

Occasional Paper

347

May 2023



Livelihood Opportunities Through Scaling Marine and Coastal EbA

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Abstract

Both the climate emergency and ecosystem collapse pose a significant risk to SADC coastal communities whose livelihoods are highly dependent on coastal and marine resources. This paper explores ecosystem-based adaptation (EbA) interventions in the region that include livelihood outcomes, with a preference for those that can be taken to scale. A search of peer-reviewed and grey literature, as well as interviews with people working in the thematic area, revealed a range of relevant cases from across the region. These were categorised according to the type of EbA intervention, nature of livelihood co-benefit(s) and scalability. Notable among the findings, and highlighted as a case study, was the development over the past two decades of locally managed marine areas in Madagascar, a model that has spread throughout the Western Indian Ocean region of SADC. This model uses periodic fishery closures as an initial means of addressing coastal communities' urgent need to put food on the table, subsequently scaling this up to include larger areas, permanent closures, and ecosystem restoration and conservation. This provides a useful example of an incremental, community-based approach foregrounding livelihood opportunities as a gateway to further ecosystem-based adaptation. Other examples are also drawn on in the paper, in particular the case of the Rufiji Delta in Tanzania which, in contrast, is a resource-intensive project, but also has opportunities for significant livelihood outcomes and the potential for scaling.

Introduction

People have been living and surviving along the coast of southern Africa for centuries, drawing their livelihoods from the sea. These coastal resources and environments have not only provided people with food and a livelihood but also have been, and still are, central to their identity and culture. This close relationship with the sea prevails today among many SADC coastal communities that still rely heavily on this natural resource base to sustain themselves.¹

However, this natural resource base is being undermined by habitat degradation and conversion, overharvesting, pollution, invasive alien species and the illegal wildlife trade.² Compounding this is the effect of climate change on the oceans, which includes warming, acidification and deoxygenation, increased salinity, changes to ocean currents and vertical stratification. All of these are affecting the integrity of marine ecosystems and altering the distribution and abundance of marine and coastal species. Impacts associated with climate change on coastal communities include more intense rainfall resulting in flooding, such as

1 Christopher H Trisos et al., "Africa", in *Climate Change 2022: Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Hans-Otto Pörtner et al. (Cambridge: Cambridge University Press, 2022), 1285-455.

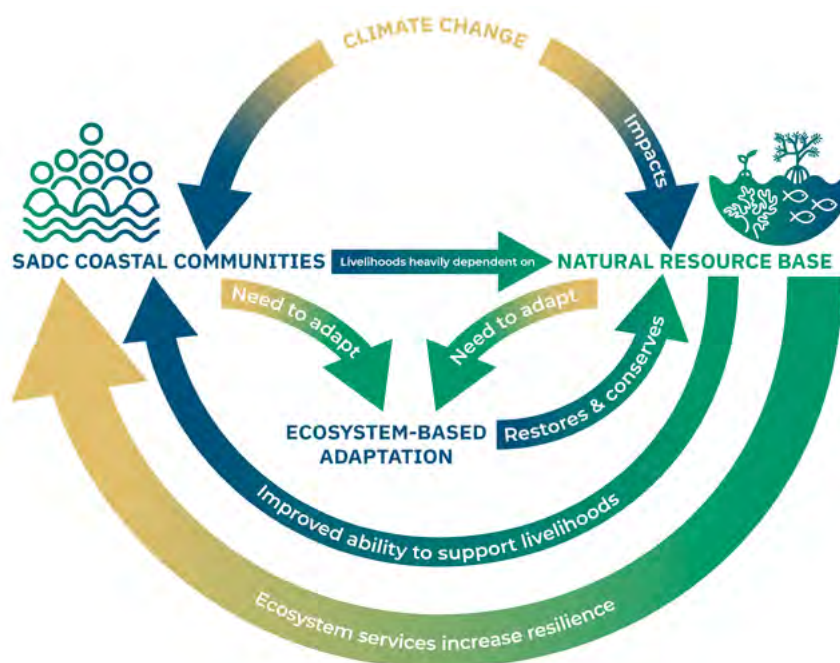
2 Emma Archer et al., "Biodiversity and Ecosystem Services on the African Continent: What Is Changing, and What Are Our Options?", *Environmental Development* 37 (March 2021).

that associated with cyclones Idai and Kenneth in 2019, recurring coral bleaching events, droughts and more frequent and intense storms leading to erosion and coastal inundation. These impacts highlight the urgent need for adaptation measures.³

As a result of the combined effects of ecosystem loss and climate change, valuable ecosystem services are being compromised, undermining the resilience of the socio-ecological system as a whole. These services include provision of food and raw materials, protection of the coast, maintenance of critical marine life cycles, preservation of cultural heritage and identity, as well as the creation and sustaining of recreation and tourism opportunities.⁴

Many SADC coastal communities are exposed to the impacts associated with these extreme events and losses, which are compounded by a high degree of vulnerability associated with low levels of socio-economic development.⁵ This is exacerbated by the large-scale reliance on dwindling natural resources to make a living, combined with limited alternative and/or supplemental livelihood opportunities.

Figure 1 Framing of the potential for EbA to positively impact livelihoods of SADC coastal communities



Source: Compiled by authors

3 Trisos et al., "Africa"; Sarah R Cooley et al., "Oceans and Coastal Ecosystems and Their Service", in *Climate Change 2022: Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Hans-Otto Pörtner et al. (Cambridge: Cambridge University Press, 2022).

4 Trisos et al., "Africa".

5 Trisos et al., "Africa".

As illustrated in Figure 1, ecosystem-based adaptation (EbA) presents an opportunity to address some of these challenges by combining climate change adaptation, socio-economic benefits, and biodiversity and ecosystem conservation.⁶

As one of four thematic studies associated with the project ‘Strengthening the Role of Coastal and Marine EbA in the National Climate Responses of SADC’s Coastal States’, this paper focuses on livelihood opportunities associated with scaling marine and coastal EbA interventions.

Methodology

Drawing on peer-reviewed and grey literature, non-governmental organisation (NGO) websites, blog posts and correspondence with people working in the sector, a desktop search for coastal and marine EbA interventions within the region was conducted. This was followed by direct correspondence with people working in the field, aimed at coverage across SADC coastal states. Interviews were conducted with 18 respondents and email correspondence with a further six, favouring people working directly with communities on the implementation of projects at project sites. Unfortunately, only one project beneficiary was interviewed, largely due to technology and data limitations among beneficiaries, as well as language barriers. The spread of these interviewees across countries and types of organisations is provided in Table 1.

TABLE 1 GEOGRAPHICAL AND ORGANISATIONAL REPRESENTATION OF INTERVIEWS CONDUCTED							
	Academic	Government	NGO	CBO	Social enterprise	Consultant	International organisation
Tanzania		1			1		
Madagascar			2			1	
Comoros			1				
Mozambique	1						
South Africa	2		2			1	
Namibia	1						
Angola							1
DRC		1					
Kenya (non-SADC)		1	1	1			

Source: Compiled by authors

⁶ Government of South Africa, Department of Environmental Affairs, *Guidelines for Ecosystem-based Adaptation (EbA) in South Africa* (Pretoria: DEA, 2018).

The interviews served as a deep dive into the primary motivation for and aim of projects, the nature of livelihood co-benefits, the sustainability of these benefits beyond the projects' timeframes and the potential for projects to be scaled. All project information was collated and categorised according to the type of EbA intervention, nature of livelihood co-benefit(s) and scalability. The findings are presented and discussed in this paper.

Climate impacts and ecosystem services

Climate change poses a significant threat to SADC coastal and island states in the form of higher temperatures, unpredictable rainfall, fiercer storms, accelerating rising sea levels, increased frequency of marine heatwaves, and increasing ocean acidification and deoxygenation.⁷ The consequences are already being experienced. For example, the Western Indian Ocean (WIO) region experienced a 40% reduction in coral cover between 1998 and 2016 due to mass coral reef bleaching and mortality events triggered by marine heatwaves.⁸ The WIO has also seen a reduction in phytoplankton biomass owing to an increase in sea surface temperatures inhibiting nutrient mixing. This phenomenon is thought to be negatively impacting tuna catches.⁹ Similarly, there have been distribution shifts in anchovy, sardine, hake, West Coast rock lobster and certain seabirds in southern Africa,¹⁰ although the exact causal relationship between these shifts and climate change is not yet fully understood. Ecological impacts of this nature, along with projected sea-level rise, are expected to escalate rapidly after 2050.¹¹

The health and abundance of these ecosystems underpins life in these communities, often providing the backbone of their livelihood options

The resultant ecosystem degradation and loss of valuable ecosystem services have had significant impacts on coastal communities. Coastal and marine ecosystems, such as mangroves, coral reefs, kelp forests, seagrass meadows, coastal wetlands and dune systems, offer valuable supporting, provisioning, regulating and cultural ecosystem services.¹² The health and abundance of these ecosystems underpins life in these communities, often providing the backbone of their livelihood options and the basis for their income generation. For example, mangrove forests provide a habitat for many marine species, thus

7 Trisos et al., "Africa".

8 Trisos et al., "Africa".

9 Trisos et al., "Africa".

10 Trisos et al., "Africa".

11 Cooley et al., "Oceans and Coastal Ecosystems".

12 Stella Manes et al., "Nature-based Solutions Promote Climate Change Adaptation Safeguarding Ecosystem Services", *Ecosystem Services* 55 (June 2022).

contributing to fisheries and food security among coastal populations. These forests are a source of timber for building and for fuel, and provide protection from coastal storms and floods by attenuating wave energy. They improve water quality by trapping sediments and absorbing excess nutrients, sequester carbon, provide tourism opportunities, and are central to the culture and spirituality of these communities.¹³ There are numerous other marine and coastal ecosystems within the SADC region that provide a similar array of ecosystem services that benefit those living in their vicinity (see Table 2).

Ecosystem-based adaptation

Although there are variations in the exact definition and interpretation of EbA, all coalesce on the central principle of simultaneously addressing climate adaptation and socio-economic and conservation outcomes in an effort to safeguard people from the adverse effects of climate change.¹⁴ This paper draws on the Convention on Biological Diversity definition, which states that EbA refers to ‘the use of biodiversity and ecosystem services as part of an overall climate adaptation strategy to help people to adapt to the adverse effects of climate change.’¹⁵ This approach is relevant and applicable to the SADC coastal region, which is highly vulnerable to the impacts of climate change; has significant socio-economic needs, many tied to ecosystem services; and has an abundance of coastal ecosystems, many under threat.¹⁶

The regional assessment forming part of the Strengthening Marine and Coastal EbA in the National Climate Responses of SADC’s Coastal States project sets out various EbA interventions relevant to SADC coastal environments, along with examples drawn from countries of the region.¹⁷ These include the conservation and restoration of a number of coastal ecosystems, sustainable fisheries management, and the protection and diversification of ecosystem-based livelihoods. Although some of the interventions listed may not fall squarely into EbA, but rather tend towards community-based adaptation (CbA) or community-based marine resource management (CbMRM), these ultimately result in increased resilience within the ecosystems and/or the communities involved. Given the level of dependency of many SADC coastal communities on coastal and marine resources and the level of vulnerability within both communities and ecosystems, benefits to either or both raise the resilience of the system as a whole. Examples of EbA can be drawn from the inclusion of sustainable fisheries management, and the protection and diversification of ecosystem-based livelihoods. Protection and diversification are particularly relevant to this thematic paper and are discussed in more detail in the following section.

13 Janine B Adams and Anusha Rajkaran, “Changes in Mangroves at Their Southernmost African Distribution Limit”, *Estuarine, Coastal and Shelf Science*, 247 (December 2021).

14 Guy F Midgley et al., *Biodiversity, Climate Change and Sustainable Development: Harnessing Synergies and Celebrating Successes*, Final Technical Report (New York: UN Framework Convention on Climate Change, 2012).

15 Convention on Biological Diversity, “Climate Change and Biodiversity”, <https://www.cbd.int/climate/intro.shtml>.

16 For more detail on EbA and its definition, please see Hannah Sack, *A Regional Assessment of Marine and Coastal EbA Adaptation in SADC* (Johannesburg: SAIIA, 2023).

17 Sack, *A Regional Assessment*.

Livelihoods

The concept of livelihoods speaks to how people make a living.¹⁸ Livelihood strategies based on available assets (human, social, natural, physical and financial) are dependent on the context within which people find themselves. Livelihood strategies are also dynamic, typically involving multiple activities and drawing on numerous livelihood capitals. The activities and capitals available to households are determined by contextual factors. An example of a livelihood strategy dependent on the natural resource base was cited by an NGO worker interviewed for this project, who stated:¹⁹

Poor, remote communities living in coastal villages in north-western Madagascar do not have access to roads in the rainy season, which restricts their [small-scale fishers] ability to trade with fishmongers from the bigger towns. Instead, they travel through the coastal deltas by canoe (a five- to seven-hour trip one way) to the nearby bays where they fish and camp out in the hope that a fishmonger will arrive by boat. They have no electricity to keep the fish cold, are half-a-day to a day away from their homes and unsure of whether anyone will come to buy their fish as they have no means of telecommunication.

Livelihood strategies based on available assets (human, social, natural, physical and financial) are dependent on the context within which people find themselves

This is a precarious and climate-exposed livelihood strategy, which is almost solely dependent on dwindling marine and coastal resources. Unfortunately, this example is not unique in the region in terms of reliance on coastal ecosystems, accompanied by low levels of socio-economic development and high levels of poverty.²⁰ Remote locations, vast distances, limited transport, and basic services and economic infrastructure further restrict livelihood opportunities. In addition, restricted local community access to coastal resources in some countries has undermined people's ability to secure and sustain livelihoods. As a

18 Government of the UK, Department for International Development, *Sustainable Livelihoods Guidance Sheets* (London: DFID, 1999); Vincent Möller et al., eds., "IPCC 2022: Annex II: Glossary", in *Climate Change 2022: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Hans-Otto Portner et al. (Cambridge: Cambridge University Press, 2022), 2897–930.

19 Tahiri Randrianjafimanana (national technical advisor, Fisheries Management and Marine Protected Areas, Blue Ventures, Madagascar), interview by Thérèse Boulle and Penelope Price, October 2022.

20 Steve Rocliffe et al., "Towards a Network of Locally Managed Marine Areas (LMMAs) in the Western Indian Ocean", *PLoS ONE* 9, no. 7 (July 2014).

result, many communities have little choice but to continue to try and eke a livelihood out of dwindling coastal and marine resources, as explained by one interviewee:²¹

Sometimes, even with the best will, community members have no option but to take from the sea even if it is in a conservation space. Sometimes the mangroves are the only accessible fuel for fires. So even if someone comes home from school with good education, knowing that they shouldn't, they still have to go out and cut down some mangrove, otherwise there is no fire for cooking. We have to understand these real constraints. We can't ignore their plight.

Poverty is not merely a condition of want or lack of access to limited resources, it is an expression of powerlessness within the broader political and economic systems in the region or country where the community is located. Therefore, as much as the local context, as exemplified above, is key to determining livelihood options, or lack thereof, the macro-forces that drive and underpin this context also need to be considered.²² These include historical elements such as the legacies of colonialism and industrialisation, trends such as globalisation and trade liberalisation, and structural elements such as the political economies of the region. In many instances this has resulted in unsustainable resource extraction and use practices (from fish to minerals), mainly by commercial and industrial sectors, placing increasing pressure on coastal and marine environments.

The central role that coastal and marine ecosystems play in sustaining coastal communities in the SADC region, and the sensitivity of these ecosystems to climate change, creates a complex contextual landscape

The central role that coastal and marine ecosystems play in sustaining coastal communities in the SADC region, and the sensitivity of these ecosystems to climate change and other threats, creates a complex contextual landscape. Furthermore, the focus on livelihoods highlights justice and equity issues around the availability of and access to coastal resources. For example, closing threatened coastal areas to poverty-stricken communities in order to restore biodiversity stocks is not an equitable solution, as one interviewee noted: 'We can't say to coastal communities that they can't take fish from the sea, yet there'll still be [commercial] trawlers offshore.'²³

21 Hery Rasafimamonjiraibe (national technical advisor, Livelihoods, Blue Ventures, Madagascar), interview by Thérèse Boulle and Penelope Price, October 2022.

22 Nithya Natarajan et al., "A Sustainable Livelihoods Framework for the 21st Century", *World Development* 155 (July 2022).

23 Simone Dale (projects director, Wild Trust), interview by Thérèse Boulle and Penelope Price, September 2022.

EbA provides a unique tool with which to address the complex interconnections in the coastal and marine climate-livelihoods-ecosystem landscape. In addition to the well-documented restoration and conservation of relevant ecosystems that comprise the bulk of EbA interventions in the coastal and marine space, additional interventions have been identified in the regional assessment that are particularly relevant to livelihoods. These include the diversification and protection of ecosystem-based livelihoods, as well as sustainable fisheries management approaches. Examples of diversified livelihoods in the coastal zone include, but are not limited to, sustainable mariculture, mangrove beekeeping and seaweed harvesting. Examples of livelihood benefits associated with sustainable fisheries management include the use of periodic fishery closures (PFCs) and the establishment of locally managed marine areas (LMMAs), both of which are discussed in detail later in this paper.

Expanding livelihood opportunities through scaling

One of the central questions of this research revolves around the expansion of livelihood opportunities through the scaling of marine and coastal EbA interventions. This requires the identification of livelihood opportunities associated with EbA interventions that either have demonstrated scalability or could potentially be replicated. To this end, livelihood co-benefits associated with EbA projects from across the SADC region were explored for suitability.

Scalability implies that projects can be expanded to encompass larger areas or multiple communities. It also implies that projects operated at a local level can be replicated in other areas, thereby broadening the base and reach of the EbA programme. Operating projects on a larger scale, however, poses particular challenges. Larger-scale programmes invariably require more significant resource investment, higher levels of management and operating capacity within communities and programme partners, and often wider access to markets. Where scaling involves expanded areas within which adaptation strategies are being fostered, multi-community participation may be required. With this in mind, cases of coastal EbAs within the SADC coastal region are explored in the following section.

Livelihoods and EbA in coastal SADC states

Examples of EbA projects within the SADC coastal and marine environments that have exhibited livelihood co-benefits are represented in Table 2. This is not an exhaustive list of all EbA projects in the region, but rather, these examples serve to illustrate the types of livelihood co-benefits associated with EbA projects, particularly those that have been scaled or have the potential to be scaled. Selection was also based on geographic representation across the region, and an attempt was made to cover all SADC coastal states. Information

captured in the table includes the project location and timeframe, the organisation(s) involved, a brief project description/outline, the type of EbA intervention(s) involved, the livelihood co-benefits and the sustainability and scalability potential of the livelihood co-benefit.

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
<ul style="list-style-type: none"> • La Gaulette (west) • Quatre Soeurs (east) • Grand Gaube (north) • Bel Ombre (south) Mauritius (2017–2020)	<ul style="list-style-type: none"> • Mauritius Oceanography Institute (MOI) • Albion Fisheries Research Centre • Mauritius government ministries • National Coast Guard, Mauritius • Registered fishermen associations • NGOs 	<p>MOI developed locally adapted techniques for growing coral for the community-based coral culture project. Coastal community members participated in a Coral Culture Training Programme and were trained in the setup, maintenance, monitoring and management of demonstration sea-based coral farms and coral gardens. Training in snorkelling, PADI-First Aid Emergency First Responder and eco-tourism guiding were provided. Demonstration farms were established where coral nubbins were propagated and transferred to coral colonies, which were transplanted to coral gardens. In this way, over 1 500 m² of degraded reefs were rehabilitated. The project was extended for a further two years with additional funding from the Nairobi Convention.</p>	<ul style="list-style-type: none"> • Coral reef planting, conservation and restoration. • Diversification and protection of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> • Human capital was enhanced through training. Skills in coral restoration, also transferable to eco-tourism industry and, potentially, to small business management, were taught, thus addressing alternative ecosystem-based livelihood options. • Trainees received a monthly stipend. • Anticipated livelihood co-benefits from ecosystem services associated with restored and conserved coral reefs, eg, food and tourism-related livelihood opportunities. 	<ul style="list-style-type: none"> • Government-funded resource-intensive (financial and innovation) project. Would require similar inputs to replicate or scale. • Income generation tied to project activities, therefore not sustainable beyond the project timeframe. • No information available on sustainability of coral farming as an alternative livelihood activity post project.

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
uThukela Banks South Africa (2022–2027)	<ul style="list-style-type: none"> • WILDTRUST • Green Climate Fund’s Blue Action Fund • South African Association for Marine Biological Research • South African Environmental Observation Network • Nelson Mandela University • Ezemvelo KZN Wildlife 	<p>The uThukela Marine Protected Area Ecosystem-based Adaptation Project aims to effectively manage recently designated marine protected areas (MPAs); restore degraded coastal ecosystems; conserve the restored ecosystems; and use nature-based solutions and EbA approaches to improve livelihoods and food security for coastal communities affected by MPA designation. Leadership, training and mentorship provided to support the development of alternative livelihoods to address reduced access to coastal and marine resources due to establishment of MPA. Community provided with stipends for the restoration of the natural resources.</p>	<ul style="list-style-type: none"> • Effective management, restoration and conservation of coral reefs, mangroves, reed beds, saltmarsh meadows, riparian vegetation and coastal dune cordons. • Diversification and protection of ecosystem-based livelihoods. • Sustainable fisheries management through MPA. 	<ul style="list-style-type: none"> • Income generation (in the form of a stipend) associated with ecosystem restoration work. • Establishment of alternative livelihood activities supported by training in business management skills, enhancing human capital. • Medium- to long-term livelihood co-benefit in terms of ecosystem services associated with restored ecosystems, such as food and tourism-related livelihood opportunities. 	<ul style="list-style-type: none"> • A resource-intensive five-year Blue Action Fund project. Would require similar inputs to replicate or scale. • Enhanced livelihood opportunities through scaling. EbA activities may be evident at the end of the project (2027) as the landscape approach of using nature-based solutions to manage a large MPA may provide spatial scale. • Income generation tied to project activities, therefore not sustainable beyond the project timeframe.

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Velondriake, Madagascar (2006–ongoing)	<ul style="list-style-type: none"> • LMMAs • Blue Ventures • MIHARI • University of Toliara's Institut Halieutique et des Sciences Marines • Wildlife Conservation Society, Madagascar • National and local government • Commercial fish and seafood collection companies 	<p>Community-managed temporary octopus and fish closures associated with initial project improved food security and income generation, and led to community-based fisheries management through establishment of LMMA, which rapidly expanded to include adjacent areas. A network of LMMAs (MIHARI) was formed as a result, including community-based governance structures. Ongoing community-based mangrove, coral and other coastal ecosystem restoration and conservation work led by NGO (Blue Ventures). Examples of alternative livelihoods associated with LMMA included mangrove beekeeping, and sea cucumber and seaweed farming. Village savings and loan associations (VSLAs) were fostered to fund diversification of livelihoods. The Velondriake Association, in partnership with Blue Ventures, has registered Tahiry Honko, the world's largest community-led mangrove carbon conservation project.</p>	<ul style="list-style-type: none"> • Sustainable fisheries management. • Mangrove and coral reef restoration and conservation. • Diversification and protection of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> • Improved food security, income generation potential and collective social capital enhanced through PFCs and LMMAs. • Alternative ecosystem-based livelihoods include mangrove beekeeping, sea cucumber and seaweed farming. • Anticipated livelihood co-benefits in terms of ecosystem services associated with mangrove and coral reefs restoration and conservation, eg, food and tourism-related livelihood opportunities. 	<ul style="list-style-type: none"> • This project provides an example of marine and coastal EbA taken to scale over time. Scale was achieved through the replication of the LMMAs initially created around the PFCs, thus covering an expanded area. Eventually a formal network of LMMAs was formed. PFC activity was slowly expanded to include ecosystem restoration and conservation, as well as address diversification of ecosystem-based livelihoods, and additional community development projects in health and education. • Ongoing efforts are being made to secure the financial sustainability of the Velondriake Association, one of which saw the registration of the Tahiry Honko project as a Plan Vivo carbon credit project.

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Cabo Delgado, Mozambique (2013–2019)	<ul style="list-style-type: none"> • Cabo Delgado LMMA • Zoological Society of London • Government officials 	<p>Our Sea, Our Life project: Drawing on examples from other areas in the WIO, LMMAs were established to manage the government-regulated community conservation areas. Project aimed to reduce the decline of marine resources as well as reducing poverty and improving food security of local communities. Activities included temporary fishery closures for octopus stock replenishment, as well as permanently closed areas aimed at replenishment (these included critical habitats such as mangroves, corals and seagrasses), alternative livelihoods through aquaculture, and use of micro-lending through VSLAs. Project disrupted due to presence of violent insurgency in the area.</p>	<ul style="list-style-type: none"> • Sustainable fisheries management. • Diversification and protection of ecosystem-based livelihoods. • Mangrove, coral and seagrass conservation. 	<ul style="list-style-type: none"> • Improved food security, income generation potential and collective social capital enhanced through PFCs and LMMAs. • Income generation opportunities through aquaculture. • Anticipated livelihood co-benefits in terms of ecosystem services associated with conserved ecosystems, eg, food and tourism-related livelihood opportunities. • Establishment of alternative livelihood activities supported by introduction of eco-credit facility enhancing access to financial capital and training in business management skills, enhancing human capital. 	<p>Like the other projects featured in this table that draw on the Velondriake model, this model would have been scalable, but it occurred in a politically unstable situation and therefore could not be taken to scale. Noteworthy was the application of financial mechanisms to sustain the LMMA, such as incentivising fishers by paying a premium for sustainably harvested/caught goods, through small levies on octopuses caught following a closure, and through VSLAs. Larger-scale and longer-term mechanisms were suggested for future projects of this nature, such as biodiversity offsets or payment for ecosystem services.</p>

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Greater Maputo area, Mozambique (2019–2025)	<ul style="list-style-type: none"> • Global Environment Facility (GEF) of the UN Environment Programme (UNEP) • Ministry of Land and Environment • National Fund for Sustainable Development • UN-Habitat Mozambique • Maputo, Matola, Boane municipalities • Maputo, Boane, Marracuene and Matutuine district authorities • National Water Supply Company 	<p>GEF project 'Building resilience in the coastal zone through ecosystem-based approaches to adaptation (EbA) in the Greater Maputo Area' aims to enhance the ecosystem services of mangrove and riparian ecosystems through protection, restoration and management activities. These will include training of local community members in the implementation of EbA interventions, development of alternative livelihoods and diversification of agricultural practices. Outcomes include sustainable agricultural practices, fisheries and fuelwood consumption. Alternative livelihoods will be based on ecosystem services from restored mangrove and riparian ecosystems and goods from diversified agricultural practices. The project outputs will also include an upscaling strategy for mangrove and riparian EbA in Mozambique.</p>	<ul style="list-style-type: none"> • Mangrove restoration and conservation. • Protection and diversification of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> • Anticipated livelihood co-benefits in terms of ecosystem services associated with restored and conserved mangroves, eg, food and tourism-related livelihood opportunities. • Enhanced human capital through training. • Unclear if participants received a stipend or other direct livelihood benefits as a result of participation. 	<p>The project is addressing the issue of scale by including the development of an upscaling strategy for mangrove and riparian EbA in Mozambique. Livelihood benefits associated with the project and the translation of these to scale will have to be assessed at the end of the project.</p>

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Ndooni Village, Fundo Island, Pemba, Zanzibar, Tanzania (2018–unknown)	<ul style="list-style-type: none"> Ndooni Village LMMA Fundo Fisheries Mwambao Coastal Community Network Blue Ventures Indian Ocean Commission Biodiversity Project 	<ul style="list-style-type: none"> Mwambao supported the Ndooni community to establish temporary octopus closures in the face of declining fisheries in the area. Initial short closures of a few months resulted in a significant increase of average weight of caught octopuses. This encouraged the community to continue with regular closures, resulting in a more sustainable local management of the fisheries resource. There are numerous similar projects in the area run under Mwambao. Another component of the project on Fundo Island is Mwambao's introduction of the 'Mkuba' – an eco-credit scheme designed to incentivise sustainable fishery practices. 	<ul style="list-style-type: none"> Sustainable fisheries management. Protection and diversification of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> Improved food security, income generation potential and collective social capital enhanced through PFCs and LMMAs. Establishment of alternative livelihood activities supported by introduction of eco-credit facilities, enhancing access to financial capital, and training in business management skills, enhancing human capital. 	<p>Drawing on the model adopted by Blue Ventures in Velondriake, and in partnership with Blue Ventures, this case uses PFCs as an initial measure, which is scaled up and collaboratively managed in partnership between the local community organisation and the overarching network NGO (Mwambao). In this case, the introduction of micro-credit facilities, as an incentive to fishers to use sustainable fishery practices, grounds this approach further as it enables fishers to diversify their livelihoods through loans to set up small-scale businesses.</p>

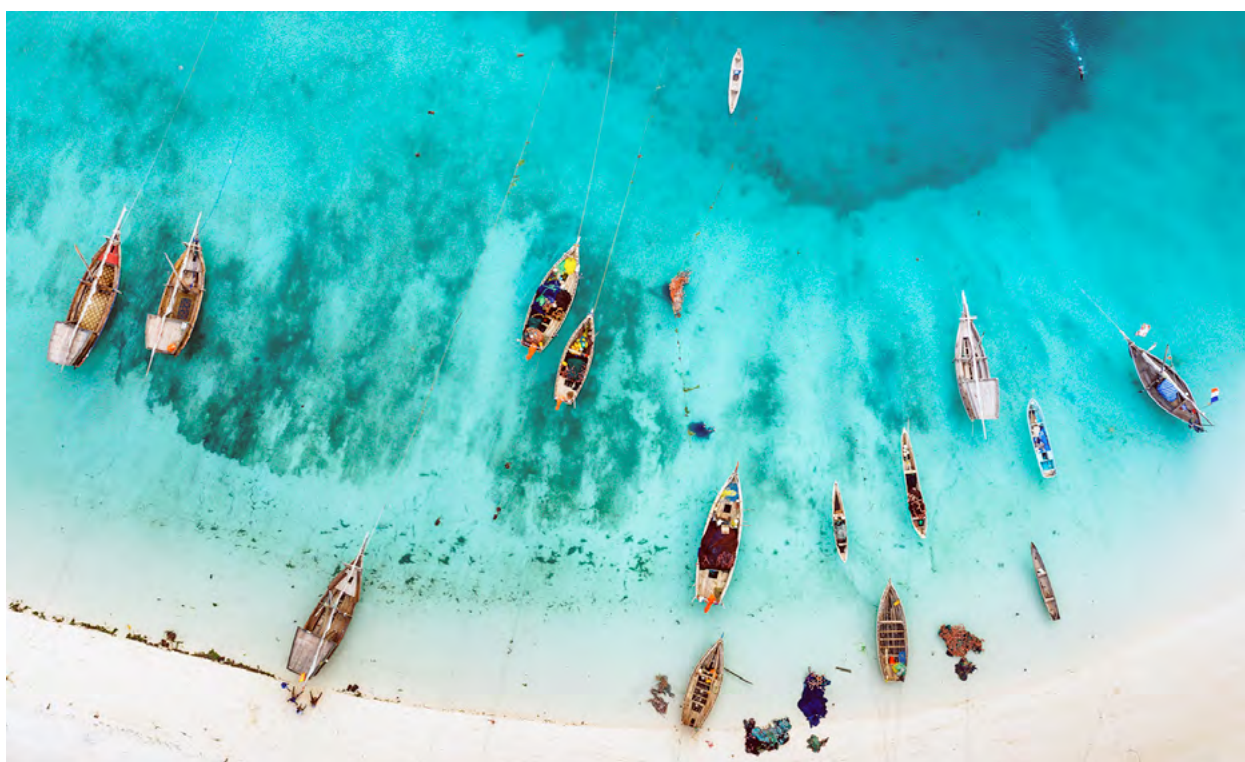
Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Rufiji, Mafia and Kilwa Districts, Tanzania (2019–2023)	<ul style="list-style-type: none"> • WWF • Wetlands International • Ministry of Livestock & Fisheries Development • Tanzania Forest Service • Kibiti, Mafia and Kilwa district councils • Village councils • BMUs • VLCs • Village natural resources committees • National Environment Management Council of the Vice President's Office • Rufiji Basin Water Board • Blue Ventures 	<p>One of the 'Strengthening Marine Protected Area management in Rufiji, Mafia and Kilwa Districts' project's aims is to improve livelihoods and ecological value in the MPAs and collaborative fisheries management areas (CFMAs) within the Rufiji-Mafia-Kilwa seascape. The project has numerous objectives, but most relevant to this paper is to improve coastal communities' livelihood security and resilience to change through the sustainable use of natural resources and diversified livelihoods. The project recognises the need for fishing communities to be compensated for short-term losses due to restrictions to access to marine and coastal resources and have thus taken an approach whereby complementary livelihoods can be strengthened through enhanced access to credit, developing entrepreneurial skills and demand-led training. This approach does not prescribe alternative livelihoods, but hopes to provide the skills, support and environment to nurture the diversification of livelihoods.</p>	<ul style="list-style-type: none"> • Sustainable fisheries management. • Mangrove and coral reef conservation. • Protection and diversification of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> • Improved food security, income generation potential and collective social capital enhanced through PFCs and LMMAs.* • Enhanced human capital through skills development and training, and enhanced access to financial capital through micro-credit. • Anticipated livelihood co-benefits in terms of ecosystem services associated with conserved ecosystems, eg, food and tourism-related livelihoods. 	<p>Although a resource-intensive project, it is building on interventions that have been taking place in the area prior to the project, such as the development of the CFMAs from collective agreements between beach management units (BMUs) already managing PFCs. This illustrates an element of sustainability and scalability in that previous projects could develop governance structures, approaches and mechanisms that could be built upon and expanded.</p>

Location & timeframe	Organisations involved	Project overview	EbA intervention	Livelihood co-benefit(s)	Sustainability & scalability
Anjouan, Comoros (2015–ongoing)	<ul style="list-style-type: none"> Dahari Blue Ventures 	PFCs result in increased catches. Dahari (an NGO) supports livelihoods associated with sustainable fisheries management through working on an increased value from the market for sustainable catches. This has resulted in six PFCs and one permanent no-take zone thus far. Dahari also works with the agricultural sector to diversify livelihood strategies. Training is provided in the form of sustainable fishing techniques, collective management and leadership, and fisheries monitoring.	<ul style="list-style-type: none"> Coastal ecosystem management, restoration and conservation. Protection and diversification of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> Anticipated livelihood co-benefits in terms of ecosystem services associated with restored and conserved ecosystems, eg, food and tourism-related livelihoods. Enhanced human capital through training. Unclear if participants received a stipend or other direct livelihood benefits as a result of participation. 	Resource intensive, largely externally driven programme. Appears to be reliant on financial input for replication or scaling.
Seychelles (2014–2015)	<ul style="list-style-type: none"> Adaptation Fund (AF) UNDP Government of Seychelles 	The Ecosystem-based Adaptation to Climate Change in Seychelles used EbA to reduce coastal flooding and erosion risk associated with sea-level rise and storm surges. Coral reefs, coastal wetlands, mangroves and beach berms rehabilitated and restored, including artificial breakwater designed as coral reef substrate. Training in tidal wetland, beach and reef rehabilitation was provided to local residents.	<ul style="list-style-type: none"> Coastal ecosystem management, restoration and conservation. Protection and diversification of ecosystem-based livelihoods. 	<ul style="list-style-type: none"> Anticipated livelihood co-benefits in terms of ecosystem services associated with restored and conserved ecosystems, eg, food and tourism-related livelihoods. Enhanced human capital through training. Unclear if participants received a stipend or other direct livelihood benefits as a result of participation. 	Resource intensive, largely externally driven programme. Appears to be reliant on financial input for replication or scaling.

* In Tanzania, LMMAs are referred to as Collaborative Fisheries Management Areas (CFMAs).

Sources: Republic of Mauritius, "Fishers Receive Certificates under a Coral Culture Training Programme", <https://govmu.org/EN/Pages/NewsDetails.aspx?n=Fishers-receive-certificates-under-a-Coral-Culture-Training-Programme.aspx>; Simone Dale, (projects director, Wild Trust), interview by Thérèse Boulle and Penelope Price, September 2022; Blue Action Fund and Green Climate Fund, "Protection and

Restoration of Important Ecosystems in uThukela Marine Protected Area, and Associated Estuarine Functional Zones (EFZs), Reducing Climate-related Socio-ecological Risk”, (Grant Fact Sheet, BAF, Frankfurt, 2022); Blue Ventures, “Search Results for: Velondriake”, <https://blueventures.org/?s=Velondriake>; Plan Vivo, “Tahiry Honko – Madagascar”, Current Projects, <https://www.planvivo.org/tahiry-honko>; Jérémy Huet (programme manager, Zoological Society of London), interview by Thérèse Boulle, September 2022; Sergio Rosendo et al., eds., *Toolkit for LMMA Establishment: A Case Study of Our Sea Our Life’s Approach to Community-based Marine Conservation in Northern Mozambique* (London: Zoological Society of London & Pemba: Associação do Meio Ambiente, 2020), <https://www.zsl.org/sites/default/files/Toolkit%20ENG%20FINAL%20300620.pdf>; Blue Ventures, “Sustained Benefits from Local Fisheries Management on Fundo Island”, News and Stories, <https://blueventures.org/sustained-benefits-from-local-fisheries-management-on-fundo-island-2/>; Mwambao Coastal Community Network, “Success at Fundo Island Fishery Opening”, <https://mwambao.or.tz/success-fundo-island-fishery-opening/>; *Strengthening Marine Protected Area Management in Rufiji, Mafia and Kilwa Districts Tanzania, 2019-2023*, Project Proposal, https://wwfint.awsassets.panda.org/downloads/strengthening_marine_protected_area_management_rufiji_mafia_kilwa_districts.pdf; Dahari, *The Comoros of Today and Tomorrow: Dahari’s Strategic Plan 2022-2027* (Mutsamudu: Dahari, 2021); Government of Seychelles and UNDP-GEF, *Ecosystem Based Adaptation to Climate Change in Seychelles*, Inception Workshop Report, <https://pubdocs.worldbank.org/en/546541582057594268/19-PIMS-4775-EBA-Project-Inception-Workshop-Report-ver3.pdf>



Fishing boats on a Zanzibari beach [Nikada via Getty Images]

Overview of findings

All nine cases presented in Table 2 address the protection and diversification of ecosystem-based livelihoods. This speaks to the thematic area being explored in this paper.

Periodic fishery closures

Five of the nine cases presented included the protection of ecosystem-based livelihoods through the adoption of PFCs. PFCs are a common and effective approach that prioritises the livelihood needs of coastal communities as an entry point to further EbA interventions. This model is presented in detail below as a case study.

Training and skills development

A feature of all the cases presented in Table 2 was some form of training associated with the EbA activities. This not only serves the projects' purposes, but also enhances the human capital among participating communities and thus, in some cases, provides opportunities for livelihood diversification.

The range of training presented has been grouped into the following broad categories:

- training associated with restoration activities, eg, mangrove and coral propagation or diving skills for coral reef restoration;
- training in alternative livelihoods such as mangrove beekeeping, seaweed or cucumber farming, or eco-tourism guiding;
- training in community-based management of marine resources, eg, leadership training, governance and conflict resolution; and
- training in small business development and management.

Financial sustainability of EbA livelihood interventions

Four cases presented in Table 2 included community access to credit through micro-lending or eco-credit schemes. These included VSLAs, as mentioned in the Our Seas, Our Life project in Cabo Delgado, and the Velondriake project in Madagascar, both of which used community credit access as a means of supporting livelihood diversification. The community eco-credit scheme, known as the Mkuba, was introduced in Tanzania by a group of NGOs²⁴ and was aimed at incentivising sustainable coastal ecosystem practices among local fishers.²⁵ The scheme works by providing loans to community members who commit to jointly agreed-on actions in line with community marine resource plans. The loans can be used for income-generating activities aligned with these plans, such as seaweed farming. Loans are accompanied by support and training in the setting up and management of these small businesses. This, in effect, helps to diversify ecosystem-based livelihoods. In some instances the loans can be used to fund activities such as building a house or a small shop, which are not related to EbA but strengthen the resilience and economy of the area as a whole.

In addition, associated with Madagascar's Velondriake project presented in Table 2, is Tahiry Honko, the world's largest community-led mangrove carbon conservation project. Sales of carbon credits obtained by the conservation and restoration of mangroves are

24 NGOs involved include Mwambao Coastal Community Network, Fauna & Flora International and GreenFi.

25 Tanguy Nicholas, "Microcredit Scheme Benefits Coastal Communities and Marine Conservation in Tanzania", Fauna & Flora International, <https://www.fauna-flora.org/news/microcredit-scheme-benefits-coastal-communities-marine-conservation-tanzania/>.

used to sustain the broader Velondriake project, which includes health and education development alongside the EbA activities already documented.

The Cabo Delgado Our Seas, Our Life project reflected on the importance of addressing the financial sustainability of the LMMA. It tried various mechanisms to generate income on a small scale, including paying a premium for sustainably harvested/caught goods, through small levies on octopus caught following a closure, and through VSLAs. It recognised the need for larger-scale and longer-term mechanisms such as payment for ecosystem services or biodiversity offsets.

Across the seven SADC countries represented in Table 2, are two high-income countries, namely Mauritius and Seychelles, that had a primary EbA focus on restoration and conservation activities, as opposed to the direct livelihoods benefit entry point exhibited in the other cases. This may be reflective of lower livelihood pressures in these two countries.

Scaling EbA to enhance livelihood outcomes

One approach stood out in terms of achieving sustainable livelihood outcomes through scaling, or showing the potential to do so. This approach adopted PFCs as an initial EbA intervention for sustainable fisheries management. The intervention progressed to include other EbA activities such as the conservation and restoration of coastal and marine ecosystems, and the protection and diversification of ecosystem-based livelihoods. Other examples were found across the WIO region of SADC, including Madagascar, Tanzania, Mozambique and the Comoros. In most cases these involved an expansion of closure areas and/or an extension of the period of closure. In addition to extending the reach of EbA-related activities at project sites, PFCs typically scaled to neighbouring sites as the short-term livelihood benefits became apparent to other villages. In this way LMMAs are formed and community-based management of coastal and marine resources is scaled. Networks have formed around collections of LMMAs in Madagascar and Tanzania, and to some degree in the Comoros, and have fostered further scaling of the PFC approach across the WIO region through exchange visits and advocacy. Unfortunately, one of the recent initiatives that held promise in Mozambique, in the Cabo Delgado area, was discontinued due to political instability in the region.²⁶ This approach is discussed in detail in the case study below.

In addition to extending the reach of EbA-related activities at project sites, PFCs typically scaled to neighbouring sites as the short-term livelihood benefits became apparent to other villages

²⁶ Jérémy Huet (programme manager, Zoological Society of London), interview by Thérèse Boulle, September 2022.

Some projects represented in Table 2 relied on an initial large financial investment, such as the 'Ecosystem-based Adaptation to Climate Change in Seychelles' project, which is funded by the Adaptation Fund; the uThukela Marine Protected Area Ecosystem-based Management Project funded by the Blue Action Fund, a component of the Green Climate Fund; and the Mozambique: Building Resilience in the Coastal Zone through Ecosystem-based Approaches to Adaptation (EbA), in the Greater Maputo Area, which is a five-year GEF project. Such substantial amounts of funding are able to deliver large-scale projects, in terms of either spatial extent, thematic scope or temporal scale (rarely over five years) – or any combination of these. This signals an ability to positively impact the livelihoods of a large number of coastal communities, and most of these do. However, concern was expressed by interviewees as to the post-project sustainability of these livelihood benefits. Examples include sustaining community-based nurseries and other small ecosystem-based businesses without an adequate market such as previously provided by the project, or sustaining ecosystem-based management in the face of pressing socio-economic needs.

However, there is growing evidence that these large-scale funders are responding to learnings and reflections around the relative lack of meaningful change that is often associated with working at such scales. An interview with the Wild Trust (implementing the uThukela project) highlighted a willingness on the part of the funder to support mutual learning around how best to ensure maximum community benefit, especially in terms of livelihood support. This was particularly focused on the early design stages of the project.

Missing evidence of coastal and marine EbAs with livelihood outcomes

Despite available literature and interviews with Namibian researchers, there was no evidence of Namibian coastal or marine EbA programmes associated with livelihood co-benefits. There were programmes targeting alternative livelihoods for small-scale fishers, but they were not associated with ecosystem restoration or conservation, or sustainable fisheries management, and thus not included. There were also interesting projects targeting small grants for landscape-scale EbAs in Namibia, but these did not appear to have a coastal component.²⁷ The same conclusion was drawn for Angola, where evidence was found in the literature of adaptation work being undertaken among small-scale or artisanal fishers to address livelihood issues, but these were not ecosystem-based. There was no information found on coastal and marine EbAs in the DRC. This does not necessarily indicate an absence of such interventions, but rather points to the paucity of available information and difficulty in securing interviews with people on the ground, which was the case for Angola and the DRC in particular.

²⁷ Green Climate Fund, *Gender Action Plan: SAP006: Building Resilience of Communities Living in Landscapes Threatened under Climate Change through an Ecosystems-based Adaptation Approach*, Funding Proposal (Windhoek: Environmental Investment Fund of Namibia, 2019).

Putting food on the table

Having examined the range of EbA interventions with livelihood outcomes across the region, this section focuses on one of the outstanding approaches in terms of achieving livelihood gains through scaling EbA projects. It is clear from the popularity of using PFCs as a starting point from which to engage communities in further conservation or restoration activities, that this approach is beneficial. Interviews with organisations that have adopted this approach shed light on the trend by explaining that many communities' priorities

As one interviewee explained about the coastal communities with whom they were working: 'People's priorities are about putting food on the table'

are focused on meeting their immediate needs. As one interviewee explained about the coastal communities with whom they were working: 'People's priorities are about putting food on the table',²⁸ adding that one needs to 'work with what the community is willing to give you ... start small with easy wins'.²⁹ This entails starting the engagement with the community by listening and responding to their priority needs. In the WIO this approach favoured PFCs that targeted octopus, which, as the octopus has a relatively short lifecycle (about one year), means that closures need last only a few months before local communities reap the benefits of increased catches upon reopening.³⁰ This practice provides a gateway to further fisheries management activities as the community realises the benefits and chooses to extend the initiative temporally and/or spatially and/or to other species. Moreover, neighbouring villages see the success of the PFCs and the related livelihood benefits, with some choosing to replicate it, thus extending the spatial scale.³¹ The approach is well-articulated in the following statement from the website of the Comoros NGO, Dahari, which states that its activities are aimed at³²

support[ing] communities in the implementation of short-term management measures such as octopus fishery temporary closures, which increase octopus catches significantly over a few months only. Fishers can therefore enjoy rapid benefits from short-term marine management, increasing their interest in marine management and engaging them towards longer-term management measures, such as permanent no-take zones, that preserve marine resources effectively in the long term.

28 Randrianjafimanana, interview.

29 Randrianjafimanana, interview.

30 Rosendo et al., *Toolkit for LMMA Establishment*.

31 Charlie J Gardner et al., "A Decade and a Half of Learning from Madagascar's First Locally Managed Marine Area", *Conservation Science and Practice* 2, no. 12 (December 2020).

32 Dahari, "Marine Resources Management", <https://daharicomores.org/en/marine-resources-management/>.

PFCs constitute a form of community-level common-pool resource management, which hinges on community consensus and management in order to be effective. This requires community-level governance structures that can determine and enforce the rules governing the closure, such as the location, extent and periodicity of the closure. A number of community-based governance structures have emerged across the region as a result. These include beach management units in Kenya and Tanzania, community fishery councils³³ in Mozambique, community or village associations in Madagascar and local fishers' associations in the Comoros.

While PFCs improve livelihoods, the benefits are relatively small and, according to one interviewee, aquaculture projects provide more tangible livelihood benefits.³⁴ Although the aquaculture projects do show considerable potential for livelihood support, they often have limited EbA value, are relatively small scale and are time consuming. They require more effort to establish and maintain, and to establish viable access for commercial partners. However, the interviewee stated that once the aquaculture project was operating effectively, community partners were able to earn more effectively.

CASE STUDY: VELONDRIAKE IN MADAGASCAR

Following the success of temporary octopus closures in 24 villages, the NGO Blue Ventures, which has a permanent presence in the region, and its main partners, the University of Toliara's Institut Halieutique et des Sciences Marines and Madagascar's Wildlife Conservation Society, established Velondriake, Madagascar's first LMMA, in 2006.³⁵ The initial project aimed at 'protecting the region's coral reefs, their biological diversity, sustainability and productivity while improving the quality of life of the local community, which depends almost entirely on the region's marine resources for subsistence and income'.³⁶

Velondriake, which was gazetted by the state as a marine protected area (MPA) in 2015, is co-managed by the Velondriake Association in partnership with Blue Ventures. Governance takes the form of a community-based co-management partnership, based on customary law. Velondriake has continued to grow beyond the initial PFCs, and currently covers an area of 683km², which includes a range of diverse initiatives.³⁷ Notable among these are:

- five permanent coral reef reserves, and two mangrove reserves;
- alternative livelihoods in the form of seaweed and sea cucumber aquaculture in partnership with private companies that take the products to market;

33 Called Conselhos Comunitários de Pesca (CCP) in Portuguese.

34 Rasafimamonjiraibe, interview.

35 M Epps and S Benbow, *Community Attitudes and Perceptions of Marine and Coastal Resources and Sustainable Management in SW Madagascar*, Conservation Report (Bristol: Blue Ventures, 2007).

36 Epps and Benbow, *Community Attitudes*, iii.

37 Gardner et al., "Locally Managed Marine Area".

- mangrove beekeeping, as an alternative livelihood;
- numerous octopus PFCs and the Velondriake Association as part of a regional multi-stakeholder octopus management committee;
- community patrollers;
- a community science team that monitors and records community conservation data;
- community savings and loan groups;
- ecotourism through the development of homestays;
- health and education programmes; and
- Tahiry Honko (listed in Table 2), one of the largest community-led mangrove carbon conservation projects globally, trading carbon credits as a source of funding for the LMMA management association, as well as education and health development projects in the area.³⁸

Velondriake remains an impressive initiative that has developed and expanded over nearly two decades, as well as having been replicated and scaled in other SADC countries. A review published 15 years after the project's inception included some valuable reflections, notable among these being:³⁹

- A co-management partnership between Blue Ventures and the community-established Velondriake Association brings additional capacity to navigating complex environmental, social and economic development initiatives associated with the project, as well as facilitating access to external assistance such as legal and academic specialists.
- Blue Ventures has maintained a permanent presence in the Velondriake LMMA since project inception. The review expands on the benefit of presence by stating that,⁴⁰

by nature of its operating model, BV [the NGO] is fully enmeshed as an active constituent within the Velondriake community, rather than a predominantly absent actor dispensing punctuated projects. This facilitates the development of relationships of trust and acceptance, and fosters a deeper understanding of social dynamics ...

38 Gilde Tahindraza, "Velondriake, Madagascar's First LMMA: Testing and Scaling Community Models", IUCN Congress 2020, <https://www.iucncongress2020.org/newsroom/all-news/velondriake-madagascars-first-lmma-testing-and-scaling-community-models>.

39 Steve Rocliffe and Rupert Quinlan, "Why Conservation Needs a New Way to Scale", *Stanford Social Innovation Review* (2020); Michele Barnes-Mauthe et al, "What Determines Social Capital in a Social-ecological System?: Insights from a Network Perspective", *Environmental Management* 55 no. 2 (Feb 2015): 392-410.

40 Rocliffe and Quinlan, "Why Conservation Needs", 6.

- It is important to honour community priorities such as community choices of species and locations for conservation initiatives, which are not based on scientific data, such as most threatened or most at risk, but rather on community criteria.
- Addressing barriers related to poverty has been an important component of the Velondriake model. These have included alternative livelihood opportunities, education and health initiatives.
- The diversity of initiatives within the Velondriake LMMA attracts diverse funder interests such as conservation, education, health, livelihoods, fisheries and climate change. However, an entrepreneurial model has also been adopted based on a variety of self-generated income streams. Examples include a blue carbon payment for ecosystem services from mangrove conservation, a levy or contribution from those engaged in aquaculture and octopus fishery related to the PFCs, and entrance fees charged to tourists visiting the area.

Establishing locally managed marine areas

The establishment of LMMAs has provided a useful vehicle for formalising and scaling up the community structures established to manage the PFCs.⁴¹ As a form of community-based natural resource management, LMMAs place decision-making in the hands of local resource users. Seen as a more sustainable approach than ‘top-down’ centralised approaches where decision-making is far removed from local actors, this approach has traction in countries where fisheries management has been decentralised, such as Madagascar, Tanzania and Mozambique.

LMMAs in the WIO context typically include management of an area comprising a number of villages, forming an umbrella body with one governance structure comprised of representatives from participating villages or fishing associations (see the case study). LMMAs typically use strategies such as fishery closures, both permanent and temporary; species-specific reserves (eg, octopus and mackerel); gear restrictions (eg, ban on mosquito-mesh fishing nets); and other locally specific controls such as swimming only (no walking) at coral reefs, to conserve and manage local marine resources.⁴² As presented in Table 2, LMMAs were found in Madagascar, the Comoros, Tanzania, Mozambique and Kenya (the last being a non-SADC state).

Blue Ventures, which has worked for over a decade across a number of SADC states on establishing LMMAs, describes LMMAs as follows:⁴³

41 Hugh Govan et al., eds., *Locally-Managed Marine Areas: A Guide for Practitioners* (Locally-Managed Marine Area Network, 2008).

42 Rocliffe et al., “Towards a Network”.

43 Steve Rocliffe and Shawn Peabody, *Locally-managed Marine Areas: Towards a Global Learning Network*, Workshop Report, World Conservation Congress, Jeju, South Korea, September 2012 (London: Blue Ventures, 2013), 1.

These locally centred approaches have emerged as an effective solution to many of the challenges of small-scale management commonly faced by fishing communities in developing countries. LMMAs have proven to be a cost effective, scaleable, resilient and more socially acceptable alternative to more traditional ‘top down’ methods of marine resource management. They have also shown promise as a means to safeguard food security, address coastal poverty, and help coastal communities to adapt to climate change.

Networks of LMMAs

The Velondriake model has been replicated in Madagascar, Tanzania, the Comoros, Kenya and Mozambique, effectively scaling the LMMA approach. In response, networks of LMMAs have emerged in the region, among these being MIHARI, which was established in Madagascar in 2012.⁴⁴ MIHARI now includes over 80 LMMAs, comprised of 219 fishing communities, collectively managing nearly 20% of Madagascar’s coastline.⁴⁵ The network aims to advocate for the rights of LMMAs; strengthen the capacity of participating communities; promote solidarity between the LMMAs; work for conservation, restoration and preservation of natural resources; and develop income-generating alternatives.⁴⁶ The Mwambao Coastal Community Network in Tanzania is another prominent LMMA network NGO in the region. Mwambao’s mission is to facilitate ‘a network linking coastal communities and other partner stakeholders that builds community resilience and improved sustainable coastal resource management and livelihoods’.⁴⁷

Exchange visits and collective gatherings, such as regular conventions, expand and strengthen these networks, serving to connect communities through peer-to-peer learning and collaboration, and motivating new communities to establish LMMAs and join the network. As the Mwambao website attests: ‘We believe that networking leads to knowledge sharing and capacity building which in turn leads to resilience and community voice, which ultimately leads to action and change.’⁴⁸

Having a common purpose at the core of the network helps to overcome one of the fundamental issues with scaling, which is the false assumption that projects successful in one local area can be replicated in other local areas. However, operating at larger scales poses particular challenges, as larger-scale programmes invariably require higher levels of resource investment, management and operating capacity. In order for this model to work at scale, it is critical that these networks are sufficiently resourced to overcome such challenges.

44 Govan et al., *Locally-Managed Marine Areas*.

45 Tahindraza, “Velondriake”; Blue Ventures, “Madagascar’s MIHARI Network Begins its Journey to Legal Independence”, <https://blueventures.org/madagascars-mihari-network-begins-its-journey-to-legal-independence/>.

46 MIHARI, “Nos Axes Stratégiques 2021-2025” [Our Strategic Axes 2021-2025], <https://mihari-network.org/en/about-mihari/>.

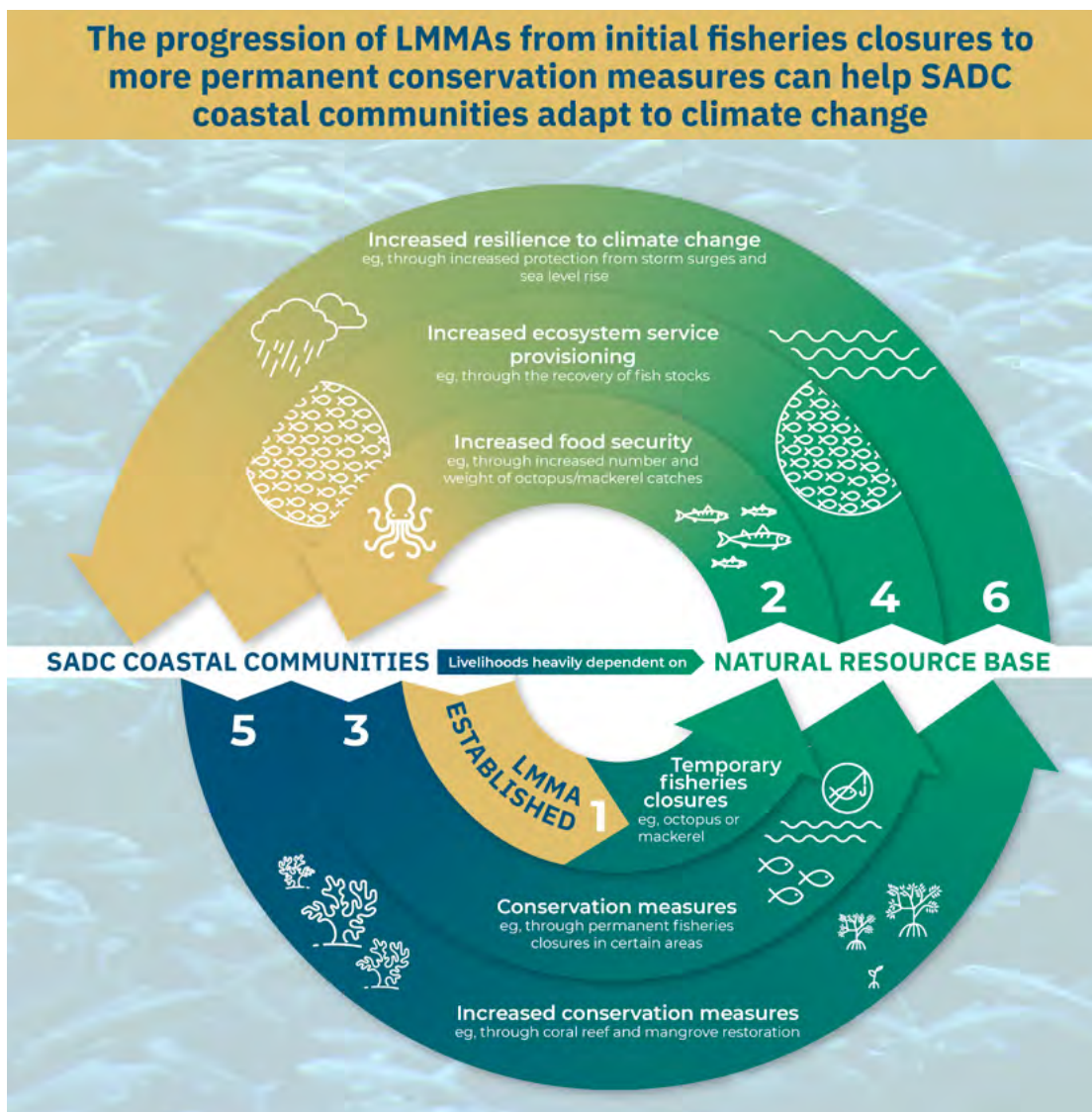
47 Mwambao, “Coastal Resource Conservation for Coastal Communities”, <https://mwambao.or.tz/about-us/>.

48 Mwambao, “From Networking to Action: Our Theory of Change”, <https://mwambao.or.tz/about-us/>.

Prioritising livelihoods: An incremental approach to EbA

In effect, the story of Velondriake illustrates an incremental, community-centred approach that has been adopted across the region. Starting by addressing community priorities and working at a pace dictated by community needs, appetite and capacity, this incremental approach works with reinforcing feedback loops as depicted in Figure 2, which shows how the initial use of PFCs led to increased food security and other livelihood gains for Velondriake communities. This resulted in community willingness to expand the spatial extent and scope of the EbA measures, which improved local ecosystem functioning, thus enhancing the capacity to provide ecosystem services. This process involves the establishment of partnerships, working with community governance, community-based resource management, knowledge sharing and capacity building, and other enabling factors that arguably bolster community resilience.

Figure 2 The progression of LMMAs



Source: Compiled by authors

This process involves the establishment of partnerships, working with community governance, community-based resource management, knowledge sharing and capacity building, and other enabling factors that arguably bolster community resilience

Although one review of the LMMA approach indicated that participating communities remained more interested in the financial and development gains than the climate change or conservation concerns, this may be expected given the extreme poverty of many SADC coastal communities and their reliance on dwindling marine resources. Co-management in these circumstances bodes well in terms of balancing environmental/conservation and community development agendas.

Enablers and barriers

Community participation

It is essential that the primacy of community is established. Stewardship of the coastal space remains in the hands of the local residents. Collaborative efforts to enhance livelihood support and productivity of the space, and to conserve its natural resources for future generations will only happen when communities are properly engaged. Most interviewees emphasised the need for a participatory approach and the building of trusted partnerships.

Being open to listening and learning were other features that helped to co-create an environment of trust and collaboration between the community and 'external' support agencies. This was borne of time, talking and listening and, most importantly, understanding. Coastal communities have generational memories, knowledge and experience from which to draw.

Partnerships

Where partnerships between communities, NGOs and government are strong, the community-conservation-climate nexus thrives. This is borne out in Madagascar, Tanzania and the Comoros where communities and NGO partners have emphasised the importance of partnerships. Tanzania is another case where NGOs would be unable to carry out their work without government support. These partnerships facilitate access to markets, commercial partners and funding, and are vital to the sustainability of livelihood adaptations.

Without the support of NGOs and government, it is assumed that coastal communities would remain subject to the destructive effects of climate change without the hope of improved livelihoods

Without the support of NGOs and government, it is assumed that coastal communities would remain subject to the destructive effects of climate change without the hope of improved livelihoods. The literature documents the work of the supported coastal communities, but little is known about those that are not supported. Nevertheless, given the findings of the former, it appears that external support for local community adaptation is necessary to overcome many of the circumstantial barriers to effective and sustainable livelihood adaptation.

Resources and funding

Interviewees were clear that scalability is supported by access to funding and the resources that such funding brings. NGOs are keen to expand, but the process of working with communities requires time to build trust and establish relationships, both difficult outcomes with which to attract funding, or to measure and report on should such funding become available. None of the work of NGOs could be done without funders – the more resourced the project, the better its prospects of success. In Madagascar, Blue Ventures has about 200 employees. They are well resourced and clearly have active and responsive funders. Without funding and resources, none of the EbA projects would be viable. Coastal communities are required to compete with one another for access to funding. The scale of available funding is a significant constraint.

None of the work of NGOs could be done without funders – the more resourced the project, the better its prospects of success

Scalability would be best served by relevant government departments and their fisci. When questioned about this potential, key informants were unanimous in their response. They supported the idea, but noted that government resources were not prioritised towards marine and coastal spaces, especially on the scale that is required. However, an entrepreneurial model has recently been adopted based on a variety of self-generated income streams. Examples, previously mentioned in the paper, include blue carbon ‘payment for ecosystem services’ from mangrove conservation, a ‘levy’ or contribution from

those engaged in aquaculture and octopus fishery related to the PFCs, and entrance fees charged to tourists.

The COVID-19 pandemic taught many lessons, among which were that access to markets was essential to livelihoods. According to a Malagasy researcher,⁴⁹ fishers stopped going to sea. It was too expensive to take their boats out as they could not sell their catch. This rapidly led to a crisis with households becoming increasingly food insecure. This illustrates how, in practical terms, limited access to markets can constrain local livelihood adaptation strategies. But lack of access to markets serves as a broader constraint that needs to be taken into consideration at the project design stage. Accessing markets can be constrained by physical, financial, and policy or regulatory factors. Each of these may serve as a barrier to sustainable livelihood adaptation by coastal communities.

RECOMMENDATIONS

- In many instances livelihood opportunities are of paramount importance to SADC coastal communities, therefore EbA initiatives need to be designed around this priority to ensure poverty reduction, uptake and sustainability, and to address ethical concerns regarding equity.
- Coastal communities, particularly where there are high levels of poverty and disenfranchisement, should not be expected to sustain EbA projects or related initiatives without external support or co-management in the post-project period. Opportunities that could be explored in this regard include mainstreaming into government planning and development programmes, particularly local government; pursuing sustainable finance options such as carbon trading; and seeking additional funding to support ongoing local NGO support post project.
- LMMA have shown promise in the WIO as an entry point to community-based marine resource management. A similar approach should be investigated for other SADC coastal states.
- The LMMA networks established in the WIO provide an opportunity for scaling locally based initiatives through the collective without compromising the local specificity of individual LMMA members. Scaling through the use of a similar network of local initiatives should be explored in other SADC coastal states.
- There is increased funding appetite for livelihood-centred approaches to EbA. This should foreground enablers associated with a community-based approaches, such as support for governance and leadership capacity building, training in conflict resolution, training in monitoring and reporting, among others.

49 Percy Yvon Rakoto (consultant, natural resource management) interview by Thérèse Boulle and Penelope Price, September 2022.

- At the international level, countries from the Global North that have created the conditions of advanced climate change are required to consider how best to support countries in the Global South that are enduring most of the climate crisis. The recent talks at COP27 contained a focus on meeting this responsibility. Continued pressure needs to be exerted on these countries to address the finance deficit.
- Government programmes need to focus on coastal livelihoods that will help to support and build ecosystems. NGOs, such as Blue Ventures, have been leading the way in this regard. Local governments have much to learn from these initiatives. If they can mainstream EbA initiatives into their governmental programmes, a sustainable outcome is more likely.
- The national fiscus needs to be aligned with support for coastal livelihoods and their sustainability. Governments need to be lobbied to ensure their understanding and prioritisation of these initiatives. Concerted effort needs to be made to support coastal communities to advocate for livelihood opportunities.

Conclusion

Although limited in number, there are various examples of marine and coastal EbAs within the SADC region that have livelihood outcomes. One model in particular stands out, namely the incremental approach of addressing communities' short-term livelihood needs through a sustainable fisheries management intervention, and then scaling this up spatially and thematically to encompass a wider area and further EbA interventions. This approach has been widely adopted within, and has spread throughout, the WIO. Placing community priorities at the centre and developing EbA interventions outwards from there fosters community willingness to engage. This approach embeds the EbA interventions in community wellbeing, enhancing the sustainability of the programme as a whole. Furthermore, improved livelihoods based on the sustainable management of marine and coastal resources increases the resilience of coastal communities to a number of stressors, including climate change. This model currently occurs only in the WIO and it is recommended that livelihood-centred approaches to marine and coastal EbAs be explored in other regions within SADC.

There is pressure on funders to address the climate crisis and ecosystem collapse, and the scale of financial resources being made available through the large funding agencies and mechanisms to do so is encouraging. However, without embedding these in locally transformative programmes, they will not turn the tide. Although working with human-behaviour change and the accompanying policy development and implementation are slower processes than biophysical interventions such as restoration, these are necessary to ensure the sustainability of EbA interventions.

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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. The SADC 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.)

We are deeply grateful to the many people who so willingly contributed their time, experience and knowledge to exploring this topic.

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