ankazoberavina-Russes bays, Ambodivahibe Bay, and PK32-Ranobe. These sites could be prioritized and carefully managed to avoid overharvest.

Small-Scale Fisheries: Number of Food-Insecure People with Access to Coastal/Marine

Ecosystems Many coastal/marine KBAs contain ecosystems (coral reefs and mangroves) that may serve as important sources of food to food-insecure populations. A subset of those KBAs contain ecosystems that are accessible (within 10km) of relatively large numbers of food-insecure people. Examples include Sainte Marie Island (Ambohidena), Three Bays complex, Antogil Bay, Southwestern Coastal Wetlands and Nosy Manitse Future SAPM Marine, and Ampasindava/Rigny Bay (Est).

Regulating: Disaster Risk Reduction and Climate Adaptation

Number of People Vulnerable to Climate Change-Driven Increases in Storm Surges that are Potentially Protected by Mangroves. 63 KBAs of the study contain mangroves that are within 2 km of people that are considered vulnerable to storm surges, based on historical cyclone events. This analysis uses historical occurrence of cyclones as a proxy for future risk, and assumes that proximity to mangroves provides some protection. Examples of KBAs that contain mangroves within 2km of people who are vulnerable to cyclone surge include Amoron'i Onilahy et Onilahy River, Three Bays complex, PK32-Ranobe, Mikea Forest, and Diégo Bay. In Madagascar, cyclones primarily hit from the east and north; however remaining mangrove habitat exists primarily in the west. More research is required to understand the actual protection provided by mangroves, and the potential for mangrove restoration in the eastern part of the country.

Among the other services providing, we find:

Ecotourism – especially in National Parks where the number of visitors is higher (Nosy be and its satellite islands)

Cultural/Spiritual Values

- Coastal and marine KBAs provide commercial fisheries, as well as mangrove and coral reef ecosystems that protect coastal areas from storms and support small-scale fisheries.
- The coastal areas of the east are extremely important because of the amount of services they could provide in terms of resilience to climate-related events.
- KBAs in Madagascar's national park system provide important ecotourism values, supporting local livelihoods and the country's economy.

VII - Gaps or weaknesses (SWOT analysis) including institutional capacity for the management of MPAs that need to be addressed

The SWOT analysis is obviously quite different from one country to another; it's less different from one MPA to another. We could synthesise the SWOT analysis as below: most of the elements listed in each category are about the same according to our study.

Moreover, we can notice the list of threats, unfortunately, is the most significant... poaching, over exploitation, destruction of habitats, etc,..affect most of the MPAs in Austral and Eastern Africa.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Important Bird Areas (IBA), • Important Marine Mammals Areas (IMMA), • Man And Biosphere (MAB), • Rich and diverse biodiversity, • Home of International Union for Conservation of Nature (IUCN) red-listed species, • Dedicated workforce with good reputation, • Strong legal framework 	<ul style="list-style-type: none"> • Low financial support, • Low workforce, • Weak linkages with the county government, • Little staff training, • Little use of technology • Insufficient monitoring of the MPA's ecological and cultural aspects
Opportunities	Threats
<ul style="list-style-type: none"> • Robust government policies, • National and international goodwill, • Diverse wildlife species and habitats, • Investments in training, • Research and education, • Collaboration with other stakeholders, • Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials, 	<ul style="list-style-type: none"> • Poaching, • Encroachments, • Coastal development and urbanization, • Pollution, • Increase in population, • Climate change (sea level rise, etc), • Destructive exploitation (destructive gears & methods), • Use of illegal and/or destructive fishing gear • Overfishing, • High poverty levels, • Illiteracy among local communities, • Resource use conflicts, • Terrorism, • Resource over exploitation

VIII - Develop guidelines on mechanisms and priority actions for intervention by the project to support strengthening of implementation and effective governance of identified MPAs for the conservation of aquatic biodiversity in AU member states and at regional levels for transboundary MPAs.

The findings from the study:

According to the wardens of MPAs in Kenya, the priority actions should be to:

- Work on Management plan for each MPA. For instance, Mombasa MPA in Kenya has none, though it's one of the MPAs in Kenya where there is the most important human pressure.
- Establish guidelines for all the marine users: divers (not supposed to touch underwater), boat users (for waste management), snorkelers (not supposed to feed fish),
- Establish guidelines for whale and dolphin watching
- Establish guidelines for strategic adaptative management

According to the key person resources interviewed in Tanzania mainland and Zanzibar, the MPAs have already guidelines that should be applied: Code of conducts, Fisheries Act 2010, MCU Regulation 2014, General Management Plan (GMP), Fisheries Management Plan (FMP) and Standard Operation Procedure (SOPs).

However, there is no specific ones per MPA. Either in Kenya, Tanzania mainland and Zanzibar, specific assessments should be conducted in each MPA for them to be better managed.

According to key organisations, departments, NGOs, etc, working on MPAs in the region, the priority actions should be:

- To review the institutional framework on MPA management in Kenya:

The Kenya Wildlife Service (KWS), a state parastatal body, established in 1990, is responsible for the management of these MPAs. There are also other government agencies with roles at certain levels in the management of MPAs in Kenya. Also, the State Department of Fisheries is responsible for the licencing of fishers who operate in marine reserves. Between KWS and the Department of Fisheries, the management of MPAs could be confusing and the roles of each institution not really clear for the users. A clear understanding of the role of each body has to be undertaken and know by the users of the MPAs.

- provide technical trainings to the staff working on MPAs
- To conduct specific assessments in each MPA: water sports, diving, etc
- To set up specific research and monitoring programmes

Intervention by the project to support management effectiveness of the MPAs:

- Support organizations working at the regional level like WIOMSA:

i. To improve their training programmes

Training is a big issue at the regional level. The technical staff working on MPA is not well trained and well qualified to manage effectively the MPAs.

There is not specific school in the region providing this kind of training courses.

WIOMSA has developed an online training toolkit called “Managing the Marine Protected Area: a Toolkit for the Western Indian Ocean. It is free download: <https://wiomsa.org/wiompan/download/managing-marine-protected-areas-a-toolkit-for-the-western-indian-ocean/>

The toolkit is divided into different modules: Types and categories of MPAs, MPA goals and objectives, Organisational structure, legislation, Integrated coastal management and so on.

It gives a very good overview on MPA management but It’s too theoretical. It doesn’t address the needs of the technical staff. They need theoretical and practical courses.

Specific training modules should be implemented on: ecological monitoring, MPA establishment, restoration, ecosystem services, effective planning, tourism and recreation, community involvement, ...

IUCN has developed online trainings and one on MPA: https://mooc-conservation.org/courses/course-v1:mooc-conservation+marine-areas+2021_T1_EN/about

A similar MOOC should be adapted to the regional context and implemented either on online or in the field.

A training school should be implemented in the region delivering these specific modules with highly qualified teachers.

It could be based in a central position, either in Kenya or in Seychelles.

A partnership might be found with NOAA – National Oceanic and Atmospheric Administration – that has set up a MPA center working with other MPA Programs, funders and NGO partners to provide training and capacity building in the United States and internationally. Tailored to share best practices in the management of MPAs and MPA networks and the specific needs of each country or region over a multi-year period, this program directly impacts and improves daily resource management efforts, addressing a wide range of management issues from management plan development to sustainable tourism to marine spatial planning.

<https://marineprotectedareas.noaa.gov/resources/training/>

ii. In reforming the institutional framework

WIOMSA has started a work to review the structuration of the Marine Parks and Reserves Unit (MPRU) in Tanzania. The institution is quite old and therefore, inefficient. It has to be renewed and restructured according to the new effectiveness management tools and body.

A similar work should be operated afterwards in Kenya.

This project could bring its support to WIOMSA for the organization to finalize its work already started.

iii. Support organisations, associations, NGOs working on AAL and livelihood programmes

For a MPA to be sustainably managed, alternative livelihood programmes have to be developed for the local communities to reduce the pressure and exploitation on marine resources. Moreover, the sanitary crisis has led to an economic crisis with more and more pressure on natural resources. The consequences are more overfishing, overexploitation of marine resources as a whole. It has become crucial to work closely with local communities to try to increase their revenue.

Some organisations, NGOs, local, national, international, associations work on livelihood programmes. For instance, the Coastal & Marine Resource Development (COMRED) is a registered non-profit organisation based in Mombasa, Kenya, advancing the socio-economic well-being of the coastal population. They collaborate with KWS in MPAs, like Kisite to train communities on patrols, improving management, co-management,..they established Beach Management Units (gather all type of users in a MPA). COMRED needs further support for the BMU to be operational and to develop AAL for the communities.

They have started to train local communities in cooking, having a restaurant – like the creek restaurant along the mangrove area in Watamu...

However, additional fundings and on the long run are needed to set up an efficient livelihood programmes. The communities need technical assistance for 3 up to 5 years to learn how to manage a micro business, enterprise; to learn technical skills in tourism, agriculture, aquaculture, ...

The project should support this kind of initiatives as livelihood programmes are one of the key success for an MPA to be efficiently managed.

iv. Support the LMMAs

Locally Managed Marine Areas (LMMAs), are characterized by local communities taking a lead in the conservation and sustainable use of marine resources, which is essential for the long-term social and economic well-being of communities. The governance system of LMMAs is based on the devolution of regulatory powers concerning resource access and use to traditional institutions. The Beach Management Units (BMUs), the community institutions established to co-manage stretches of coastline in Kenya, are granted a significant level of autonomy by the Fisheries Act to decide the rules governing LMMA management collectively. External organisations, including government departments and conservation NGOs, play an important role in enabling and reinforcing such community initiatives, and ensuring that such community

efforts are consistent with existing legal and policy frameworks, including the fulfilment of fisheries and biodiversity conservation objectives and obligations.

More than 200 already exist in Madagascar. In Kenya, the concept is still relatively new. Therefore, weak governance remains a challenge to their effectiveness. More than half of the LMMAs have not defined their resource limitations, they don't have clearly delineated boundaries of management and some BMUs are clearly still open access.

The project could support all the organizations working on this concept for the LMMAs to be largely extended all over the region and effectively managed.

v. *Support the establishment of large scale MPAs and transboundary initiatives*

Two transboundary MPA initiatives are currently ongoing in the region:

- 1. *TFCA:*** The Ponta do Ouro-Kosi Bay Transfrontier Conservation Area between Mozambique and South Africa. Established in June 2000, it integrates the Ponta do Ouro Partial Marine Reserve and the iSimangaliso Wetland Park. It forms part of the larger Lubombo TFCA, which encompasses a complex system of conservation areas between Mozambique, South Africa and Swaziland.
- 2. *TBCA:*** the Transboundary Conservation Area between Kenya and Tanzania. The proposed site extends from the Northern boundary of Diani-Chale in Kenya to Southern boundary of Mkinga District in Tanzania, just north of the Tanga Coelacanth Marine Park.

The TBCA includes in Tanzania:

- 4 marine reserves, established in 2010
- At least 3 Community Managed Marine Areas established during the Tanga Coastal Zone Management Programme

Adjacent to the TBCA:

- Pemba Conservation Area
- Tanga Coelacanth Marine Park gazetted 2009

In Kenya

- 2 marine reserves
- 1 marine park
- Network of community-conserved areas in Shimoni, Majoreni and Vanga
- Adjacent to the TBCA:
- Mombasa marine park

The area has been recognized by international agencies such as the Worldwide Fund for nature (WWF) and the Convention for Biological Diversity (CBD) as a biologically significant area deserving special conservation attention.

Both sites have the support of international organizations: respectively, the Peace Park Foundation and WCS.

The transboundary MPA initiative between Kenya and Tanzania is coordinated by Tanzania Marine Parks and Reserves Unit (MRPU)

The project should support this initiative and WCS in fulfilling their specific objectives:

- Conducting a socio-ecological inventory of the natural assets in the area and identify current drivers of change and emerging threats including the impacts of COVID-19 on Marine Protected Area (MPA)/ natural resource management and associated community livelihoods.
- Develop a collaborative management framework for the Transboundary Conservation Area (TBCA) with a mutually determined and agreed upon implementation mechanism.
- Strengthening capacity for restoring ecosystem health and conserving biodiversity at the local, national and trans-boundary level to enhance ecological and socio-economic resilience and thus build back better especially after the COVID-19 disruptions.
- Supporting the Tanzania and Kenyan governments achieve their protected areas target under sustainable development goal 14.5 (10% of Exclusive Economic Zone (EEZ)) and progress towards the 30% under the Global Biodiversity Framework (GBF).
- Strengthening sustainable blue economy opportunities (which includes sustaining healthy coastal and marine ecosystems, catalyzing sustainable fisheries management, and addressing pollution reduction of both nutrients and marine plastics).

IX - Note on additional activities/best practices that need to be undertaken in the management of MPAs with the AU-MS and at regional levels for transboundary MPAs

Support Research and monitoring programmes at the large scale

Development of Additional and alternative Livelihoods for communities

Development of ecotourism projects as a tool for conservation and development

As we have seen it further up, ecotourism could be a real opportunity for the local communities if it's managed in a sustainable manner. It can be a tool for conservation and development.

Firstly, the regional countries should encourage private investments in tourism businesses. Private investors would enable to develop tourism businesses with a high-quality standard, attracting upper-class visitors ready to pay more for conservation and development.

In most of the MPAs, the park entry fee is quite low (< 10 USD in Kenya and Tanzania) and it's directly transferred to the national treasure (apart for KIUNGA MARINE NATIONAL RESERVE in Kenya, 50% is reinvested in conservation programmes)

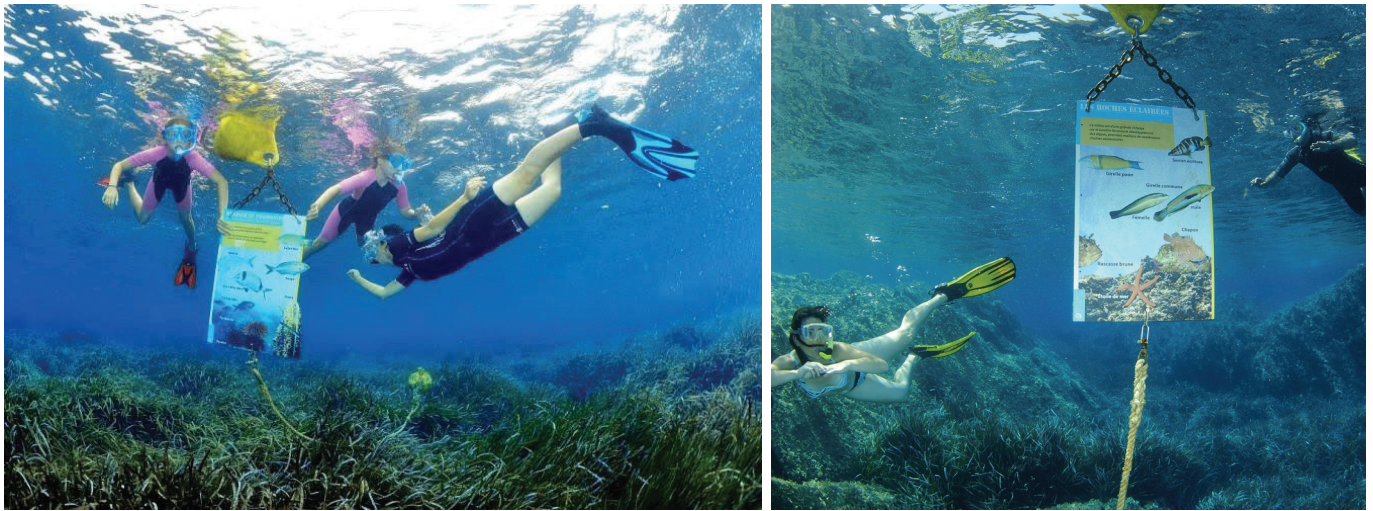
- A percentage of the entry fee should return into the MPA and dedicate to conservation programmes.
- Another percentage of the entry fee could be kept for development projects

In that way, ecotourism would enable the MPA to be more financially sustainable. However, for ecotourism to generate enough money, tourism has to be well developed, structured with tourism products well identified and marketed locally. Professionalism is missing usually, as much as a diverse ecotourism offer.

Among the programmes missing, we find:

- Underwater trails:

The concept is to discover the marine biodiversity along an underwater trail while snorkeling. The key species are marked with a sign underwater. It enables the visitors to discover an ecosystem and to learn about it. A local guide is usually guiding the small group of visitors underwater.



Source: CPIE La Ciotat

Underwater trails projects have the advantage to create jobs within communities and to raise awareness on marine life.

An underwater trail did exist in Blue Bay Marine Park (Mauritius) and one was in project in SEMPA Rodrigues; however, it never came up, unfortunately.

- **Interpretative trails and centres**

Ecotourism is about discovering a natural and cultural environment.

Apart from the marine biodiversity underwater, the coastline is also full of biodiversity and the local communities have their own traditions and way of life that would be very interested for visitors to discover, if developed in a sustainable manner.

Interpretative trails could be developed in mangrove areas for instance. This ecosystem is so particular and rich in terms of biodiversity, it deserves to be more highlighted.

In the natural reserve called Bamboung in Senegal, it's possible for visitors to discover the mangrove area on foot or by canoe.

The fauna and flora along the coast could be highlighted with interpretative signs. It enables an MPA to develop specific tourism products like botanical trail, medicinal plants, reptile, marine turtles trail and so on.

Lots of MPA are IBA – it's to say, many birds can be found in the MPAs. Bird watching should be developed with the MPAs. Specific products could be designed to attract bird watchers either naturalist people or photographers.

- **Eco-museums and ecotourism offices**

They are very rare in the region, at least, in the countries visited and from the results of the online interviews. Ecotourism houses and eco-museums are the starting point to any trip around marine biodiversity. They should give all the information required on marine life and the communities in its surroundings to visitors.

They are places to highlight the local culture, the traditional way of life, the handicraft.

The project should support NGOs or other organisations working on ecotourism development locally – like Fanamby in Madagascar supporting ecotourism programmes all over the country; and Blue Ventures working on marine conservation programmes and ecotourism development all along the coast of the Indian Ocean.

Support the development of other AALs:

- **Development of Mariculture:**

Mariculture is still relatively undeveloped in Tanga District and Kwale County (Tanzania) but has growing potential, and is considered a viable alternative option for food security if effort is invested to build the necessary technical skills. If done correctly, mariculture provides communities with comparatively more stable access to food and income. Moreover, initiatives are already in place to promote mud crab fattening, lobster sheltering and prawn farming. If improved, these can relieve fishing pressure from the wild stocks.

Seaweed farming hold some potential and lessons learned from other areas such as Zanzibar where this activity has had some success need to drawn upon.

In Kenya, the country lacks a developmental framework to guide sectoral development, and in this regard, it would be appropriate for the State Department of Fisheries of Fisheries to commission a mariculture sector development plan to guide future interventions in the sector. The plan needs to take cognisance of the current institutional constraints to development and constraints to specific sub-sectors (e.g. crab culture, finfish and prawn polyculture) and identify new opportunities (e.g. small-scale grouper culture, coral culture). Institutional constraints such as the current lack of extension capacity, the need for additional extension capacity and demonstration facilities at Kwetu, and a focused research and development agenda for mariculture development at KMFRI need to be addressed and funded. The policy and regulatory environment need to be reviewed such that an enabling investor environment is created. Where appropriate, regulations will need to be altered. For example, the current requirement for all mariculture operations to require an EIA irrespective of production volumes needs to be reassessed - such a regulation is likely to deter small scale investors into the sector. In terms of governance, clarity is required in terms of institutional roles and responsibilities. In this regard the role of the Coastal Development Authority (CDA) which has a developmental mandate, and the SDF and KFS need to be clarified such that institutional responses to development are coordinated, and in this regard, one organisation becomes responsible for coordinating sector development.

- **Development of Aquaculture and fish farming**

- *Built outposts / security check point towers into the water to make sure the aquaculture wouldn't be stolen*
 - Consolidate the Aquaculture Development Strategy (2008) in Tanzania, there is currently limited capacity and funding within the Aquaculture Division (MLFD) to realise the strategy and effectively plan and manage the development of the sector. Under the current management dispensation,

private sector investors are limited, and while a few large-scale aquaculture projects have been or are currently being proposed by the private sector, few if any have been realised. The exception to this would be the seaweed culture sub-sector that has ostensibly been driven by private sector interventions at the village level. In many respects, current developments are being driven by the donor community, and the international and local research institutions that are trialling and developing appropriate culture technologies. In terms of planning, it is evident that the sector is developing in an ad hoc manner with developments primarily being driven by the various mandates of the donor organisations. In terms of sustainable development frameworks, in 2001 the Tanzanian Coastal Management Partnership published a comprehensive mariculture guideline source book. The document provides a basic framework for sustainable mariculture development, and if applied correctly can significantly contribute to the sustainable development of the sector

- Enhance stakeholder and community participation the MPA management

Like the LMMA in Madagascar. But no try to replicate a model that works in a country but might not work in another. For instance, LMMAs work in Madagascar because people work together; in Kenya, people are more individuals.

Use Co-management plan between the governments & communities as a model

Stakeholders have to be involved from the beginning; participatory process to define all together the zoning areas

In most countries, there is a long history of using marine areas close to the coast, often for subsistence. Attempts to exclude these uses from traditional areas may jeopardize the well-being or even survival of the human communities involved.

Conclusion

First of all, it is important to say that all the information compiled in this present report come from the main stakeholders involved in marine conservation in WIO. Some topics – especially the data related to aquatic biodiversity located in the lakes and rivers inland could not be treated and analysed for lack of transmission from the key persons. This information hasn't been shared at all.

Therefore, we concentrated our study on MPAs located in the WIO and along the Eastern coast of Eastern and Southern Africa.

Regarding the countries and MPAs visited during our field work: Kenya, Zanzibar and part of Tanzania mainland, where we could collect detailed information from KWS, the fisheries department and other stakeholders; the MPAs still face lots of threat and weakness to achieve their goals in terms of conservation. They all have legal and institutional framework formalized; however, they are very far from being sustainably managed – apart from rare examples like in Chumbe Island where a partnership has been signed with CHICOP a private society. The revenue generated from tourism enables the MPA to be sustained and the results in conservation are significant.

Most of the MPAs visited need to enhance stakeholder and community participation in the MPA management, strengthen law enforcement, develop tourism and livelihood for communities, develop infrastructure to support tourism and community projects, re-establish MPA boundaries, Staff training, equipment for the technical and administrative staff, etc. The needs are huge and the financial and technical means very poor... They need financial partners on the long-term running.

Apart from the MPAs visited, the results collected from the key stakeholders involved in marine conservation in the region show that almost all the MPAs suffered of the same kind of weaknesses and threats than the ones seen during our field study. There are clearly major deficiencies in management, a lack of financial and human resources for the majority, which consequently contributed to the low enforcement capacity of managers and rangers. Efforts have been made for collaborative management, for the local people, especially the communities to be part of the process from the beginning. Even if they are not formally declared, the LMMAs are very good initiatives and allow all the local stakeholders to be involved in the conservation of their marine environment.

The size of the MPAs established is also increasing from 1km² to more than 100 000km² - which could be an effective strategy for sustaining target species within MPA boundaries. MPAs networks through transboundary MPAs initiatives are also promising.

Thus, even though there are shortfalls in the achievement of conservation targets and management effectiveness of MPAs in the region, the countries have made tremendous progress in protecting the WIO and need support to continue their efforts as the pressure on the marine wildlife and habitats is still significant.

The main support we could expect from an organization like IBAR would be:

- Encouraging the initiatives to establish MPAs network in WIO, especially the one in process with WCS and WIOMSA
- Encouraging monitoring and research in each MPA, specific assessments on marine biodiversity and recreation activities to avoid conflicts between users
- Creating a platform with shared data on MPAs for the managers to be able to talk together and to improve their management effectiveness
- Developing capacity-building of all stakeholders working in and around the MPA. IBAR could support WIOMSA in creating a regional marine school for all the stakeholders of the WIO region and enhance their technical capacities. The school could organize seminars, trainings, site visits and learning exchanges. The training modules would have to be theoretical and practical to be the most efficient.
- Encouraging the regional partners working on livelihoods and community-based projects for a minimum of 5 years. The main issues with the financial support are their length, the funds and the technical assistance that the communities need are usually too short to be efficient.

Lots of regional partners like COMRED in Kenya have developed very good initiatives with the communities but they have stopped because of a lack of financial support.

The main priority actions have been well described and are already well documented in reports and the partners are identified. AU-IBAR and all others funding partners have all the information required to move forward and to support all the active regional stakeholders and organizations ready to do the Western Indian Ocean a well-preserved marine environment.

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Annexes

Annex I: Matrix of data compiled: model of ZANZIBAR MPAs

	Location	The TUMCA is located to the northwestern part of Unguja Island	The MIMCA is located to the northeastern part of Unguja Island	The MBCA is located to the southern part of Unguja Island	The CHABAM-CA is located to the western part of Unguja Island,	The PECCA is located to the western part of Pemba Island
	Date of establishment	2014	2002	9th August 1997	2014	23rd September 2005
GENERAL INFORMATION Location	Description	The current boundary starts from a point on the west of Nungwi, at the northwest limit of the Mnemba Island-Chwaka Bay Marine Conservation Area (MIMCA), and extends to mangroves and associated beach at Fujoni, in North B. (Figure 2). The TUMCA encompasses Tumbatu Island, plus several small islands and sand banks, many with fringing coral reefs. The small islands include Popo Island, facing Gomani village, Mwana wa Mwana island at the north of Tumbatu, Daloni Island (and a smaller islet) closer to Unguja at Kendwa, and the islet of Makatuni off the southeastern corner of Tumbatu.	The current boundary starts from Ras Michamvi, to the east of Chwaka Bay, in the Central district, close to, but not adjacent the northeastern border of the Menai Bay Conservation Area (MBCA), and extending to Nungwi on the north coast (Figure 2). The MIMCA encompasses a few sand banks, around Mnemba Island and a few scattered locations in the wider lagoons, and most of the site is bordered by and extensive fringing coral reef. The principal features of the MIMCA are the reefs and sandbanks around Mnemba Island, and the inlets and mangrove creeks in the Chwaka Bay, covering fringing reef to the 10 m contour depth at spring low tide, extensive intertidal expanses and shallow lagoons.	The current boundary starts from Chukwani in the West B district (close to the southern border of Zanzibar Town) to Bwejuu, on the southeast coast (Figure 2). The MBCA encompasses several small islands and sand banks, many with fringing coral reefs. The islets in the bay include Pungume, Kwale, Miwi, Nyemembe, Komonda, Vundwe, Sume, Tele, Nguruwe, and Ukanga, which are covered mostly by coral rag bush and surrounded by coral reefs and seagrass beds. It covers an extensive marine area which includes the seabed and substrata extending into Menai Bay and beyond the east coast fringing reef to the 10 m contour depth at spring low tide.	The current boundary starts from a point north of Stone Town, the Mtoni Palace Ruins and Stone Town Gapco fuel tank farm at Mtoni, westward around four small islands and three reefs, and back to Unguja at Mazizini close to northwestern limit of Menai Bay Conservation Area	PECCA comprises all marine waters off the west coast of Pemba starting from the beach of Kangani at Ngazi Islet in the south to the north tip of the beach of Ras Kigomasha in the north. The coastline is heavily indented with numerous large and small bays, and a network of deep channels separated by shallow sandbanks, peninsulas and 13 main islands, plus numerous smaller islets and rocky outcrops.

	Location	The TUMCA is located to the northwestern part of Unguja Island	The MIMCA is located to the northeastern part of Unguja Island	The MBCA is located to the southern part of Unguja Island	The CHABAM-CA is located to the western part of Unguja Island,	The PECCA is located to the western part of Pemba Island
	Date of establishment	2014	2002	9th August 1997	2014	23rd September 2005
ZANZIBAR MPAs	<p>THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration</p> <p>WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff</p>	<p>THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration</p> <p>WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff</p>	<p>THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration</p> <p>WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff</p>	<p>THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration</p> <p>WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff</p>	<p>THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration</p> <p>WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff</p>	
	<p>STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs)</p> <p>OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials</p>	<p>STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs)</p> <p>OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials</p>	<p>STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs)</p> <p>OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials</p>	<p>STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs)</p> <p>OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials</p>	<p>STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs)</p> <p>OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials</p>	

Annex 2: List of contacts

List of persons met per country and description of the interview

KENYA

Name	Function / Organization	Email	Summary of the findings
Rodrick KUNDU	Director - Department Fisheries & Aquaculture Development	rodkundu@yahoo.com	He facilitated me the interviews I had with KWS/ COMRED/WRTI in Mombasa
Mika ODIDO	IOC Coordinator in Africa	m.odido@unesco.org	I couldn't meet with him as I arrived during the week-end Online interview should be planned soon
Samuel TOKORE	Director MPAs - KWS – Mombasa	stokore@kws.go.ke	Some management plans missing – key document for an MPA to be sustainably managed MPAs, some are IBA (Important Bird Areas) like Watamu, Arabuko WATAMU + DIANI CHIALE (no management plan) = the 2 most visited MPAs. Watamu received 4938 visitors only in July 2022. All the MPAs have conservation zones KISITE has been designed as a “Blue Park” Designated a MPA in 1978, Kisite-Mpunguti has successfully showcased its impressive biodiversity and management efforts over the decades. Threats: poaching (sea turtles), over fishing Needs: equipment, funds, awareness campaign, capacity building in marine conservation for the office staff and technical ones, management plans, specific monitoring of each MPA t
	Mombasa Warden – KWS		Mombasa MPA = highly threatened by multi tourism operators No Management plans The communities are organized to operate, especially for the boat activities KWS have to set up rule for jet skis – not sustainable activity. Different zonings are set up Lots of human pressure. MPA “on paper” The MPA needs a management plan, more staff to control, more equipment, specific regulations.

Name	Function / Organization	Email	Summary of the findings
Dadley TSINGANYIU	Warden - KWS – Watamu	tsinganyiu@kws.go.ke	<p>WATAMU: leading destination</p> <p>Activities in Watamu: picnic sites; snorkelling; diving; boat trips (the communities own the boats); traditional canoes (dhow trips)</p> <p>Main attractions: dolphin watching (November > march), snorkelling, whale watching (July > September); traditional dancing; mangrove excursions;</p> <p>Main issues: watersport: jet sky, kite surf, windsurf.</p> <p>Problem with the lagoon which is very shallow</p> <p>Issues with the regulations: the fishing act = challenging between the tourists activities & the local fishermen</p> <p>Threats: illegal fishing (undersize nets) + using spear guns; bycatch</p> <p>Needs: specific assessment to define where the watersports can be done for them to disturb the marine biodiversity</p> <p>Education awareness</p> <p>Rescue centre</p> <p>Equipment: new boats; Office/ dive equipment (need currently to borrow some from the locals)</p> <p>Trainings: the last ones were delivered 30 years ago</p> <p>Proper regulations for each MPA = need specific laws</p> <p>The way the MPAs have been zoned is not done in a scientific way – done only during gazettement => zoning should be done in a participatory and co-management approach</p> <p>Review management plan (applicable up to 2026)</p> <p>Scientific studies have to be done on tourism; corals; watersports activities (they're currently done in no take zone)</p> <p>Need standard rules = none exists in Kenya for MPAs</p> <p>Need boundaries inland;</p> <p>Need new infrastructures</p> <p>The situation has improved (the fish biomass with CORDIO); no case in some parts of sea turtle poaching; no problem on marine mammals</p>
LOCAL OCEAN TRUST			We went to save a sea turtle (hawksbill) taken in fishing net with the team and released her
Dr. Judy Nyunja	Director WRTI - Wildlife Research and Training Institute	jnyunja@wrti.go.ke	Online interview should be planned soon

Name	Function / Organization	Email	Summary of the findings
Patrick KIMANI	COMRED	director@comred.or.ke . patrick.kimani2002@gmail.com	<p>Biodiversity conservation programme</p> <p>No specific projects on management. COMRED collaborates with KWS in KISITE in community trainings on patrols; improving management; and co-management plan. They also support the BMU – Beach Management Unit</p> <p>According to COMRED, the LMMAs are not working well.</p> <p>Needs = enforcement; the communities need lots of support and on the long term (longer than the duration of the projects). No marketing done; no products packaging</p> <p>Priority actions: provide ALLs (Alternative Livelihoods) for communities, need capacity building (skills development); standard has to be higher; projects on the long run (at least 10 years to support properly the communities)</p>
Evelyne NDIRITU	Director - CORDIO	endiritu@cordioea.net	Online interview should be done
MUTHIGA Nyawira	Director - WCS	nmuthiga@wcs.org	<p>Phone call + documents sent when I was in Kenya</p> <p>high biodiversity ‘seascapes’ in Eastern Africa</p> <p>By the 1990s, larger, zoned, multiple-use MPAs were seen as more effective for conservation, and sites designated at this time tended to be over 200 km² (e.g. Bazaruto in Mozambique and Mafia Island Marine Park in Tanzania) and their management emphasized a more participatory approach</p> <p>Results</p> <p>>> MPA management capacity in these countries (Mozambique, Kenya, Tanzania) is improving</p> <p>>> all lacked adequately trained staff and assured funding sources</p> <p>>> The commitment to expanded MPA coverage suggests that these governments recognize the economic benefits to be gained from well-managed marine resources, particularly in terms of coastal livelihoods and the revenue generated from tourism.</p> <p>>> Very few MPAs meet their objectives : biodiversity conservation and improved livelihoods, even if some have been in place for more than 20 years</p> <p>>> MPAs may be able to generate more income from tourism than from the fisheries that they displace (in the case of no-take areas) or reduce (in the case of areas where fishing is allowed but in a more regulated fashion). Communities in Kenya are benefiting from employment opportunities generated by tourism related to the MPAs (e.g. providing boat services, managing tourist attractions such as boardwalks)</p> <p>>> better monitoring systems are needed that will measure progress and also demonstrate the impact of the MPA on both biodiversity and livelihoods</p>

TANZANIA/ ZANZIBAR

Name	Function / Organization	Email	Summary of the findings
Artur TUDA	WIOMSA coordinator	tuda@wiomsa.org	<p>WIOMSA supports > 100 MPAs in the region; at the macro level</p> <p>The set up a certification programme on MPAs : MPA toolkit online : www.wiomsa.org/mpatoolkit/Home.htm</p> <p>They currently work on the reorganization of the MPA unit in Tanzania. Once done, they'll carry on with the MPA unit in Kenya. The structure is old and has to be renewed for it to be efficient. (funds from USA)</p> <p>Transboundary project work with WCS – 2 years project. So far, they've worked on a conservation plan + to set up a big management area including the communities. Up to 2024, WIOMSA receives support from the Blue Action Fund</p> <p>Main issues: the capacity building + set up proper indicators (on the economic, social sides especially; specific biodiversity ones as well); with proper socioeconomic assessments on each MPA</p> <p>Management effectiveness is ok at the high level, the regional level is the issue</p> <p>On the ecological side, the MPAs work. From a community perspective, it doesn't work</p> <p>Needs : a regional coordination (a clear one, not divided into 2 Ministries or different organizations : Fisheries/ KWS) ; more funds ; a regional system to monitor and to manage datas ; capacity building from the Department of MPA to the field : people are getting old, close to the retirement, need to renew the school and to get devoted marine schools in the region : the regional school could be based in Kenya or the Seychelles ; restructuration of the institutions (like KWS)</p> <p>The priority actions have to be done at the high level : the institutions and the way they operate are the biggest problem according to Artur</p> <p>Need Livelihoods : Need to change the model of community conservation model – how they interact with the natural resources</p> <p>Need to look at the value chain</p>
John David KOMAKOMA	Marine Parks and Reserves Unit	jkomakoma@gmail.com	<p>online interview : the conclusions of the needs and priority actions formulated are the same as WIOMSA</p>

Name	Function / Organization	Email	Summary of the findings
Saïd Shaid SAID	Acting Manager TUMBA & CHABAMCA MCA – Department of Marine Conservation - Zanzibar	saidhamamni@gmail.com ; funguamlango46@gmail.com	Visit of 3 MPAs : TUMBATU + CHABAMCA + Chumbe Island -CHUMBE ISLAND : Privately managed Marine Park Island is still public (belongs to the Government) but privately managed Coral reef sanctuary & coral fossil forest. Visitor centre, restaurant, 7 eco bungalows, nature trails & historical buildings 39 Staff : Marine biologist + education officer + cooking/ housekeepers + rangers + volunteers (work on black-tip sharks+ coconut crabs) >100 different species of birds + antelopes + coconut crabs ; >500 species of fish 1921 = tourism industry started German woman supported the conservation; Several goals of Chumbe Conservation Programme: 1 st = conservation of the biodiversity 2 nd = environmental awareness = receive schools, students... 3 rd = Research on marine conservation 4 th = ecological tourism = ensure minimum impact on the environment ⇒ Money reinvests into conservation and education. Works well. Self-sustained thanks to tourism ⇒ Model in terms of conservation and tourism development -CHAMBANCA + TUMBATU : Co-Management (Government and community) MPAs Endemic species : BIRDS:Nectarinia olivacea grantiand Cercotrichas quadrivrigata greenwayi, Tauraco fischeri zanzibaricus, Andropadus virens zanzibaricus and Nectarinia veroxii zanzibarica, endangered sea cucumber humpback dolphin Main threats :THREAT Over exploitation of resources, Climate change (sea level rise, etc) , Pollution, Destructive exploitation (destructive gears & methods), Land erosion/ sediment, Tourism pressure, Removal of keystone species, Boat anchoring, Coastal development, Overfishing , Entanglement in fishing gears, Impact from oil and gas exploration WEAKNESS. Shortage of staff, law enforcement, shortage of working equipments, low of wareness on conservation, poor skills and knowledge to conservation staff STRENGTHS: Presence of Department of Marine Conservation, presence of Fisheries Act 2010, MCU Regulation 2014, Fisheries policy, Standards Operation Procedure (SOPs) OPPORTUNITY:• Presence of the development partner to invest on fisheries and marine resources, • Presence of large water body resources with high fisheries and marine resources potentials Priority actions : equipment, better management, efficient monitoring system, specific regulations on MPAs, Alternative livelihoods for the communities, capacity building, funds
Kassim Heije THUWAIBA	Conservation officer – Department of Marine Conservation – Zanzibar		
Fatma ABDULCA AMOUR	Conservation officer – Department of Marine Conservation – Zanzibar		
MWINYI	Fishery Legal officer - Department of Marine Conservation – Zanzibar	mwinymioiny@gmail.com	
Dr MAKAME	Director MPAs- Department of Fisheries - Zanzibar	makame.makame@suza.ac.tz	Put me in contact with the acting manager for me to have an interview with the team and to visit the MPAs



African Union
Inter-African Bureau for Animal Resources (AU-IBAR)
Kenindia Business Park
Museum Hill, Westlands Road
P.O. Box 30786
00100, Nairobi, KENYA
Telephone: +254 (20) 3674 000 / 201
Fax: +254 (20) 3674 341 / 342
Website: www.au.ibar.org
Email address: ibar.office@au-ibar.org