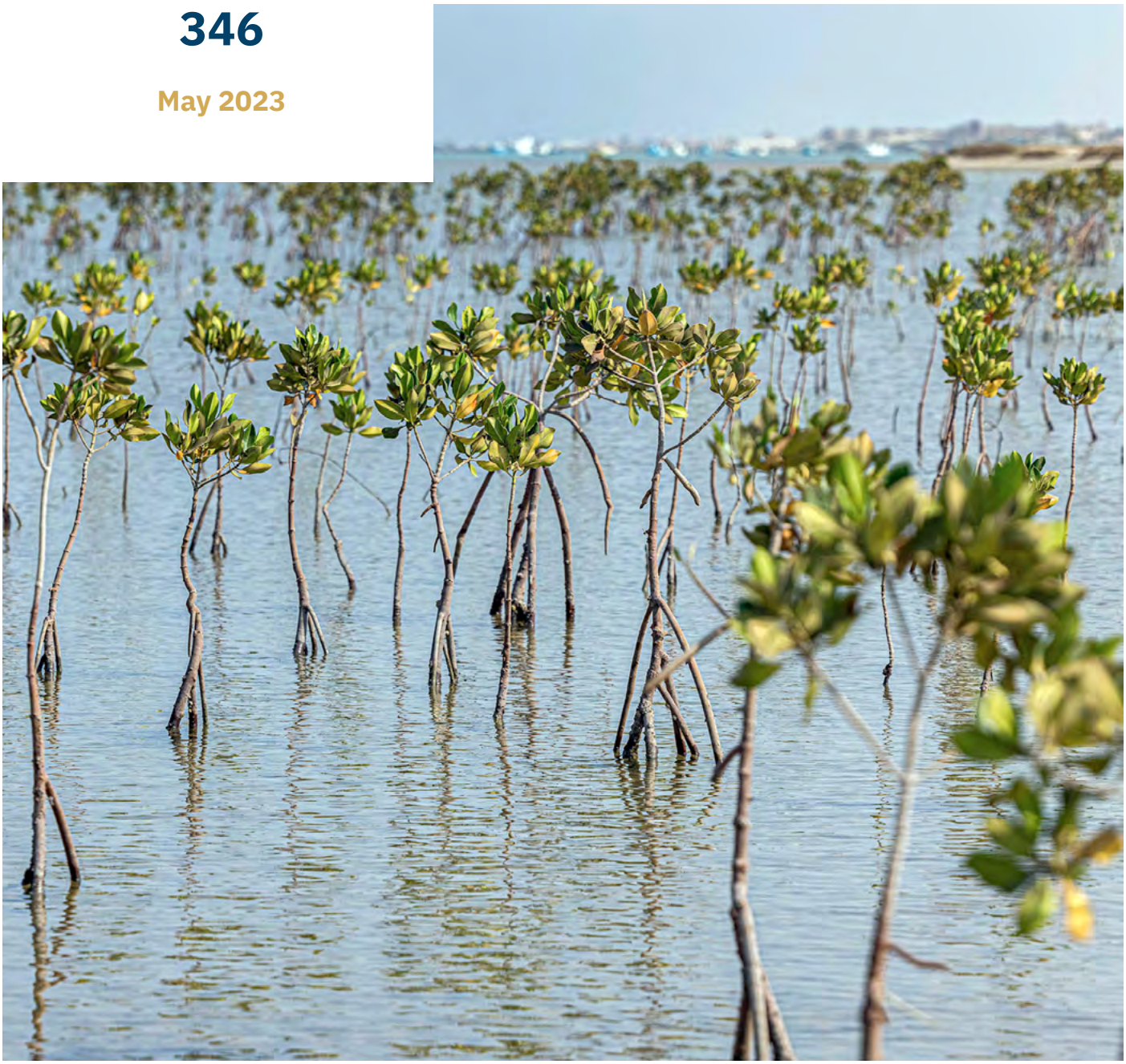
Occasional Paper

346

May 2023



Strengthening Marine and Coastal EbA in Climate Policies in Southern Africa

JESSICA THORN

SAIIA SOUTH AFRICAN INSTITUTE OF INTERNATIONAL AFFAIRS

SADC SOUTHERN AFRICAN DEVELOPMENT COMMUNITY · TOWARDS A COMMON FUTURE ·

GCCA+ THE GLOBAL CLIMATE CHANGE ALLIANCE PLUS INITIATIVE

INTRA-ACP GCCA+ PROGRAMME An initiative of the ACP Group of States funded by the European Union's European Development Fund

Abstract

In recent years there has been progress in strengthening marine and coastal ecosystem-based adaptation (EbA) in climate policy debates in Africa, along with a surge in ocean research globally. Much national effort has been put into drafting the latest versions of countries' Nationally Determined Contributions (NDCs), submitted by parties to the Paris Agreement and aiming to communicate countries' climate plans to achieve its 1.5°C goals. However, there is agreement that rising concerns over terrestrial issues in climate policy have overshadowed marine and coastal EbA concerns. Moreover, many question to what extent these high-level discussions at the global level have translated into effective EbA action at the local level. In SADC, there remains a need to have a more nuanced understanding of phenomena that impact effective EbA implementation. The aims of this paper are to (1) review current NDCs and other national climate and blue economy policies and processes; (2) analyse national and regional gaps; and (3) identify windows of opportunity to integrate EbA with a coastal and marine focus. The scope of this analysis is the 10 member states of SADC situated along the coast of Southern and Eastern Africa. The target audience is the SADC Secretariat and its constituents at local, subnational and national levels.

Introduction

Background

Oceans cover 72% of the Earth's surface, absorb 30% of CO_2 emissions, provide 1 billion people with protein, employ over 200 million people, support 80% of global trade, have a value of $3 trillion per year and have the potential to provide 65% of future protein.[1] In SADC alone, the mainland and small island states have a total of 15 128km of coastline, which supports critical ecosystem goods and services, such as sequestering carbon, trapping sediment and providing shoreline protection.[2] For instance, in South Africa, coastal goods and services alone are estimated to contribute over a third (35%) of the gross domestic product (GDP), producing 600 000 tonnes of fish per year, providing livelihoods to more than 127 000 people and food security to millions, while the coast is home to approximately 12 914 species.[3]

However, the marine ecosystems of SADC are under significant threat – each with significantly varying levels of protection.[4] Approximately 75% of Western Indian Ocean (WIO)

1 Alasdair Harris and Steve Rocliffe, "Strengthening Coastal Food Security and Small-Scale Fisheries Livelihoods in the Face of Climate Breakdown" (Presentation, Towards a Blue Economy Conference, September 14, 2021).

2 Andrea Ghermandi et al., "The Economic Value of Wetland Conservation and Creation: A Meta-Analysis" (Working Paper No. 79.2008, Fondazione Eni Enrico Mattei, September 24, 2008).

3 World Wildlife Fund, *Ocean Facts and Figures: Valuing South Africa's Ocean Economy* (Cape Town: WWF, 2016).

4 Government of South Africa, Department of Environmental Affairs and the South African National Biodiversity Institute, *Guidelines for Ecosystem-Based Adaptation (EbA) in South Africa* (Pretoria: DEA, 2017).

stocks are fully or over exploited, while offshoring in the northern hemisphere has recently been misplaced into the Global South.[5] Siloed, single-sectored policies, programmes and management, weak institutions and regulatory and enforcement mechanisms are widespread. Meanwhile, significant issues remain around marine ecosystem restoration, planning and effective conservation.

Siloed, single-sectored policies, programmes and management, weak institutions and regulatory and enforcement mechanisms are widespread

Observed climate change impacts in Africa include increasing sea surface temperature, sea-level rise, ocean acidification and salinity, as well as changes in ocean currents and vertical stratification. In addition, there are changes in water circulation from decreased river inflow, increases in sedimentation and turbidity, heatwaves associated with El Niño–Southern Oscillation events and coastal erosion.[6] This will cause changes to marine biodiversity, ecosystem functioning and services, with the highest vulnerability among poorly dispersing organisms (plants) and species with narrowing and disappearing niches. Another impact will be changes in tidal forces and animal movement. Low-income coastal communities, including small-scale fishing communities whose livelihoods, food security and nutrition depend on healthy coral reefs, seagrass beds and mangroves, will be affected.

Meanwhile, economic pressure will grow for coastal municipalities managing rapidly growing and sometimes migrating populations and greater water resource demand while maintaining transport and protective infrastructure. Similarly, several non-climatic megatrends influence marine and coastal EbA, such as deep seabed and sand mining, toxic waste contamination, overfishing, the use of inappropriate fishing gear, and offshore submarine power and telecommunication cable installation. Other non-climatic megatrends are land-use change, sewerage discharge and pump station overflow, illegal fishing and dumping of industrial and solid waste, channel excavation and association sedimentation, catchment mismanagement, a lack of political will for authorities to ensure compliance, and the growth of the construction industry.[7] Such megatrends affect offshore, coastal and inshore systems, estuaries, wetlands, salt marshes, upstream rivers, intertidal areas, foredunes and lagoons around marine-protected areas and exclusive economic zones.

5 I Okafor-Yarwood, "African Countries Must Protect Their Fish Stocks from the European Union – Here's How", *The Conversation*, February 15, 2022.

6 Intergovernmental Panel on Climate Change, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge and New York: Cambridge University Press, 2022).

7 IPCC, *Climate Change 2022*.

To combat these issues, over the past two years countries that are parties to the Paris Agreement have been submitting their Nationally Determined Contributions (NDCs) outlining plans to achieve 1.5˚C goals and ecosystem-based adaptation (EbA) ambitions. There has been a recent surge in research on oceans globally and associated funding mechanisms. Yet there remains a need to have a more nuanced understanding of phenomena that contribute to effective EbA, climate and blue economy policy and implementation in SADC.

There remains a need to have a more nuanced understanding of phenomena that contribute to effective EbA, climate and blue economy policy and implementation in SADC

Against this background, the aim of this paper is to review collective progress in the integration of marine and coastal EbA in NDCs and other national climate processes and identify windows of opportunity to integrate EbA with a coastal and marine focus. It furthermore aims to identify both national and regional gaps and learn from best practice. This analysis covers the 10 member states of SADC situated along the coast of Southern and Eastern Africa. These countries are Angola, the Comoros, the Democratic Republic of Congo (DRC), Madagascar, Mauritius, Mozambique, Namibia, South Africa, Seychelles and Tanzania. The target audience is the SADC Secretariat and its constituents at local, subnational and national levels.

Definition of ocean and marine ecosystem-based adaptation

Here we define EbA as 'the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change …, reduc[ing] vulnerability and increase[ing] the resilience of social-ecological systems to both climatic and non-climatic risks, while … providing multiple benefits to society'.[8]

Marine and coastal EbA takes on varying forms, processes, emphases and funding strategies, spanning governments, non-governmental organisations (NGOs), and the private and other sectors. Additionally, substantive differences in the form in which EbA unfolds occur between the east, west and southern coasts of Africa. This is partly attributed to the biophysical difference between the productive, more commercialised fisheries industry

8 DEA and SANBI, *EBA Guidelines in South Africa*, 4.

in the south-west, compared to the warmer, more artisanal and tourism-dependent east coast. There is a difference in monitoring infrastructure, such as the higher amount of monitoring gauge stations in South Africa. There are also differing lengths of coastline, an example of which is the DRC coastline of 40km, with the DRC government department for oceans being comparatively small. There are also variations in politics associated with tenure rights and coastal population, as in Namibia, where most artisanal fishermen do not have access rights to harvest fish beyond subsistence use. In addition, SADC countries all have their own international treaty agreements with commercial vessels and unequal enforcement capacity regarding bycatch, toxic waste dumping or oil spills' offshore monitoring. Each country has different degrees of scientific capacity and horizontal and vertical integration between managers, government officials and scientists.

EbA is closely related to the 'ecosystem approach' and employs strategies such as stewardship, restoration and improved management in the context of a changing climate, and work that helps build resilience against climate change. These need to be assessed and applied for the approach to qualify as an EbA. In certain contexts, such as South Africa, there is some reticence in moving from the term EbA to nature-based solutions (NbS). One reason for this is because much time has been invested in developing a widespread understanding of EbA, while NbS is not well defined and is also more of an umbrella term that encompasses EbA activities without being limited to these.

Key principles for achieving effective EbA interventions are to:[9]

- support resilient and functional ecosystems that ensure and enhance ecosystem services;
- support people in adapting to climate change and climate variability;
- ensure participatory, inclusive and transparent prior informed consent and deep consultation;
- be evidence-based and informed by the best available scientific and robust Indigenous knowledge;
- contextualise EbA within broader national and regional policy and landscape processes and design EbA to be scalable and replicable;
- be integrative and promote interdisciplinary and multi-sectoral collaboration throughout the project lifecycle, avoiding information silos and bringing different portfolios together; and
- achieve common benefits and outcomes, avoiding maladaptive approaches, averting trade-offs and blockages and communicating to identify gaps.

9 DEA and SANBI, *EBA Guidelines in South Africa*.

Methodology

A total of 38 experts from 10 African countries, as well as Kenya and the UK, were interviewed. Interviews lasted 60–90 minutes and were conducted virtually in English on Microsoft Teams. The success rate in getting interviews was 25%, with 152 stakeholders contacted across the region. The interview tool was open-ended consisting of seven sections each with 3–5 questions, provided to the informants in advance. Confidentiality, voluntary participation and anonymity protocols were in place.

Key informants included people working at national, sub-national and municipal levels across scales and sectors, with representation across age, gender and career stage. One-third (34.2%) of stakeholders represented NGOs while another third (34.2%) represented the government, followed by academia and research (18.4%), multilateral organisations (7.9%) and private companies (5.3%). In terms of scale of operation, half of the interviewees operate at the national level (50%), followed by the regional (26.3%), international (15.8%), local (5.4%) and provincial or county level (2.6%). Approximately 44.7% were female, while 52.6% were male. NGOs included the Worldwide Fund for Nature (WWF), Conservation South Africa, CORDIO International, WildTrust, the Wildlife Conservation Society and Blue Ventures. Government bodies represented were departments, local authorities and ministries working in oceans, fisheries, marine resources, environment, forestry, tourism, climate change, energy, agriculture and agronomics. Academic and research institutes interviewed included London School of Economics, University of York, Oceanographic Research Institute, the University of Namibia, the Scottish Ocean Institute and the University of St Andrews. Multilateral organisations represented were the Benguela Current Convention (BCC) and the Western Indian Ocean Marine Scientific Association (WIOMSA). Private consultants operating independently were also interviewed.

All NDCs were analysed with a focus on EbA or NbS matters. Reports were read and manually coded using Adobe Acrobat Software. Reports were sourced from the NDC registry of the UNFCCC. Where NDCs (published in 2021) were unavailable, intended NDCs (published in 2017) were reviewed. Where NDCs were published in French, Google Translate was used. Broader literature recommended by stakeholders interviewed was further analysed per country, regionally and globally. This included commentaries, peer-reviewed journal articles, reports and policy briefs. Where the source was credible, media articles were also be reviewed. The following key words using Boolean logic and wild cards were searched: 'ecosystem-based adaptation' OR 'nature recovery' OR 'natural climate solutions' OR 'nature-based solutions' OR 'blue economy' AND 'coast*' OR 'marine' OR 'ocean'. Finally, case studies were reviewed that document the perspectives of coastal communities, including studies that report on Indigenous, traditional or local ecological knowledge, natural resource stewardship and biocultural diversity. These case studies were selected based on their progress implementing EbA, whether through capacity building, stakeholder engagement, financing from domestic and international sources, monitoring or institutional governance, or otherwise.

Results

To what extent are marine and coastal matters given consideration in climate policy?

Progress is evident in strengthening marine and coastal EbA in climate policy debates, with growing political commitment, private investment and operationalisation of restoration strategies. Several initiatives have raised marine EbA's profile and encouraged governments to set targets, including the:

- Great Blue Wall initiative launched at COP26 (aiming to regenerate the sustainable blue economy and accelerate sustainable utilisation in the WIO);
- UN Decade on Ecosystem Restoration;
- 2030 Bonn Challenge (aiming to bring 50 million ha of degraded landscape into restoration and 30% of marine conservation areas, with $210.12 million pledged in 31 African countries);
- Post-2020 Global Biodiversity Framework (strengthening the implementation of National Biodiversity Strategies and Action Plans [NBSAPs]);
- Ramsar Convention on Wetlands (conserving wetlands); and
- African Forest Landscape Restoration Initiative (AFR100).

More regionally, some important agreements for marine EbA in SADC include:

- Benguela Current Large Marine Ecosystem Treaty;
- updated national biodiversity and strategy and action plans; and
- Nairobi Convention for the Protection, Management and Development of Marine and Coastal Areas of the Eastern African Region.

In addition, there are the Libreville Declaration on Health and Environment in Africa and the Algiers Convention on the Conservation of Nature and Natural Resources.[10]

All of these contribute to the UN's Sustainable Development Goals and the AU Agenda 2063, and constitute regional platforms for scientific and policy exchange and collaboration.

10 Republic of Madagascar, Ministry of the Environment and UN Environment Programme, *National Biodiversity Strategy and Action Plan 2015–2025* (Antananarivo: Ministry of the Environment, 2015).

However, wide agreement suggests terrestrial issues trump EbA concerns and much more could be done to integrate marine EbA into the NDCs. For instance, the Kigali Call to Action arose from the first gathering of African leaders at the International Union for Conservation of Nature (IUCN) African Protected Areas Congress in 2022 to drive a more integrated approach to addressing the climate–biodiversity–health–conflict nexus, increase financing and acknowledge past injustices experienced by Indigenous people. Yet it did not explicitly mention oceans.[11] Nor did the first NDC of South Africa. Many call into question to what extent high-level discussions have influenced EbA action on the ground. Currently there remains a disconnect in EbA policy development at global and local levels.

However, wide agreement suggests terrestrial issues trump EbA concerns and much more could be done to integrate marine EbA into the NDCs

Case studies of EbA in ocean and marine systems in practice in SADC

Angola

Much marine EbA falls under integrated coastal zone management (ICZM) and within environmentally sensitive planning areas (ESPAs). The focus is on prioritising which species to conserve in marine protected areas (MPAs), ecotourism and ways to enhance Indigenous people's rights and biocultural heritage. An example is a coastal programme to address adaptation needs and capacity gaps, funded by the Global Environmental Facility and led by the Ministry of Environment, National Institute of Water Resources Civil Protection and the National Institute of Meteorology and Geophysics.

Comoros

Activities aim to reduce the overexploitation of reef fish, destructive fishing techniques and deforestation for firewood and charcoal. Participatory community-led management strategies include temporary octopus and fishery closure no-take zones, livelihood diversification, added value to fisheries products (eg, drying), riparian Indigenous reforestation to improve water availability and quality, exchange visits to build the capacity of local organisations and feeding data into management processes. Organisations such as Dahari and Blue Ventures work in catchment reef management, with the support of the government, integrating EbA into wider coastal management.

11 Africa Protected and Conserved Areas Congress, *Kigali Call to Action for Nature and People* (Kigali: APAC, 2022).

DRC

Community management of natural resources combats coastal flooding, saline intrusion, agricultural losses, coastal erosion and biodiversity loss. To regulate the intensity of breaking waves and the height of swells, initiatives regulate and delineate construction near mangroves, diversify fisherfolk livelihoods, build water retention ponds, reforest, conserve soil and substitute ligneous fuels with renewable energy for domestic sources.[12] For instance, work is underway in Banana-Muanda and Tshende-Yema in the marine park.

Madagascar

Since 2012, a national network of Locally Managed Marine Areas in 150 communities and 64 management associations, covering 7 250km² of marine and coastal habitat or 11% of Madagascar's coastal shelf, has been in place. Called MIHARI (translated as marine resources management at the local level),[13] its management tools include permanent and temporary octopus, reef, fisheries and other species closures, fishing gear restrictions (eg, beach seine nets), alternative livelihoods (eg, aquaculture, mangrove restoration), local marine resources plans, artificial reef construction, the creation of MPAs and support for the seafood supply chain, with buyers paying premiums to fishers for their products. The approach has shown a dramatic increase in octopus landings and incomes when closed areas are reopened to fishing.[14] REDD+[15] in the context of mangroves and seagrass has been an important mechanism to enhance biodiversity and carbon sequestration, and to provide economic returns to the communities through the sale of carbon credits to international markets, thus helping to alleviate poverty.[16]

Mauritius

In the past 20 years, Mauritius has made significant investments in marine EbA, with rising sea levels and concerns about the shift of the coastal zone in a landward direction. Coastal hazard risk management and adaptation planning have used ICZM assessment models and dynamic and interactive vulnerability assessments to build scenarios of flooding, relative sea-level rise, erosion and wetland or river change. The Fisheries Division ensures industry participants comply with fishery regulations, the Beach Authority manages all public beaches, and the Ministry of Environment enforces compliance with environmental impact assessment licences and monitors emissions, pollution abatement and cleaner

12 Government of the DRC, Ministry of Environment, *Second National Communication to the Convention Climate Change Framework* (Kinshasa: Ministry of Environment, 2009).

13 Blue Ventures, "MIHARI: Madagascar's Locally Managed Marine Area Network", https://blueventures.org/publications/mihari-madagascars-locally-managed-marine-area-network/.

14 Panorama, "Temporary Octopus Fishery Closures", October 24, 2019.

15 The Conference of the Parties (COP) invited parties, relevant organisations and stakeholders to share outcomes, experiences and lessons learned from their efforts to reduce emissions from deforestation and forest degradation in developing countries (REDD+). The REDD+ Web Platform, mandated by the COP in decision 2/CP.13, was established with the purpose of making available such information on the outcomes of activities relating to REDD+, including activities on capacity building, demonstration activities, addressing drivers of deforestation and mobilisation of resources. Since the launch of the REDD+ Web Platform after COP 13, both the COP and the Subsidiary Body for Scientific and Technological Advice have recognised the platform as a useful tool and have mandated additional functions to be developed.

16 Republic of Madagascar, Ministry of Environment, Ecology and Forestry and UNEP, *National Biodiversity Action Plans*.

production.[17] The private sector has an important role to play, such as the Reef Conservation which, through the Primary School Programme, supports the integration of marine sciences in curricula.

Mozambique

The Resilient Coastal Communities project, led by International Development Enterprises, the Millennium Challenge Corporation and the government, is designing an integrated climate management and coastal development project in north-central Mozambique. The Coastal Resilience to Climate Change Project in the Memba, Dondo and Inhassoro districts is being implemented by the government, IUCN, Rare and others. Additionally, in the Northern Mozambique Channel, a Marine Spatial Planning programme in partnership with the WWF is restoring seagrass and 400 species of hard corals. The aim is to foster disaster risk reduction, food security and breeding grounds for breeding, foraging, flagship, migratory and endemic species; support extensive artisanal and small-scale fishing communities; and recover water systems after frequent and intensifying cyclones.[18]

Namibia

Efforts are underway to restore this coastal habitat. On the Swakopmund–Walvis Bay coastline, palm trees (*Phoenix canariensis*) are being planted along beach promenades for their dust retention and wind-break benefits, and their ability to tolerate the fog precipitation and cool coastal environments. These initiatives are between developers such as Aphrodite Beach and the Road Authority.[19] Olives, which withstand dry conditions on coasts and brackish underground water, are being planted in Okombahe and Henties Bay, through initiatives by the Erongo Regional Council, Namsov Fishing Enterprises, Ruhleben Estates and a seal-processing factory, among others. Seven cultivars of olives and cold-pressed extra-virgin olive oil and processing provide full-time, year-long work to employees of the seal factory.[20] Restoration efforts are also underway to restore the Walvis Bay Lagoon, a 6 000-year-old lagoon that acts as a natural buffer to slow storm surges and dissipate wave energy, erosion and prevailing winds. It is also home to West Atlantic flyway birds migrating from Scotland to the Cape and flamingo populations. Additionally, since 2003 the Namibian government has invested over NAD[21] 200 million (about $11 million) in a commercial aquaculture value supply chain, given that the arid climate creates good conditions to generate a large yield. In addition, most stock domestically consumed is imported from Asia, while Namibia is the only country in Southern Africa that does not farm Nile tilapia.[22]

17 Ailbhe Travers, Carmen Elrick-Barr and Robert Kay, *Integrating Climate Change into Coastal Planning and Management in the Republic of Mauritius: Recommendations for Mainstreaming Climate Change into the Current ICZM Framework*, Report (Nairobi: UNDP, 2012).

18 For a full list of projects, see Romy Chevallier, *Marine and Coastal Ecosystem-based Adaptation for Enhanced Resilience in Southern Africa*, Special Synthesis Report (Johannesburg: SAIIA, 2019).

19 Adam Hartman, "World's Longest Palm Avenue Envisaged for Walvis Bay", *The Namibian*, March 1, 2011.

20 Sukhsatej Batra, "Seal Factory Looks to Olives in the Off-Season", *Olive Oil Times*, February 15, 2015.

21 Currency code for the Namibian dollar.

22 Namibian economist, interview by Dr Jessica Thorn, 2020.

Seychelles

The Ministry of Environment, Energy and Climate Change and the Blue Economy Committee, in partnership with local communities and schools, are involved in coastal wetland and mangrove restoration. The country is known for its 'Debt for Nature Swap' and its extensive MPAs. Since up to 80% of the road network is along the coast, there is also a lot of work being done using nature-based solutions rather than traditional grey and hard engineering approaches in coastal road rehabilitation, reducing erosion and improving drainage in partnership with the Ministry of Land and Housing. On the main island of Mahi, a Green Climate Fund project is focused on overall watershed management, including water supply and distribution. Other actors include the private sector, such as hotels and the tourism industry, which is bringing in a lot of investment. In 1998 there was a large coral bleaching event that helped transform how a lot of hotels view the importance of corals, not only for fisheries and tourism but also to act as a barrier against sea-level rise. This also ties strongly with the effectiveness of environmental impact assessments to ensure the ecological integrity of reefs during the construction and expansion of new hotels and reclaimed islands. The controversies surrounding the 'Reefresh' project, with a construction investment of $58 million and another $50 million to go to the government in the form of taxes, have helped to highlight this.[23]

South Africa

iSimangaliso Wetland Park is South Africa's third largest protected area spanning 280km of coastline. It is part of the Ponta do Ouro–Kosi Bay Transfrontier Conservation Area and a world heritage site. WildTrust Wildoceans and Wildlands, through its 'Oceans Alive Project', diverts community members from reef harvesting for timber and baskets, line fishing and over-extracting ingredients for traditional medicine, while reducing conflict and incorporating climate adaptation into management plans. The St Lucia Estuary Rehabilitation Project aims to artificially place sand in the uMfolozi River, reducing the salinity of the estuary and improving its health during the dry winter months with low water levels from evaporation.[24] The Expanded Public Works Programme Working for the Coast generates tourism work opportunities over two years, helps municipalities obtain blue flag status, conducts regular coastal clean-ups, repairs and builds access structures and servitudes, removes invasive vegetation, ensures equitable access to coastal public property, implements estuary management plans and reduces catchment erosion to adapt to climate change.[25] Beyond these local projects, nationally the MPA expansion project aims to increase marine protection by 10% by 2030. This includes 5% already in place to be enacted and 5% research on where to expand. The South African National Biodiversity Institute (SANBI) Marine Programme monitors and reports on the state of biodiversity in

23 Sedrick Nicette, "Environment Impact: Final Decision on Reef Hotel Project in Seychelles yet to be Taken", *Seychelles News Agency*, August 2, 2022.

24 Romy Chevallier, "Enhancing Resilience through Marine and Coastal Ecosystem-based Adaptation", (Policy Briefing 188, SAIIA, Johannesburg, 2019).

25 Government of South Africa, Department of Forestry, Fisheries and the Environment, *Working for the Coast Project* (Pretoria: DFFE, 2022).

the marine environment, coordinates research, provides planning and policy advice, maps most vulnerable areas for protection and pilots management models through collaborative partnerships with stakeholders, in line with the South African Biodiversity Act. Current projects that provide EbA-relevant information include Deep Seacrets, FishAtlas, FishForLife, Marine Alien and Invasive Species, Phakisa, SeaKeys and work to support the National Biodiversity Assessments.

Tanzania

The Vice President's Office, in partnership with UNEP and the UN Office for Project Services in Dar es Salaam, is working to deal with coastal flooding and erosion from increased tidal activities and storm surge rise. The partnership is working to develop hybridised blue green infrastructure – ie, rehabilitate sea walls and plant 40ha of mangroves and other vegetation to protect important assets along the coastline such as roads, buildings, ports and markets, as well as rehabilitating 2 000m of coral reefs.[26] In addition, in Zanzibar, beach clean-ups are regularly conducted to increase coastal resilience, coupled with monitoring; beach profiling; raising awareness to prevent pollution locally, upstream and offshore; and banning single-use plastic bans.

Mangroves [apomares via Getty Images]

26 UNEP, "Ecosystem-based Adaptation in Tanzania", https://www.unep.org/explore-topics/climate-action/what-we-do/climate-adaptation/ecosystem-based-adaptation/ecosystem-5.

Seaweed farm, Zanzibar [brytta via Getty Images]

What are the hurdles in moving from pledge to implementation?

Capacity

Key skills are lacking in the public institutions, community-based natural resource management groups and youth groups, among others, typically responsible for implementing EbA. Such skills relate to ecology restoration techniques, eg, redistributing topsoil along estuaries, lagoons, wetlands and rivers, dunes or offshore on reefs or in the deep sea; controlling invasive species; preventing pollution; collecting litter; managing

Key skills are lacking in the public institutions, community-based natural resource management groups and youth groups, among others, typically responsible for implementing EbA

marine cultural heritage; installing sewer outlets along rivers and coasts; and putting in place standardised, open and centralised monitoring protocols. Capacity is needed in the rehabilitation and restoration of offshore mining activities for industries such as diamonds, phosphorus, aggregates, magnesium, manganese, cobalt, salt, gold, oil, shale and other heavy metals and minerals and enforcing regulations. When individuals are trained there

is the risk that public institutions will not retain them, leading to high staff turnover. And when external consultants are used in government monitoring, this limits institutional memory retention. Often the responsibility for implementation and policy falls on the same person, who is overworked and therefore less effective.

Coordination

Coordination at all levels is a challenge, as highlighted by previous studies.[27] In particular, many national governments operate in silos and autonomously, both horizontally in coordination (eg, ministries of fisheries not talking to those of environment or tourism) and vertically (eg, practitioners disconnected from policymakers). Despite many calls for collaboration, different sectors appear to remain unwilling to sit together and reconcile priorities. Communication issues relate to cascading information to the necessary institutions and across sectors (eg, between physical oceanographers and marine EbA communities). Overlapping mandates in different ministries, NGOs or even across communities result in inefficiencies in using resources.

Overlapping mandates in different ministries, NGOs or even across communities result in inefficiencies in using resources

Enforcement and compliance

Another well-known hurdle is the enforcement of policies, regulations and laws. Respondents highlighted this issue as connected to having sufficient skilled labour and financial resources, strong and accountable institutions and political will. Meanwhile, there is also a need to train the police and other oversight relevant bodies (eg, on the appropriate levels of sand extraction).

Financing

Among the most frequently cited hurdles in moving from pledge to implementation is a lack of finances for NDC implementation. Often, funding comes over a period of three years, which can be too short to make a meaningful use of the funds. In many African institutions, municipal supply chains can take up to one-and-a-half years to complete a tender process. More regulation and legislation need to be put in place to nudge businesses to become involved in marine and coastal EbA. Beyond insufficient finance and a lack of EbA considerations in state finance, some local authorities lack the capacity to spend finances in the time provided with the donor timelines. This translates into a poor ability to absorb

27 Chevallier, "Enhancing Resilience through Coastal".

adaptation finance. There is also a need to better express capacity needs in adaptation financing and to build government capacity to effectively provide robust costs for past and current actions. Municipalities need to be trained on how to mainstream EbA into local economic development plans.[28]

There is also a need to better express capacity needs in adaptation financing and to build government capacity to effectively provide robust costs for past and current actions

Negotiation power of environment ministries

Equity concerns are well known, stemming from the asymmetry between countries' emissions and their respective burdens to respond to climate change.[29] Another pervasive asymmetry is that, typically, ministries responsible for environment and climate change and climate policy in SADC countries have low negotiation power. This is vis-a-vis other ministries that typically carry more weight in government operations. This limits environment ministries' capacity to access finance and to operationalise, institutionalise or implement policies, strategies and plans.

Another pervasive asymmetry is that, typically, ministries responsible for environment and climate change and climate policy in SADC countries have low negotiation power

Scaling

While there is growing discussion around scaling marine and ocean EbA and associated benefits for socioeconomic activities and industrial productivity, a deeper understanding of scaling is needed. This will allow a fuller appreciation of all the ecological, social, climate, institutional and economic parameters beforehand. It is also crucial to understand the limits to scaling. If projects grow too quickly, challenges in coordination, financial management and equitable distribution of benefits can arise. Another pitfall of scaling

28 African Development Bank, *Analysis of Adaptation Components of Africa's Nationally Determined Contributions (NDCs)*, Report (Abidjan: Africa NDC Hub Secretariat and Geodata Sierra Leone, 2019).

29 Sinan Ülgen, "How Deep Is the North-South Divide on Climate Negotiations?", Carnegie Europe, October 6, 2021.

too fast is the issue of individuals moving into positions of responsibility without adequate training or organisational processes. It takes time to achieve national-level buy-in, regular communication and coordination. While large-scale financing and management are needed to garner interest, concerns remain regarding the tendency of big projects to go awry. The extent to which large initiatives translate into practice depends on the strength of local institutions, the effectiveness of devolved institutions and the commitment of local politicians, among other factors.

The extent to which large initiatives translate into practice depends on the strength of local institutions, the effectiveness of devolved institutions and the commitment of local politicians, among other factors

Evidence of effectiveness

More assessments are needed, for instance for hybrid approaches and cost-benefit analyses, backed by the appropriate scientific capacities and funding. There remains a lack of evidence on the effectiveness of approaches. A consultant from the Seychelles remarked:[30]

> EbA has less guarantee than other approaches and might be more financially risky. For instance, if a road is undercut from wave action, EbA might involve some rehabilitation for beach burns, but this may be considered less secure compared to engineering approaches for reinstating hard road infrastructure. A lot of EbA remains at the pilot phase, happening through donor-funded programmes because taxpayers' money is in short supply.

On the other hand, there are some examples of EbA that have been shown to be effective but that are not yet well publicised.

Translating science

Another hurdle is moving from research to practice. As a restoration ecologist working in a South African municipality mentioned, 'There may be good recommendations, but how to practically implement projects is often missing, as is legislative support to back up actions, political support, local leadership, appropriate training, and people to do the work or engage communities'.[31] As a representative of IUCN said, 'Rhetoric remains – there is no willingness to move to implementation.'[32] Questions remain of how to marry citizen

30 Dr Jude Bijoux (independent consultant in Seychelles and Senior Conservation Manager), interview by Dr Jessica Thorn, July 2022.
31 Errol Douwes (Senior Manager: Restoration Ecology Branch, eThekwini Municipality), interview by Dr Jessica Thorn, July 2022.
32 Vhalinavho Khavhagali (International Union for Conservation of Nature, South Africa), interview by Dr Jessica Thorn, August 2022.

There may be good recommendations, but how to practically implement projects is often missing, as is legislative support to back up actions

science, current Intergovernmental Panel on Climate Change science and Indigenous science. Issues around the timing of the release of data are widely known, as much information is still published within traditional academic routes, which limits the number of end users and extends publication time. Often institutions do not have the funds to publish manuscripts using open-access creative commons licences that permit unrestricted access.

Questioning the value of targets

There is little value in developing international and national targets if there is no evidence on how these targets can be implemented effectively. For instance, many perceive initiatives such as REDD as not having achieved the intended outcomes, or targets are intangible.

Awareness about the links between adaptation and livelihoods

There is insufficient active education and general awareness about how climate change impacts local or marginalised communities and how this connects to basic human needs. There remains a need to make better connections between conservation and livelihoods.

National governments also need to do a better job of ensuring meaningful stakeholder participation in decision-making and policy processes, which are usually piecemeal and superficial

As one government stakeholder from a South African municipality stated: 'How do you build a conversation with a person who is concerned about finding food for the family about the needs for ecosystem-based adaptation? We need to find a better way.'[33] National and provincial governments need to do more in terms of showcasing positive stories to help people be equipped with basic knowledge and education on integrating marine and ocean EbA into their daily practices. This is especially the case when it comes to service delivery and hard infrastructure development. National governments also need to do a better job of ensuring meaningful stakeholder participation in decision-making and policy processes, which are usually piecemeal and superficial.

33 Santosh Barchoo (Ezembelo KZN Wildlife), interview by Dr Jessica Thorn, July 2022.

Tahiry Honko Project, reforestation in Madagascar [image courtesy of Michel Strogoff, Blue Ventures]

Unequal fishing rights, carbon and land tenure

Across SADC, the operationalisation of aspirations around access and benefit sharing, as outlined by the Nagoya Protocol, is hindered by critical issues of land tenure, rights to fish, carbon and forestry or other harvested coastal and marine products. Preferential and exclusive access to resources still exists, where outsiders (often commercial companies, both domestic and international) extract local resources for their own consumption and economic gain. For instance, in South Africa, in MPAs, there remain contentions over fishing rights and equitable access to resources between subsistence communities and

Preferential and exclusive access to resources still exists, where outsiders (often commercial companies, both domestic and international) extract local resources for their own consumption and economic gain

commercial fishing entities. Similarly, in Namibia most small-scale artisanal communities still lack rights to sell fish commercially, while the fisheries industry is dominated by commercial companies and recreational anglers. This precludes the ability of many

local populations to retain livelihoods and drive potential sustainable stewardship. In Madagascar, in implementing REDD+ (eg, for seagrass and mangrove, which attenuate storm damage against cyclones in the WIO) there remains a disconnect in a community-based blue carbon project. Local communities face harvest restrictions due to conflicting government ordinances, and are inhibited in their capacity to sell carbon to incentivise conservation. Blue Ventures struggles to provide communities with income while waiting for carbon credits to be verified in a timely manner. Currently, communities cannot make money from projects, which encourages destructive practices such as charcoal production. It is key that local rights of land, including mangroves, and differences in rights to forestry and carbon are solved if coastal communities are to tap into the carbon market.

Exploitative fishing treaties

A total of 11 international treaties regulate the fishing industry in Africa. These include Sustainable Partnership Agreements with the EU, which permit vessels to access a wide range of fish stocks in a coastal state's exclusive economic zones, while they contribute to the revenue in the region. However, issues remain. The value negotiated is not commensurate with the value of species removed, while agreements often exacerbate the rate of depletion and security, with local fishers unable to compete with European vessels. Overall, there is a need for more transparency in the negotiation of treaties and renewed fishing agreements. Revenue must be invested in coastal artisanal communities. Deterrent sanctions must be imposed to minimise illegal activities – through enforcing licence fees, monitoring bycatch, making vessel monitoring data publicly available and introducing mandatory, functioning automatic systems for all industrial vessels.[34]

Overall, there is a need for more transparency in the negotiation of treaties and renewed fishing agreements

Early warning system gaps

There is limited capacity for early warning systems in relation to four areas: risk identification; monitoring and warning systems; warning dissemination; and response action.[35] Many adaptation actions on SADC's coastline remain reactive rather than proactive (as highlighted by a conservation NGO in South Africa). In addition, many people still do not have a good understanding of localised response mechanisms or often even rudimentary early warning systems on the impacts of climate change on coastal and

34 Okafor-Yarwood, *African Countries Must Protect*.

35 Johan Stander et al., "Guidelines: Storm Surge Early Warning System for South Africa", Disaster.co.za, https://www.disaster.co.za/pics/PrJohanStander_etalDMISA2011StormSurgeEW.pdf.

marine ecosystems. There remains significant disparity in access to information in coastal communities compared to inland terrestrial ecosystems when it comes to early warning systems for climate change impacts. This is becoming an issue of environmental justice.

Monitoring gaps

More monitoring is needed along the intertidal zones and dunes, not only of commercial catches. We need to better understand ocean acidification's impacts along the west coast of Southern Africa and monitor the construction of illegal shelters and settlements in risk-prone estuarine and coastal zones and the habitat quality of breeding nursing grounds. We lack real-time data on when water bodies are safe to enter, especially where there is industrial or sewerage contamination along beaches and lagoons. We urgently need to better monitor toxic waste contamination – as shown in the 2022 looting in Umhlanga, South Africa, where thousands of tonnes of agrochemical waste consisting of 1 600 types of chemicals washed into important biodiversity areas, the Umhlanga lagoon and the ocean. This was one of the most toxic spill events in the history of South Africa. A provincial government official working in coastal areas explained:[36]

> Often only larger metropolitan areas or bathing areas have comprehensive monitoring and sampling systems, but we lack an understanding of the state of ecosystems between built-up urban areas. Unless we effectively deploy the appropriate resources, we will not move strategically forward.

Less work is being done monitoring social and cultural indicators – particularly in Namibia, Angola and the DRC where, to our knowledge, there is no official structure for coastal monitoring at present – although working groups are being set up to address this gap. Much of the monitoring is short term, even though ecological processes (eg, succession) take place over longer periods.

Analytical leadership gaps

More analytical leadership is needed in SADC in marine and coastal EbA.[37] While much work is being done on climate change vulnerability assessments and adaptation, these methods need to be applicable to coastal communities in the Indian and Atlantic Ocean in particular contexts. More people need to be employed working in the national government who can conduct analysis with satellite and earth observation data, including GIS and remote sensing. Currently, there is a lack of skills in the monitoring of coastal zones, tracking and predicting sea level rise and other uses of mapping. There is also a lack of oceanographers and marine engineers – as highlighted by a representative of WIOMSA working in Mauritius. More work is needed on quantitative estimates of ecosystem

36 Omar Parak (Coastal management and policy section, Provincial government of South Africa), interview by Dr Jessica Thorn, August 2022.

37 Chevallier, "Enhancing Resilience through Coastal".

responses to sea level rise and storm surges, as these analyses tend to rely on anecdotal evidence and much of the data is qualitative.[38]

Lack of seascape approach and landscape–seascape connections

Most stakeholders interviewed highlighted the need for better connections between the marine coastal, estuarine and inland/upstream riparian systems. A 'seascape' approach supports a more ecosystem complex vision linked to ecological interdependence. According to Murphy et al.,[39] this involves using integrated planning frameworks, community-led and locally owned initiatives and a network of partners; diversified funding sources, private sector engagement and the transition of non-profit roles for durability; robust monitoring and evaluation frameworks; and effective communication.

Windows of opportunity for integrating EbA in NDCs and blue economy policies

In the past two years, many countries have begun to adopt blue economy policies, strategies and plans. Across the SADC region, several governments have begun to restructure their ministries or set up new ministries (eg, Ministry of Blue Economy and Fisheries of Seychelles, Ministry of Blue Economy and Fisheries of the Revolutionary Government of Zanzibar).

TABLE 1 KEY POLICY WINDOWS BY COUNTRY

Country	Policy currently under development	Timeline / phase
Angola	Integrated Coastal Management and Marine Spatial Plan	Waiting approval
	National Strategy for Land and Sea	Approved
Comoros	Unspecified	NA
DRC	Unspecified	NA
Madagascar	National Adaptation Plans for Climate Change	Unknown
	Regional Plan for Blue Economy	Unknown
	Integrated Coastal Zone Strategy and Action Plan	
	Strategy for the Locally Managed Marine Associations	
Mauritius	Unspecified	NA
Mozambique	Unspecified	NA
Namibia	Blue economy policy	Planned finalisation by end 2023
	Nationally Determined Contribution Implementation Plan	Unknown
	National Action Plan for the Benguela Current Commission	Planned finalisation by end 2023

38 Chevallier, "Enhancing Resilience through Coastal"; US Agency for International Development (USAID), "The Economics of Ecosystem-based Adaptation" (Evidence Summary, USAID, Washington DC, August 2017).

39 Shannon Murphy et al., "Fifteen Years of Lessons From the Seascape Approach: A Framework for Improving Ocean Management at Scale", *Conservation Science and Practice* 3, no. 6 (2021): 1–16.

Country	Policy currently under development	Timeline / phase
Seychelles	Blue Carbon policy	Planned completion by end 2023
	Seychelles Bi-Annual Review for Climate Change to incorporate	Ongoing
South Africa	Durban Climate Change Strategy and Action Plan Draft Just Transition Framework Draft White Paper on the Sustainable Use of Biodiversity Ecosystem Based Adaptation Strategy Operation Phakisa: Ocean Economy Climate Change Compact National Climate Change Bill National Blue Carbon Sinks Assessment	No deadline for comment SAIIA submitted comments 04/22 SAIIA submitted comments 09/22 Planned revision by 2023
Tanzania	Unspecified	NA
International	Great Blue Wall Adaptation Hub through WIOMSA UN Decade for Ecosystem Restoration Sustainable Development Goals African Union Agenda 2063 30x30 Post-2020 CBD framework	NA

Source: Compiled by author

Enhancing collaborative policy regimes and regional cooperation

Platforms for information sharing on lessons learnt can enhance cooperation and improve support for interaction. More partnerships with other African cities and countries are needed. To better integrate marine EbA into national and sectoral policies, sectoral policies should be replaced with more comprehensive integrated strategies, and administrative (state or public sector) capacities in governments, depending on the political arena, should be enhanced.[40] This involves the development of specific policy and institutional settings allowing for the establishment of consistent policy instruments and coherent policy goals.

Platforms for information sharing on lessons learnt can enhance cooperation and improve support for interaction

40 Ekaterina Domorenok et al., "Policy Integration, Policy Design and Administrative Capacities: Evidence from EU Cohesion Policy", *Politics and Society* 40, no. 1 (2021): 58–78.

Overall, public bodies' capacity to develop and implement integrated designs should be enhanced.[41] The success of coordination platforms depends on how they are funded, maintained and managed in relation to people's formal job expectations or mandates. Trust building needs to happen through ongoing interactions, especially for policy discussions with people working in government who may be constrained in an official capacity regarding what they can and cannot say.

Key examples of existing bodies driving regional cooperation in climate change in ocean and marine environments include the BCC between Angola, Namibia and South Africa and the WIOMSA. The Indian Ocean Commission was established in 1984 and implements initiatives such as fisheries surveillance and studies on the impacts of climate change. UNESCO is also driving regional cooperation (eg, through the Man and Biosphere Programme) and Marine Spatial Planning is widely used for informed and coordinated decision-making.

There are also examples of national innovations for regional cooperation to overcome disconnects. For instance, the City of Durban is piloting a new initiative called the 'Durban Climate Change Committee' where the mayor chairs a committee that facilitates communication across a range of departments around climate change. Associated with this structure is the measurement of performance on climate change mitigation and adaptation. In South Africa, a community of practice was set up for EbA, led by the Department of Forestry, Fisheries and the Environment, and another on invasive alien species management. According to a consultant interviewed, one of the major successes of these communities of practice is that they sit outside the formal structures of most of the organisations involved. Members are therefore unlinked from formal expectations about their position, providing a space to discuss controversial issues and smooth out potential conflicts.

Stakeholder engagement for effective policy development

Stakeholder engagement for policy development is widely advocated as a critical process and is typically incorporated into policy and programme design. Any policy requires canvassing and engaging a wide range of stakeholders in the first instance. For example, the recent revisions of the NDCs involved a series of workshops and online calls for inputs

Stakeholder engagement for policy development is widely advocated as a critical process and is typically incorporated into policy and programme design

41 Michael Howlett and Kidjie Saguin, "Policy Capacity for Policy Integration: Implications for the Sustainable Development Goals" (Policy Research Paper 18-06, Lee Kuan Yew School of Public Policy Working Paper Series, Singapore, 2018).

where organisations could make contributions. A multi-stakeholder forum established through the Draft Climate Change Bill of South Africa requires local and metropolitan municipalities and district authorities to conduct stakeholder engagement. Similarly, the Seychelles Ministry of Agriculture, Climate Change and Environment, with the World Bank, requires stakeholder engagement for the development of coastal management plans to create zoning maps and 18 priority areas. The Transformative River Management Programme in South Africa uses a catchment approach to delineate relevant stakeholders, first targeting individuals with capacity for scenario analysis and then taking it to wider stakeholder engagement to limit confusion through a phased approach.

Despite such initiatives, most interviewees highlighted limited public consultation and stakeholder buy-in and the need for stronger engagement with coastal communities across SADC. Although structures exist for stakeholder engagement for policy development and implementation, questions remain about their effectiveness. Top-down command and control approach in the protected area system has not led to substantive changes in local ecosystem management. Building trust over time is important, as is having teams on the ground representing the rationale for project and policy implementation, while learning about the reality of people living close to their resources. Differences across communities are important to acknowledge, as highlighted by one interviewee: 'Communities are not equal and elite capture is ever present and difficult to counteract to ensure marginalised groups are reached.'[42] The biggest constraint is the constrained ability of small teams, working in public bodies over short periods with limited funds, to reach large populations.

Looking forward, there are tools that can be used to improve stakeholder engagement. Visioning promotes lateral and futures thinking and cross sectoral solutions. Initial meetings need to be conducted based on the needs and levels of awareness within each community. Web portals help provide a continuous communication framework and maintain links with project and line functions for service delivery in government departments. COVID-19 facilitated some better engagement, but many populations do not have the resources to access internet data. Door-to-door interviews to assess different adaptation approaches have been shown to be successful in Seychelles. However, ensuring that city and other government officials update their profiles regularly has been shown to be a challenge – as highlighted by a senior manager in the eThekwini municipality. The Adaptation Network in South Africa, although more often focused on terrestrial adaptation, is one network that included a wide range of civil society groups, NGOs, researchers and government actors. South Africa's provincial associations enhance transparency and coordination in MPA management. Some NGOs and associations are starting to organise themselves to address support needed for marine protection and expansion, but this is still in the early stages.[43]

42 Harisoa Hasina Rakotondrazafy (Coordination of Adaptation Hub for the Worldwide Fund for Nature, Madagascar), interview by Dr Jessica Thorn, August 2022.

43 Bev Mackenzie et al., "The Role of Stakeholders in Creating Societal Value From Coastal and Ocean Observations", *Frontiers in Marine Science* 6, no. 137 (2019): 1–24.

Moreover, acknowledging the historical context of each SADC state is important – as expressed by a consultant working in Seychelles:[44]

> For a long time Seychelles was a one-party state which oppressed freedom of speech. This is slowly changing and there is a lot more stakeholder engagement and activism using social media, but we still have some way to go.

An academic working in the Comoros highlighted the importance of having an economic component in any EbA initiative, stating:[45]

> You need to have economic incentives, so people see the logical links [through the project cycle] and you meet people halfway. You need to make sure people are aware of the nuts and bolts of the landscape connections and introduce different communities to one another. It's not quick and you are getting into the long game.

Interviewees also highlighted the importance of communication to avoid duplication in initiatives. Several policy windows (eg, the Blue Economy Policy awaiting stakeholder engagement with the Ministry of Fisheries in Namibia) provide opportunities for improved stakeholder engagement and avoid policies working at cross-purposes.

Long-term monitoring and evaluation, early warning systems and knowledge portals

Overall, there is a growing body of work conducting in-situ monitoring and modelling ocean change in SADC. One stakeholder working in Madagascar suggested that this is in part funder-driven due a demand for higher standards documenting change. The scope of monitoring for most SADC countries covers activities to control EbA project delivery processes at national and subnational levels and periodic reporting to meet regional and global commitments.[46]

Regionally, South Africa appears to be leading on environmental monitoring activities related to EbA. One example is the National Oceans and Coastal Information Management System, which offers decision support for effective governance of South Africa's marine ecosystems. Another is the work of the Oceanographic Research Institute, which has been measuring and mapping the high-water mark across the province of eThekwini. Local government measures more of the physical change and environmental flows (eg, of South Africa's Nkomati River), line fisheries, and coral and turtle monitoring (eg, in iSimangaliso in South Africa and Mozambique). There are also a few initiatives by the private sector. Provinces release a State of the Coast Report and State of Environment Report, while some

44 Bijoux, interview.

45 Prof. Gill Shepherd (Visiting Professor, London School of Economics and Political Science), interview by Dr Jessica Thorn, August 2022.

46 ADB, *Analysis of Adaptation Components*.

have a State of the Bay Report. Meanwhile, KwaZulu-Natal has the Estuaries Observer Programme, which monitors emerging pressures across 76 estuaries. The Adopt a River Programme facilitates monitoring, clean-ups and enhancement of rivers connected to the coast, as does the River Eco-Status Monitoring Programme (REMP). South Africa has also set up the National Climate Change Information System and the National Climate Change Response Database, while the BCC has done some monitoring. Some of the key indicators that are commonly studied and represented in reports such as the National Biodiversity Strategy and Action Plan are shown in Table 2.

Looking forwards, essential to any EbA is the need to understand variability across time and space. When choosing indicators, consider feasibility, costs and time burdens on the departments responsible for maintaining databases. Affected communities must be involved in the collection and use of data to avoid extractive data collection. Access to mobile phones facilitates easy, rapid and affordable access to information communication technology to aid adaptive management and allow fish stocks to recover. Involving communities in data collection furthermore secures compliance with local rules, retains legitimacy and sustainability, and fills monitoring gaps where central government bodies do not fulfil this role.

Examples of this are ABALOBI, Blue Ventures and the Tableau Foundation, which work with small-scale and artisanal fisheries, training women to monitor catches at landing sites and using citizen science to provide essential scientific data. This data is then fed into a central service and returned to communities. Beyond monitoring, ABALOBI uses technology for real-time reporting, post-harvest and product development, digital marketing, financial services and weather forecasts. Further support provides infrastructure for fisher groups and intermediaries and enhances school curricula. Similar successes have been shown through the ICZM model, where community committees monitor all the activities in the coastal zone in Madagascar, Mauritius and Seychelles.[47]

Any new monitoring programme should align with existing work, or be embedded in government organisational mandates. An example of this is the 'enterprise performance monitoring system', used in South Africa in its Climate Change Strategy. A senior manager of eThekwini (Durban) Municipality said: 'We make a system that people want to complete.'[48] Another element is to include both qualitative and quantitative data and ensure the requirements are reportable for staff, as he went on to explain: 'We are trailing a pilot where there are a set of targets associated with programmes and projects, including some descriptive elements where it's difficult to have quantitative information.'[49]

Efforts are underway to enhance access to early warning systems to support EbA. For instance, the multi-hazard early warning system is working to standardise the procedures

47 For an assessment of this approach, see Government of Finland and UNEP, Priority Actions Programme, *Assessment of Integrated Coastal Management in Africa* (Split: Priority Actions Programme Regional Activity Centre, 1998), viii–72.

48 Sean O'Donoghue (Senior manager, eThekwini Municipality South Africa), interview by Dr Jessica Thorn, August 2022.

49 O'Donoghue, interview.

for issuing storm surge alerts for ocean harvesting communities.[50] An academic from the University of Namibia highlighted the need to[51]

> increase the number and quality of monitoring instruments in stations to localise bigger picture processes and impacts of climate change – including wave gauge stations – so our policies are not based on homogenous information. We are as strong as our weakest link.

The PANORAMA database offers a useful knowledge data portal that centralises spatial and other data, including case studies. Centralised portals help build technical leadership, enhance restoration and adaptive capacity through learning across geographies and themes and integrate approaches in wider policy discourses. The Blue Capacity Hub provides training in ecosystem-based marine spatial planning and leadership, transformational sustainable blue economy and blue leadership, aiming to overcome uncoordinated single-sector responses. Another example is the One Ocean Hub – an international programme of research aiming to promote inclusive decision-making for ocean management, overcoming disconnections in law, science and policy (Table 3).

TABLE 2 NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS IN SADC STATES

Country	Year	Emphasis	NBSAP marine considerations	Key actors	NBSAP link
Angola	2019–2025	Low	• Discussion of marine resources • Creation of at least two conservation areas of marine biodiversity (Obj. 2.3) • Mapping and zoning of ecological sensitivity of coastal and marine areas (Obj. 3.4)	• Ministry of Environment • Ministry of Fisheries and the Sea • Ministry of Petroleum	https://www.cbd.int/doc/world/ao/ao-nbsap-v2-en.pdf Version 2
Namibia	2013–2022	High	• Marine spatial planning for informed and coordinate decision-making • Establish ecologically and biologically significant marine areas • Strengthen transboundary freshwater fisheries management • Revise the Inland Fisheries Act • Ecosystem approach to fisheries	• Ministry of Fisheries and Marine Resources	https://www.cbd.int/doc/world/na/na-nbsap-v2-en.pdf Version 2

50 Stander, *Storm Surge Guidelines*.

51 Dr Hilkka Ndjaula (University of Namibia), interview by Dr Jessica Thorn, July 2022.

Country	Year	Emphasis	NBSAP marine considerations	Key actors	NBSAP link
Madagascar	2015–2025	High	• Minimise anthropogenic pressures on coral reefs and other marine and coastal ecosystems impacted by climate change or acidification, their integrity and functioning (Obj. 10) • Protect mangroves, phanerogamic seagrasses, estuaries, marshes, shorelines and coral reefs • Reduce direct pressure on all exploited fish stocks and other biological marine and freshwater/brackish water resources, management and destructive harvesting practices are eliminated • Develop and strengthen mechanisms and programmes to reduce pollution • Conserve wetlands and extend PAs and beyond PA boundaries	• Ministry of Environment, Ecology, the Sea and Forests	https://www.cbd.int/doc/world/mg/mg-nbsap-v2-en.pdf Version 2
Mozambique	2015–2023	Low	• Conserve seagrass meadows, particularly in the intertidal zone • Expand MPAs with the creation of the Environmental Protection Area of the Primeiras and Segundas Islands and the Partial Marine Reserve Maputo – Ponta do Ouro • Declare marine sanctuaries • Enhance connectivity using a landscape approach and promote Trans-Frontier Conservation Areas (TFCA) covering the terrestrial, coastal and marine, such as the Limpopo TFCA, the Lebombo TFCA and the Chimanimani TFCA • Proclaim the Futi Corridor as a protected area • Create buffer zones around parks and reserves	• University of Eduardo Mondlane • Plant Genetic Resources Centre	https://www.cbd.int/doc/world/mz/mz-nbsap-v3-en.pdf Version 3

Country	Year	Emphasis	NBSAP marine considerations	Key actors	NBSAP link
South Africa	2015–2025	High	• Four priority areas for oceans economy identified through inclusive growth, including marine protection services, ocean governance. • Operation Phakisa an important strategy to address sustainable optimisation of the marine wildlife sector. It is designed to fast-track the implementation of the National Development Plan 2030 and unlock the economic potential of South Africa's oceans in a way that helps poverty and unemployment	• Department of Forestry Fisheries and Environment • Oceanographic Research Institute • Conservation South Africa • Worldwide Fund for Nature • WildOceans (WildTrust) • SANBI • South African Association for Marine Biological Research • South African Association for Marine Biological Research • African Conservation Trust • Birdlife South Africa • Botanical Society of South Africa • Delta Environment Centre • Endangered Wildlife Trust • IUCN South Africa • Lewis Foundation • National Association of Conservancies of South Africa • Peace Parks Foundation • Resource Africa South Africa • Southern African Foundation for the Conservation of Coastal Birds • Southern African Wildlife College • Wilderness Foundation • WWF • Wildlands Conservation Trust • Wildlife and Environment Society of South Africa	https://www.cbd.int/doc/world/za/za-nbsap-v2-en.pdf Version 2

Country	Year	Emphasis	NBSAP marine considerations	Key actors	NBSAP link
Seychelles	2015–2020	High	• Differentiates priority species for conservation by ecosystem type (eg, rocky shores, intertidal zones, coral reefs, reef flats, mangroves, marine plateau, etc.)	• Ministry of Environment and Climate Change	https://www.cbd.int/doc/world/sc/sc-nbsap-v2-en.pdf Version 2
Mauritius	2017–2025		• Seascape approach transferred from landscape approach, promoting the idea that ecosystems are interconnected in their functions, spatial locations as well as temporal evolution • Improve the management and expansion of PA network, including rehabilitation of wetlands, seagrass, mangrove plantation, increase in tree coverage areas and coral reef rehabilitation/farming • Adaptation measures such as climate-smart agriculture and fisheries, irrigation and improving resilience of marine/coastal biodiversity	• Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping • Mauritius Marine Conservation Society • Indian Ocean Commission	https://www.cbd.int/doc/world/mu/mu-nbsap-v2-en.pdf Version 2
Comoros	2014–2019?	NA	• Report not available in English	• Not available in English	https://www.cbd.int/doc/world/km/km-nbsap-v2-fr.pdf Version 2
Tanzania	NA	NA	• Report not available	• Report not available	NA
DRC	2016-2020	NA	• Report not available in English	• Not available in English	https://www.cbd.int/doc/world/cd/cd-nbsap-v3-fr.pdf Version 3

Source: Compiled by author

TABLE 3 DATA PORTALS RELEVANT TO COASTAL AND MARINE EBA IN SADC		
Country	**Data portals**	**Key indicators inter alia used and prioritised and species mentioned in the NBSAP**
Angola	Unknown	• Invasion of seals, endemic/endangered manatee, sea turtles and avifauna • Ecologically sensitive coastal and marine areas
Namibia	State of the Ecosystem Information Systems (SEIS)	Trends in marine trophic index, sea surface temperature, Southern Oscillation Index; dissolved oxygen levels, surveillance of illegal fishing practices; fishery observer trips; MFMR air patrols; harbour and factory inspections; violations reported by enforcement officers; permit enforcements, ocean acidification, commercial fishery stocks
Madagascar	World Bank Climate knowledge portal	Habitat protection of fisheries and marine resources; coral bleaching, beach erosion and coastal ecosystems and overexploitation of water, coastal and marine resource, mangrove sediment capture; seagrass habitat integrity for dugong, turtles, fish and invertebrates; impact of unsuitable materials in fisheries communities, like bed nets, dynamite and chemicals (including plant poisons: euphorbia and mundulea).
Mozambique	African Ocean Observatory; Mozambique Marine and Fisheries Institute	• Five species of sea turtles in the Indian Ocean; 18 marine mammals, including seven species of dolphins, 8 of whales, 2 of seals and 1 species of dugong; 800 species associated with coral reefs, 92 cartilaginous fish; 1 363 species of molluscs and crustaceans, including shrimp, crab, lobster and crab hermit • Coastal lagoons, swamps and marshes, wetland integrity, nine species of mangroves, deltas and estuaries of major rivers, semi-industrial and industrial fishing, especially in kapenta and tilapia, which is one of the main activities of the population
South Africa	National Climate Change Information System National Climate Change Response Database National Oceans and Coastal Information System; South African Association for Marine Biological Research; SANBI; Department of Environmental Affairs; South Africa Weather Services	• Estuarine and marine environments with a total estimated 95 000 known species, including species of plants, animals, birds, fish, frogs, reptiles, molluscs, insects and fungi • Species with medicinal value, harvested marine or threatened species

Country	Data portals	Key indicators inter alia used and prioritised and species mentioned in the NBSAP
Seychelles	Vessel data monitoring systems; Ministry of Agriculture, Climate Change and the Environment	• Green turtle (Chelonia mydas and Eretmochelys imbricata), hawksbill, Emperor red snapper (Lutjanus sebae), Brown spotted grouper (Epinephelus chiorostigma), per capita fish consumption, macroalgae, sea grass, sponges, molluscs, sea anemones, scleratinian corals, octocorallian corals, crustacea, starfish, crinoids, ophiuroidea, sea urchins, sea cucumbers, osteichthyes, chondrichthyes, endangered sei, blue and fin whales, dolphins, dugongs • Topography of the granitic islands • Rocky shore vegetation; seabird and roost populations; intertidal zone; littorinid; Planaxis sulcatus; morulas; cowries; crab populations; chiton • Encroaching seaside properties; artisanal and other catches, vessel activity
Mauritius	Mauritius Oceanographic Institute Faculty of Science, University of Mauritius	Important bird areas, introduction of alien species, indigenous plant species, crabs, shrimps, lobsters, molluscs, octopus and sea cucumbers, fish, crustacean, migratory birds, including the common whimbrel, terns, plovers, sandpipers, turnstones, greenshanks; and other uncommon visitors and rare vagrants; freshwater turtles and two introduced amphibian species, the guttural toad and the Mascarene ridged frog; scleractinian corals (hard corals), sea grass beds, coral reef (fringing reefs, patch reefs, atolls and barrier reefs), mangroves, sandy, muddy and rocky shores, beach erosion, water pollution
Comoros	Wild Oceans, Dahari	Report not available in English
Tanzania	Tanzania Fisheries Research Institute	Report not available
DRC	Ocean section of the Ministry of Environment Pana zone cotiere	Report not available

Source: Compiled by author

Building capacity for EbA implementation

There is a need to form institutional structures and organisational networks to build capacity. Such structures can facilitate accountability and transparency by strengthening the capacities of national institutions to plan, budget and track marine EbA finance.[52] Training should be standardised so that there is a flow of information across a given region, rather than only certain local authorities or departments being trained. Capacity building should also involve designing and implementing adaptation projects and plans that generate new knowledge and develop and apply robust monitoring and evaluation

52 ADB, *Analysis of Adaptation Components.*

systems to track the effectiveness of adaptation finance at national and sub-national levels.[53] The South African EbA community of practice does this to some degree, but can further reflect on marine issues going forward. Symposiums can help showcase the work of successful practitioners. One example is the Society of Restoration Ecology, which recently held its first annual symposium. For example, in Namibia it was highlighted that positions should be established within local authorities where a particular individual focuses on climate change risk and response mechanisms, including for coastal and marine EbA. This would be factored in as part of the job description, which is currently not the case in most government departments. Action learning is needed.

BOX 1 EXAMPLES OF TOOLKITS FOR MARINE AND COASTAL EbA

IUCN Global Standard for NBS. Made up of standard and associated guidance to perform a self-assessment consisting of eight criteria and associated indicators related to sustainable development and resilient project management. This is related to designing new NbS, upscaling pilots by identifying gaps and verifying past projects and future proposals.

Global Stocktake of the UNFCCC. Takes stock of the implementation of the Paris Agreement with the aim to assess the world's collective progress towards achieving the purpose of the agreement and its long-term goals.

Society for Ecological Restoration. Showcases the work of practitioners to advance the science, practice and policy of ecological restoration.

EBA in MSP: An SEA Inclusive Handbook. Aims to contribute to a better understanding of the different contexts and to provide tools for a more harmonised implementation of EbA in MSP.

The Africa NDC Hub. Provides countries with tools required for the effective delivery of their Paris Agreement commitments, in a coordinated manner aligned with their development priorities.

Gender-responsive EbA

Underpinning the climate and biodiversity crisis in oceans are persistent gender, age and social inequalities. In climate and marine EbA policy, gendered issues commonly relate to labour relations, while reproductive roles and family planning have largely been overlooked. Persistent traditional inequities pervade in patriarchal coastal communities where female leadership is restricted, women do not have decision-making power in financial decisions

53 ADB, *Analysis of Adaptation Components.*

and gender roles dominate energy usage. Gender roles also limit the adoption of new adaptation technologies, as a respondent described in the case of Namibia: 'Some women are hesitant to adopt adaptation technologies because of engrained gendered norms such a "women can't operate machinery" link [in] solar power pumps. This has caused delays in irrigation during drought periods.'[54]

Despite this, limited evidence suggests EbA initiatives are systematically adopting a gender-responsive approach. An NGO fund manager stated: 'Generally, gender and youth are acknowledged in marine and ocean policy, but the political and cultural reality is vastly different.'[55] Gender-responsive approaches go beyond sensitivity (awareness of gender differences) to a more action-oriented approach to address gender norms, roles and inequalities.[56] Issues of intersectionality need to be more actively addressed, ie, 'the complex, cumulative way in which the effects of multiple forms of discrimination (eg, racism, sexism and classism) combine, overlap, or intersect.'[57]

In response, marine adaptation projects are working with village savings and land associations to help women take more responsibility and leadership in marine matters (up to 80%) and strengthen institutions. Here, women work with local and national government bodies and business associations to create more enabling environments.[58] Gender assessments are often incorporated into EbA initiatives and can be a requirement for setting up an MPA (eg, the case of Namibian Nature Foundation in Lüderitz). However, these are often limited to terrestrial landscapes, as in the case of community-based natural resource management projects (eg, for Green Climate Fund projects in Namibia) or for climate-smart agricultural projects.[59] Organisations such as Blue Venture are doing gender mainstreaming, trying to ensure 50% of female membership in all committees. However, an interviewee said this could be difficult due to cultural reasons, as, for example, many small-scale fisheries and harvesters along shorelines often exclude women from decision-making processes. Meanwhile, the Indian Ocean Commission is starting to work on a project on culture and gender in EbA policy. Others work with youth delegations under the Global Climate Change Alliance for Action +, where youth are included in delegations when government and NGO actors go to conferences on marine EbA.

54 Margaret Angula (Senior Lecturer, Department of Environmental Science, University of Namibia), interview by Dr Jessica Thorn, August 2022.

55 Errol Douws (Senior Manager, Restoration Ecology Branch of eThekwini Municipality), interview by Dr Jessica Thorn, August 2022.

56 National Adaptation Plan Global Network and UNFCCC, *Toolkit for a Gender-Responsive Process to Formulate and Implement National Adaptation Plans (NAPs)* (Winnipeg: International Institute for Sustainable Development, 2019); World Health Organization, "Gender and Health", https://www.who.int/health-topics/gender#tab=tab_1; UN Children's Fund, *Gender Equality: Glossary of Terms and Concepts* (Kathmandu: UNICEF Regional Office for South Asia, 2017).

57 Merriam-Webster, "Definition of Intersectionality", https://www.merriam-webster.com/dictionary/intersectionality.

58 Care International, "Village Savings and Loan Associations (VSLAs)", https://www.care-international.org/what-we-do/womens-economic-justice/village-savings-and-loans-associations.

59 For a critical assessment, see Margaret Angula, "Strengthening Gender Responsiveness of the Green Climate Fund Ecosystem-based Adaptation Programme in Namibia", *Sustainability* 13, no. 18 (2021): 1–16.

Woman in the field in Madagascar [image courtesy of MIHARI]

Effective governance and community-based management

The need to work with customary institutions is widely acknowledged as important when dealing with control over land tenure and resources. For instance, Blue Venture works with Beach Management Units or Locally Managed Marine Managed Areas in Tanzania and Kenya, dealing with *sharia* law in Zanzibar and in Madagascar. The institution is endorsed by the government and has the support of donor-funded NGOs that provide technical advice based on community needs. Self-governed organisations ensure compliance. Some organisations and government bodies are using preferential rights and recognising more issues of biocultural heritage. ICZM is widely used in Angola for community management. Another example of effective community-based management is the Transformative Riverine Management Programme, under the Durban Climate Change Strategy and its Climate Action Plan, of the eThekwini Municipality. This programme is active along 7 400km of the city's watercourses, working to lower vulnerable communities' exposure to flooding, drought and higher temperatures. The Transformative Riverine Management Programme is estimated to yield up to $1.6 billion in societal benefits and over 9 000 permanent jobs. Governance arrangements have been set up where open space systems are managed, streams cleaned, and Indigenous vegetation planted.

Innovative financing mechanisms

Various financial models show promise for enhancing marine EbA in climate policy – from domestic to private to international support. This includes Seychelle's debt for nature swaps, conservation bonds and work under the Blue Action and Adaptation funds. It has been suggested that adaptation finance overall needs to change – to avoid the current paradigm that it is risky to fund local small organisations – recognising that the risk is low with appropriate due diligence and technical support.[60]

Blue carbon is a huge opportunity to support EbA finance and communities, as shown in Tanzania, Kenya and Liberia. The role of ocean ecosystems in sequestering carbon has inspired carbon markets, where restoring ecosystems generates credits. Yet few projects are certified to sell blue carbon credits, and in some cases in SADC credit sales are pre-booked ahead of their release, as shown in the case of Mikoko Pamajo, verified by Plan Vivo in Kenya.[61]

Private companies are working on EbA. For instance, in the Comoros, Moheli National Park's Laka Lodge asks for tourist conservation levies, applying a 'beneficiary pays' approach.[62] Funds are used, for instance, to compensate local fishers for releasing critically endangered species, with some early successes.[63] Another example of private funds is that of revolving loan funds, managed by communities with the condition of ecosystem action built into loan terms, as is currently being piloted in Zanzibar by the Mambau Mihari network.

All respondents highlighted the need to ensure economic benefits within reasonable time frames. Several alternative livelihoods are employed across SADC to support marine EbA, slow ecosystem degradation and promote restoration. In South Africa mariculture operations farm marine organisms for food, pharmaceuticals, food additives, jewellery, nutraceuticals and cosmetics. Seagrass meadows in shallow waters are often promoted as a livelihood opportunity in the WIO, as is oyster, other mollusc and shellfish harvesting. Seagrass meadows are a blue carbon opportunity when restored, as are kelp, mangroves and saltmarshes. However, an ecosystem restoration finance officer highlighted the dilemma that 'most sustainable utilisation requires reducing harvesting while the ecosystem recovers to ensure long term productivity. Yet in the short-term people must tighten their belts.'[64] Many organisations work with pre-existing institutions; credit, women's or community groups; fisheries committees; or beach management units. These structures are self-governed and do their own screening in terms of eligible membership and accountability (eg, if loans are not paid back).

60 See Valuing Nature Conservation, McKinsey, as well as the Financing paper in this series.
61 "Are Blue Carbon Markets Becoming Mainstream?", *The Economist*, April 12, 2022.
62 Putu Mustika, Muhammad Ichsan and Hollie Booth, "The Economic Value of Shark and Ray Tourism in Indonesia and Its Role in Delivering Conservation Outcomes", *Frontiers in Marine Science* 7, no. 261 (2020): 1–17.
63 Hollie Booth, "How to Finance Marine Conservation Without Harming Local Communities", *The Conversation*, August 15, 2022.
64 Robert Wild (Independent Consultant and Research Fellow, Department of Environment and Development, University of York), interviewed by Dr Jessica Thorn, September 2022.

There is a dire need to scale EbA finance by prioritising coastal and marine action. Countries need to step up and propose comprehensive financing strategies that clearly define conditions and sources to mobilise resources in terms of clear, quantifiable, impact-oriented outcomes. It is also necessary to strengthen institutional capacity and investment.

There is a dire need to scale EbA finance by prioritising coastal and marine action

Future research directions

Accurate, timely, up-to-date information about the extent, spatial distribution and health of marine and coastal ecosystems is needed.[65] Intensive ongoing ecosystem mapping work, such as that conducted by SANBI in South Africa through the Key Biodiversity Areas and Marine Protected Areas, should be built upon. Many SADC countries are challenged by the unavailability of climate, wider ecosystem and socio-economic data to detect, predict and respond to climate change at local level.[66] Capturing seasonal and diurnal variations, for instance in the dynamic high-water mark, remains a particular challenge, as highlighted by a recent and ongoing assessment conducted by the Oceanographic Research Institute in the eThekwini municipality of South Africa. Across SADC, there are limited reliable cost-benefit analyses of EbA initiatives compared to more conventional engineering approaches on benefits such as employment opportunities, ecosystem services, water quality and terrestrial land use change – and critical reflections on the limitations and trade-offs of these approaches.

An important area for future research relates to blue carbon opportunities and the role of other effective area-based conservation measures and LLMAs in conservation on marine ecosystems. There is still little information on the percentage of coastal waters that is under community control across the SADC region, even though community-based management is fundamental to EbA. In Namibia, it was highlighted that there is a lack of knowledge on how sea water intrusion into underground aquifers could affect irrigation water and thus food security and desalinisation and mariculture operations. There are also methodological challenges associated with assessing and enhancing the carbon sequestration potential of marine ecosystems.[67]

65 Chevallier, "Enhancing Resilience through Coastal".
66 ADB, *Analysis of Adaptation Components*.
67 Republic of Mauritius, Ministry of Agro-Industry and Food Security, *National Biodiversity Strategy and Action Plan 2017–2025* (Port Louis: Ministry of Agro-Industry and Food Security, 2017).

RECOMMENDATIONS

The following recommendations have the potential to strengthen marine and ocean EbA in climate policy:

- Institute an enabling body to support NDCs, NAP and other climate policies and their implementation in each coastal SADC state. This will be critical to overcome one of the hurdles of translating NDCs into national policies or action plans. Such a body would support skills development, technology transfer and human resources (especially project managers) to develop concepts for implementation and ensure enforcement, compliance, monitoring and reporting for implementation.
- Enhance co-design and co-management for spatial protection that better acknowledges Indigenous peoples, biocultural heritage, gender, and youth equity, and that develops support mechanisms to allow access and benefit sharing. The co-design and management should also address challenges relating to land tenure, fisheries, carbon and forestry rights and reduce disparities in information access, both inland and along coasts.
- Bring in an integrated perspective to how coastal zones and seascapes are enabled, designed and managed, linking various sectors and policies (eg, oceanography, climate change, marine science, urban planning, disaster risk). Better incorporate the land-sea interface and intertidal zones in planning. Oceans are connected to the terrestrial environment, yet this is not fully acknowledged in decision-making processes. This will be an important step in driving a more consolidated, integrated view.
- For local management, use appropriate models (eg, LMMA and ICZM) to develop action plans to operationalise these concepts and take forward policies in specific local contexts, while balancing ambition within existing resource constraints.
- Adhere to a wide range of environmental and social safeguards and strengthen local governance institutions for effective management of coastal and marine areas.
- Better align NDCs with other environmental policy instruments such as the post-2020 Global Biodiversity Framework. This provides an important connection between climate change and biodiversity and links actions to support the protection of biodiversity against climate change, including EbA. National and local policies must place equal emphasis on the preservation of coastal and terrestrial systems in climate policy, which is currently not the case. This is where many of the climate risks are that threaten the long-term viability of EbA.
- The next NDCs should make more reference to specific marine and coastal ecosystems (eg, mangroves, coral reefs, mudflats, lagoons, dune systems, intertidal zones, estuaries, wetlands and rivers) and set specific targets for how these will be protected and by when.

RECOMMENDATIONS (CONT'D)

- Use EbA before 'artificial' or 'modified' approaches, where applicable, or use hybridised infrastructure (ie, green-blue-grey infrastructure) where artificial approaches are taken in conjunction with green or blue infrastructure approaches. Create new coastal and inshore habitats without destroying existing natural environments to aid the functioning of our coastal ecosystem and adaptation.
- Information databases for monitoring and evaluation that are open should be scaled and more widely available, as should monitoring instruments (eg, gauge stations for early warning systems), with associated fundraising and capacity development. Such databases can help improve understanding of localised climate change impacts on income, jobs and livelihoods and ensure each state has policies that are not based on homogenous information. They can also help states to set more detailed ambitious, measurable and time-bound numeric targets for enhancing ambition in protection, maintenance and restoration of coastal marine ecosystems under the NDC.
- Map available blue carbon stocks, emphasising multiple benefits, cost-benefit analysis and the limitations of such valuation techniques. Mapping can help to strengthen NDC commitment to reducing GHGs in marine and ocean systems though clear and ambitious targets. Additional blue carbon research should be done on ecosystems not well understood, for example kelp forests. It is also necessary to assess the links between EbA and EbM (environmentally based management) and how EbM can help support EbA through blue carbon finance. Visioning is another important tool to promote lateral and futures thinking and cross sectoral solutions.
- Encourage political will at all scales to increase innovative finance for nature. Scaling regional restoration hubs, the Debt for Nature Swap, Blue Action Fund and blue carbon finance mechanisms, among other innovative funds or bundles of funds, will be key.

Conclusion

The analysis of SADC states' NDCs and other climate policies and processes indicates there remains a gap in coastal and marine ecosystem-based components in terms of their specific actions for implementation, capacity building, local and regional collaboration, long-term monitoring, equity, diversity and inclusion, stakeholder engagement and innovative financing mechanisms. A more lined-up, interlinked approach across sectors, vertically and horizontally, is a priority. Hurdles in moving from pledge to implementation

highlight the need for fundamental changes in how EbA is perceived.[68] The window of opportunity for addressing global marine sustainability issues is closing. An ambitious approach is required across all SADC states to manage and sustain marine biodiversity at a large scale. Urgent work, as outlined in this paper, is needed to ensure visions of climate policy are supported by place-based action backed by political and financial institutions, governments, NGOs and the private sector if we are to meet the Paris Agreement, SDG targets, AU Agenda 2063 and the proposed post-2020 global biodiversity framework goal to conserve 30% of our oceans by 2030.

68 ADB, *Analysis of Adaptation Components.*

Author

Dr Jessica Thorn

is a Lecturer in sustainable development at the School of Geography and Sustainable Development at the University of St Andrews. She is also an African Research Initiative for Scientific Excellence Fellow at the Department of Environmental Sciences at the University of Namibia.

Acknowledgement

This publication has been produced through the 'Strengthening marine and coastal ecosystem-based adaptation (EbA) in the national climate responses of SADC's coastal states' project, which was implemented under the Global Climate Change Alliance Plus (GCCA+) programme and overseen by the SADC Secretariat. A SADC Regional Community of Practice on Marine and Coastal Ecosystem-based Adaptation was also established through this project. Please contact SAIIA's Climate and Natural Resources Programme for more details.

Thanks are due to SAIIA's Simone Phore, Hannah Sack and Alex Benkenstein and the members of the Community of Practice. We would like to acknowledge all those who took part in the interviews:

- Fiona MacKay (Oceanographic Research Institute)
- Sarshen Scorgie (Conservation South Africa)
- Santosh Barchoo & Errol Douwes (Ezemvelo KwaZulu-Natal Wildlife)
- Sophie Morgan & Elissa Lalande (Seychelles Ministry of Agriculture Climate Change and Environment)
- Ipeinge Mundjulu & Anja Kreiner (Namibia Ministry of Fisheries and Marine Resources)
- Jud Bijoux (Seychelles independent consultant)
- Sean O'Donoghue (South Africa City of Durban)
- Omar Parak (South Africa KwaZulu-Natal provincial government)
- Effy Vessaz (Comoros Blue Ventures/Dahari)
- Johannes Litembu, Margaret Angula & Hillka Ndjaula (University of Namibia)
- Gill Sheperd (Comoros, London School of Economics)
- Ian Asherwood (WWF Kenya)
- Timothy Stojanovic (University of St Andrews)
- Kendyl Wright (South African Wildlands Conservation Trust)
- James Mbubgua (CORDIO International)

- Gillan Braulid (Scottish Ocean Institute, University of St Andrews)
- Sion Shifa, Amon Andreas & Paulus Ashili (Namibian Ministry of Environment, Forestry and Tourism)
- Katrina Hilundwa (Namibia Benguela Current Convention)
- Catarina Dias (Angola Benguela Current Convention)
- Kareen Andiantsiferana, Harifidy Ralison, Harisopa Rakotondrazafy & Alice Nkongo Nchare (WWF Madagascar)
- Fidelis Mwazi (Namibian Agronomic Board)
- Lapwong Jean Marie Bope (DRC Department of Oceans)
- Steve Rocliffe and Nick Piludu (Blue Ventures)
- Gina Bonne (Mauritius WIOMSA)
- Robert Wild (University of York/Consultant).

About SAIIA

SAIIA is an independent, non-government think tank whose key strategic objectives are to make effective input into public policy, and to encourage wider and more informed debate on international affairs, with particular emphasis on African issues and concerns.

SAIIA's occasional papers present topical, incisive analyses, offering a variety of perspectives on key policy issues in Africa and beyond.

Cover image

A state-sponsored mangrove reforestation project in the Hamata area south of Marsa Alam along Egypt's southern Red Sea coast on September 16, 2022 [Khaleb Desouki/AFP via Getty Images]

All rights reserved. Copyright is vested in the South African Institute of International Affairs and the authors, and no part may be reproduced in whole or in part without the express permission, in writing, of the publisher. The views expressed in this publication are those of the author/s and do not necessarily reflect the views of SAIIA.

Please note that all currencies are in US$ unless otherwise indicated.

African perspectives.
Global insights.

Jan Smuts House, East Campus, University of the Witwatersrand
PO Box 31596, Braamfontein 2017, Johannesburg, South Africa
Tel +27 (0)11 339-2021 • Fax +27 (0)11 339-2154
www.saiia.org.za • info@saiia.org.za