INSPIRED BY LOCAL COMMUNITIES:

SCALING MADAGASCAR'S LOCALLY MANAGED MARINE AREAS (LMMA) MODEL TO DRIVE GLOBAL CLIMATE RESILIENCE

RISE

OUR WORLD HERITAGE

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1. EXECUTIVE SUMMARY

→ GLOBAL IMPORTANCE AND THREATS TO MANGROVES:

Mangrove ecosystems are essential to environmental sustainability and human well-being. In Madagascar, mangroves provide vital services, such as coastal protection, biodiversity support, and carbon sequestration. Despite their importance, mangroves face threats from deforestation, pollution, and climate change, jeopardizing local communities that depend on these ecosystems for livelihoods and protection from extreme weather events.

→ NECESSITY OF A PARADIGM SHIFT:

To effectively combat the destruction of mangroves, there is an urgent need to move beyond traditional conservation approaches. A comprehensive strategy that empowers local communities, integrates sustainable economic activities, and promotes large-scale restoration is crucial for community resilience.

→ MADAGASCAR'S SUCCESS IN MANGROVE RESTORATION:

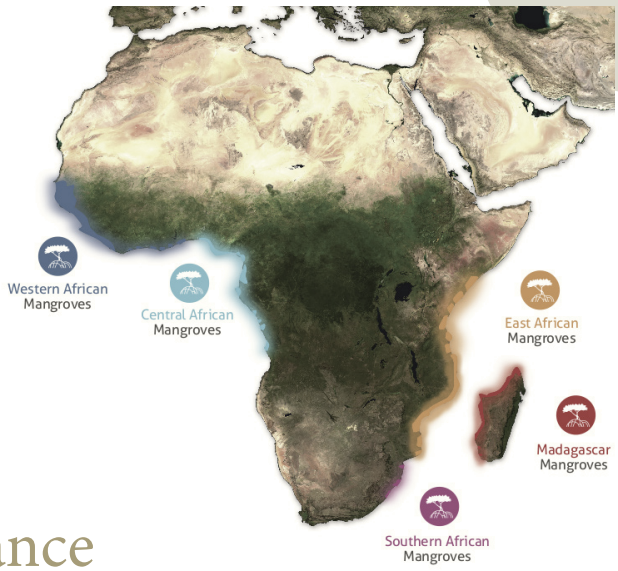
The MIHARI network in Madagascar has demonstrated how community-driven initiatives can successfully protect and restore coastal ecosystems. By empowering over 200 coastal communities to manage Locally Managed Marine Areas (LMMAs), MIHARI has become a model for sustainable marine resource management and climate resilience. This community-driven approach has helped mitigate the impact of climate change and secure livelihoods for marginalized fisherfolk.

→ PURPOSE OF THE PAPER:

This white paper aims to explore how Madagascar's mangrove restoration initiatives can be scaled up and adapted to address global climate change challenges. By analyzing successful community-led approaches and lessons from other regions, the paper offers a roadmap for scaling up mangrove restoration efforts worldwide, contributing both to environmental conservation and the economic well-being of coastal communities.

2. BENEFICES OF MONGROVES

Mangroves are coastal ecosystems consisting of salt-tolerant trees and shrubs that grow in tropical and subtropical regions. They play a crucial role in supporting both the environment resiliency and human communities livelihood across the continent.



1. Environmental Importance

EROSION CONTROL:

Mangroves act as natural barriers, reducing the impact of coastal erosion by absorbing wave energy and stabilizing shorelines. Studies show that mangrove forests can reduce wave heights by up to 66% within the first 100 meters of forest width. They also help protect coastal communities from storms, tsunamis, and sea-level rise.[1]

BIODIVERSITY AND HABITAT:

Mangroves provide a unique habitat for numerous species of plants, birds, mammals, and marine life. They serve as breeding grounds, nurseries, and feeding areas for many commercially important fishes and crustaceans, supporting fisheries and sustaining marine biodiversity. However, between 30-50% of the world's mangrove forests have been lost in the last 50 years, threatening biodiversity and fisheries.[2]

WATER QUALITY IMPROVEMENT:

Mangroves filter pollutants and trap sediment, preventing them from entering coastal waters. They improve water quality by removing excess nutrients, chemicals, and heavy metals from runoff, thereby protecting coral reefs and seagrass beds from sedimentation.

CARBON SEQUESTRATION:

Mangroves are highly efficient carbon sinks, storing up to five times more carbon per hectare than terrestrial forests. They hold an estimated 4.19 petagrams (4.19 billion metric tons) of carbon globally in their biomass and soil. Despite covering only 0.7% of the world's tropical forest area, they account for approximately 14% of carbon sequestration by coastal ecosystems, playing a crucial role in mitigating climate change.[3]

2. Economic Importance

FISHERIES AND AQUACULTURE:
Mangrove ecosystems support valuable commercial fisheries and aquaculture industries. They provide breeding grounds and nurseries for fish, shrimp, crab, and other commercially important species, contributing to local livelihoods and food security. In the Caribbean, mangroves and seagrass beds together provide around $6.7 billion in ecosystem service benefits, including fisheries.[4]

TIMBER AND NON-TIMBER FOREST PRODUCTS:
Mangroves are a source of timber for construction and fuelwood. Additionally, they provide non-timber forest products such as honey, medicinal plants, and traditional handicraft materials, supporting local economies and cultural practices. In Benin, for example, mangrove forests are protected by local traditions and deities, preserving these resources for sustainable use.[5]

TOURISM AND RECREATION:
Mangrove forests attract ecotourism activities such as birdwatching, kayaking, and nature exploration. They generate revenue, employment opportunities, and community development through tourism-related services. In the Caribbean, mangroves and coral reefs provide nearly $15 billion annually in fisheries, tourism, recreation, and carbon sequestration benefits.[6]

COASTAL PROTECTION:
The presence of mangroves helps protect coastal areas from storm surges, reducing the need for costly engineering interventions like seawalls or breakwaters. This protection supports the sustainability of coastal communities, infrastructure, and tourism assets. Optimizing the placement of future conservation efforts to protect 30% of global mangroves could potentially safeguard an additional $16.3 billion in coastal property value and protect 6.1 million people.[7]

3. Social Importance

LIVELIHOODS AND FOOD SECURITY
Mangroves provide direct and indirect livelihood opportunities for coastal communities, particularly those engaged in fishing, aquaculture, and gathering forest products. They serve as a source of income, food, and resources, supporting local economies and reducing poverty. For instance, communities living near mangroves consume 19–28% more fresh fish and 13–22% more animal-sourced foods than other coastal households, enhancing food security. Globally, approximately 120 million people depend directly on mangrove ecosystems for their livelihoods.[8]

CULTURAL HERITAGE
Mangroves hold cultural and spiritual significance for many coastal communities. They are often associated with local traditions, folklore, and customary practices, contributing to the preservation of cultural heritage. In Benin, for example, voodoo deities play a crucial role in preserving mangrove forests, integrating traditional beliefs with conservation efforts. Similarly, in the Niger Delta, mangroves are integral to local customs, serving as sites for festivals, spiritual activities, and traditional medicine practices.[9]

RECREATION AND WELL-BEING
Mangroves offer recreational and educational opportunities for local residents and visitors. Access to these natural spaces promotes physical and mental well-being, environmental awareness, and community engagement. Activities such as birdwatching, kayaking, and nature exploration attract ecotourism, generating revenue and employment opportunities. In Florida, mangroves stabilize the coastline and reduce erosion, making them valuable for both ecological health and recreational purposes. Moreover, mangroves serve as natural laboratories for environmental education, fostering a connection between communities and their natural environment.[10]

3. HOW IS MADAGASCAR COMBATING CLIMATE CHANGE

1. Levers for Success

MIHARI (Mitanatana Harena and Ranomasina avy eny ifotony) is a trailblazing national network of Locally Managed Marine Areas (LMMAs) in Madagascar, uniting over 200 coastal communities since 2012.
LMMA (Locally Managed Marine Area) is a coastal and marine management approach involving local communities taking an active role in the conservation and sustainable use of marine resources within a designated area. LMMAs are typically established and governed by local communities, often in collaboration with governmental or non-governmental organizations. These areas are managed using traditional knowledge, local practices, and adaptive management strategies, with the aim of preserving marine ecosystems, biodiversity, and the livelihoods of coastal communities. LMMAs can include various conservation measures such as fisheries management, habitat protection, and community-based regulations to ensure the long-term health and resilience of marine environments.

MIHARI empowers marginalized fisherfolk by creating a platform for engagement with decision-makers, advocating for coastal community rights, and building LMMA leaders' capacity as marine resource stewards.
MIHARI presents valuable levers for success that can be adapted and applied in addressing climate change challenges in other African countries. While these levers offer significant potential, it's crucial to acknowledge the associated limitations and tailor approaches to suit the unique contexts of each country. By drawing from MIHARI, organizations can formulate effective strategies to combat climate change and ensure sustainable use of marine resources in their regions.
The levers include:

- ADVOCACY AND RAISING THE VOICE OF COASTAL COMMUNITIES:

MIHARI's success lies in advocating for the rights of coastal communities. By giving a platform to fisherfolk and involving them in decision-making, MIHARI has empowered local communities. This approach can be applied in other African countries by establishing platforms for dialogue between communities and decision-makers. However, limitations may arise due to varying political contexts and the need for resources to sustain advocacy efforts.

- STRENGTHENING COMMUNITIES THROUGH NETWORKING:

MIHARI's success in bringing LMMA communities together to share experiences has empowered local leaders and driven positive change. This networking model can be replicated in other African countries facing similar challenges. However, limitations may arise due to differing levels of trust among NGOs and the need for sustainable funding to support networking activities.

- CAPACITY BUILDING FOR BETTER LMMA MANAGEMENT:

MIHARI's focus on capacity building has equipped LMMA leaders with skills for effective resource management. This success factor can be applied by designing tailored training programs for different regions in Africa. Yet, limitations could arise due to resource constraints and the need for ongoing skill development.

- SCALING UP AND GEOGRAPHIC INFLUENCE:

MIHARI's growth and influence can serve as a model for scaling up successful strategies in other African countries. Organizations can establish similar networks to expand their reach and impact. However, limitations may emerge due to differences in regional dynamics and the challenge of maintaining a consistent level of quality and engagement across a larger network.

- COMMUNICATIONS:

MIHARI's effective communication strategy has helped in disseminating information and engaging stakeholders. This success factor can be adopted by other organizations to raise awareness and build support for climate change initiatives. Limitations might include the need for diverse communication channels and ensuring messages resonate with various audiences.

2. Limitations

While MIHARI's levers for success have driven commendable advancements in climate change mitigation and sustainable marine resource management, it is essential to recognize that these approaches are not without their limitations. Understanding these limitations is crucial for effectively implementing similar strategies in diverse contexts and regions. In this section, we delve into the top challenges that MIHARI has encountered in its pursuit of climate resilience and the sustainable empowerment of coastal communities. These challenges underscore the complex landscape in which climate change initiatives operate and offer valuable insights for crafting comprehensive and adaptive strategies that can navigate obstacles and deliver sustained impact:

→ LIMITED RESOURCES:
As MIHARI strives for autonomy, the transition from reliance on established NGO structures presents risks. Swift and effective transfer of operations and leadership while maintaining mission alignment requires a robust financial system, adhering to labor laws, and building a skilled management team for continued fundraising.

→ SOCIO-ECONOMIC INEQUALITIES:
MIHARI's identity communication is challenged by misconceptions about its beneficiaries and the resources it targets. Clarifying its focus becomes paramount, especially with emerging exclusive funding for artisanal and traditional fishers' associations, where the distinct roles of LMMAs and fisher associations need to be unequivocally articulated.

→ TECHNOLOGICAL KNOWLEDGE GAPS:
The lack of comprehensive data on coastal resources hampers MIHARI's impact evaluation. While a database was initiated, financial constraints for environmental Monitoring, Evaluation, and Learning (MEL) programs, discrepancies in indicators and data collection methods, and absence of a developed LMMA impact monitoring manual impede efforts to validate conservation outcomes.

→ LOW CAPACITY OF COASTAL COMMUNITIES:
Illiteracy, power dynamics, and limited leadership skills hinder effective LMMA management by coastal communities. Challenges in enforcing by-laws and negotiating resource management strategies, coupled with isolated communities' restricted livelihood options, further undermine the sustainability of LMMAs.

→ WEAK GOVERNANCE AND EXTERNAL THREATS:
Frequent political changes, opaque legal frameworks, and weak law enforcement pose challenges to sustained resource management efforts. Moreover, growing demographic pressures and migration intensify resource exploitation, necessitating state intervention to preserve LMMA effectiveness..

4. EXISTING PROJECTS FROM OTHER CLIMATE-CHANGE HOTSPOTS

1. Mangrove restoration projects in West Africa

Mangrove restoration projects in West Africa are critical initiatives aimed at rehabilitating and conserving degraded mangrove ecosystems in the region. These projects address the loss of mangrove habitats due to factors like deforestation, pollution, urbanization, and unsustainable fishing practices. Several countries in West Africa have undertaken efforts to restore mangroves and promote their sustainable management. Here are a few examples:

1 SENEGAL:

The Senegal Mangrove Restoration Project, supported by organizations like Wetlands International and local communities, focuses on restoring mangrove forests in the Sine Saloum Delta. This project involves planting mangrove saplings, promoting community-based resource management, and raising awareness about the importance of mangroves.

2 GAMBIA:

The Gambia hosts various mangrove restoration projects driven by local NGOs, international organizations, and community engagement. These initiatives aim to plant mangrove trees, enhance local livelihoods through sustainable use, and protect the mangroves from further degradation.

3 GUINEA-BISSAU:

In Guinea-Bissau, organizations like the Mangrove Foundation are working to restore mangroves through community involvement, reforestation efforts, and education. These projects address the depletion of mangrove resources and support the livelihoods of coastal communities.

4 NIGERIA:

The Nigerian Conservation Foundation (NCF) has launched mangrove restoration projects in the Niger Delta region. These efforts involve planting mangrove seedlings, conducting research on mangrove ecology, and collaborating with local communities to promote sustainable resource management.

5 LIBERIA:

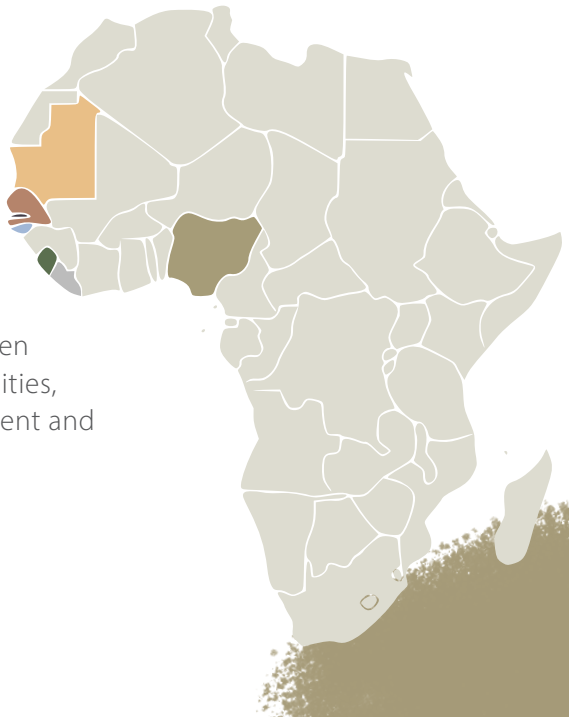
The LIBCoRe (Liberia Coastal and Rainforest Conservation and Restoration) program focuses on rehabilitating mangroves and rainforests in Liberia. By involving local communities, the program aims to enhance biodiversity, mitigate climate change, and improve the well-being of people who rely on these ecosystems.

6 SIERRA LEONE:

In Sierra Leone, the Sierra Leone Estuary Conservation Trust (SLEECT) has been working on mangrove restoration projects to address habitat loss and overexploitation. These projects involve planting mangrove trees, providing alternative livelihood opportunities, and raising awareness about mangrove conservation.

7 MAURITANIA:

The Sahara Conservation Fund is involved in mangrove restoration projects along the coast of Mauritania. These efforts aim to restore degraded mangrove habitats, protect biodiversity, and improve the resilience of coastal communities.



These are just a few examples of mangrove restoration projects in West Africa. These initiatives typically involve a combination of activities such as community engagement, reforestation, research, policy advocacy, and education. The success of these projects depends on collaboration between governments, non-governmental organizations, local communities, and international partners to ensure the sustainable management and restoration of mangrove ecosystems in the region.

2. Mangrove restoration projects in Southern Africa

Mangrove ecosystems are less common in Southern Africa compared to other regions like West Africa or Southeast Asia. However, there are a few mangrove restoration projects in Southern Africa, mainly in countries like Mozambique and South Africa. These projects aim to conserve and rehabilitate existing mangrove habitats, promote sustainable resource management, and raise awareness about the importance of mangroves. Here are some examples:

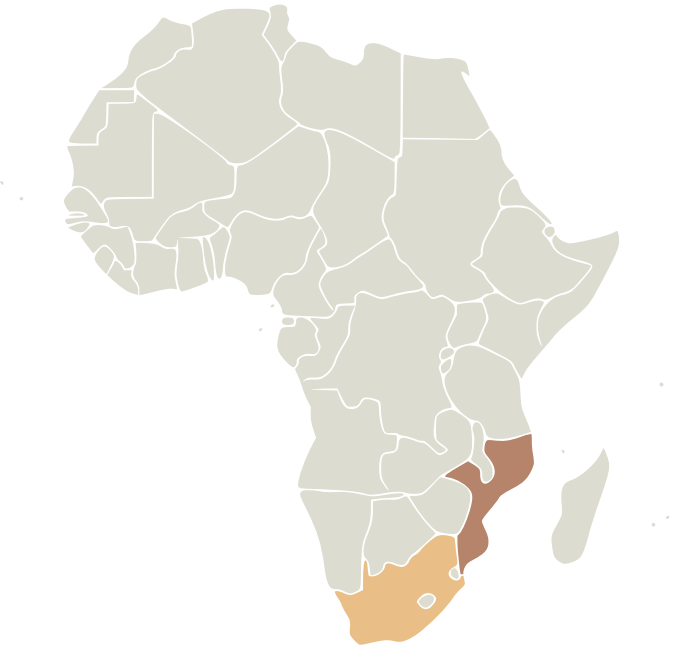
1 MOZAMBIQUE:

The Gorongosa National Park in Mozambique has initiated mangrove restoration projects as part of its broader conservation efforts. The park collaborates with local communities to restore mangrove areas that have been affected by deforestation and degradation. These projects often involve planting mangrove seedlings, promoting sustainable fishing practices, and providing alternative livelihood opportunities..

2 SOUTH AFRICA:

While not traditionally associated with mangroves, South Africa does have some limited mangrove habitats along its eastern coast. The iSimangaliso Wetland Park, a UNESCO World Heritage Site, includes mangrove ecosystems within its diverse range of wetland habitats. Conservation projects in the park focus on protecting and restoring these mangroves, as well as raising awareness about their significance.

It's important to note that mangrove restoration projects in Southern Africa might not be as widespread or prominent as those in other parts of the world due to the limited distribution of mangrove ecosystems in the region. Additionally, these projects often face challenges such as funding constraints, lack of awareness, and competing land use priorities.
As with any restoration effort, successful mangrove restoration requires collaboration between local communities, governmental agencies, non-governmental organizations, and international partners. These projects not only contribute to the preservation of biodiversity and ecosystem services but also have positive impacts on the livelihoods and resilience of coastal communities in Southern Africa.



3. Mangrove restoration projects in East Africa

Mangrove restoration projects in East Africa are significant endeavors aimed at rehabilitating and conserving mangrove ecosystems in countries along the eastern coast of the African continent. These projects address the threats faced by mangroves, such as deforestation, pollution, and unsustainable fishing practices, while also recognizing their importance for biodiversity, coastal protection, and livelihoods. Here are a few examples of mangrove restoration efforts in East Africa:

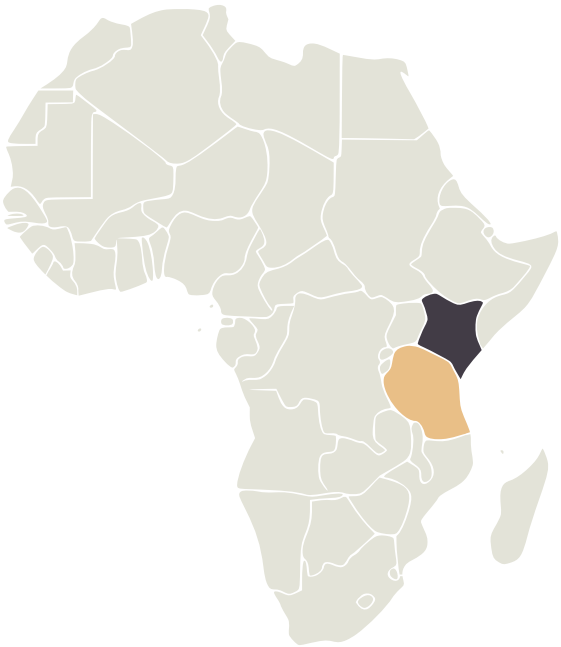
1 KENYA:

The Kenya Marine and Fisheries Research Institute (KMFRI) and various NGOs are involved in mangrove restoration projects along the Kenyan coast. These initiatives often combine community engagement, education, and planting of mangrove seedlings to restore degraded areas and promote sustainable resource management.

2 TANZANIA:

The Rufiji Delta in Tanzania is home to extensive mangrove forests. Conservation organizations like the Rufiji Environmental Management Project (REMP) work with local communities to restore mangroves, enhance livelihoods, and protect the delta's ecosystems.

These examples highlight the diverse efforts to restore and conserve mangrove ecosystems in East Africa. Mangrove restoration projects typically involve a combination of activities, including community engagement, reforestation, sustainable resource management, and education. Collaborative approaches that involve local communities, NGOs, governmental agencies, and international partners are crucial for the success of these initiatives.



4. Other coastal ecosystem restoration projects in North Africa

Mangrove ecosystems are not naturally found in North Africa due to the region's arid climate and geological conditions. Mangroves are typically associated with tropical and subtropical coastal areas, which are not prevalent in North Africa. However, there are some initiatives related to coastal ecosystem restoration and management in parts of North Africa. Here are a few examples:

1 EGYPT:

Although mangroves are not native to Egypt, there are efforts to restore and rehabilitate other coastal ecosystems such as salt marshes and wetlands along the Mediterranean and Red Sea coasts. These projects focus on enhancing biodiversity, improving water quality, and providing habitat for various species.

2 LIBYA:

Coastal conservation efforts in Libya may involve projects related to the preservation and restoration of salt marshes, seagrass beds, and other coastal habitats. These projects contribute to the overall health of the marine environment in the region.

3 ALGERIA:

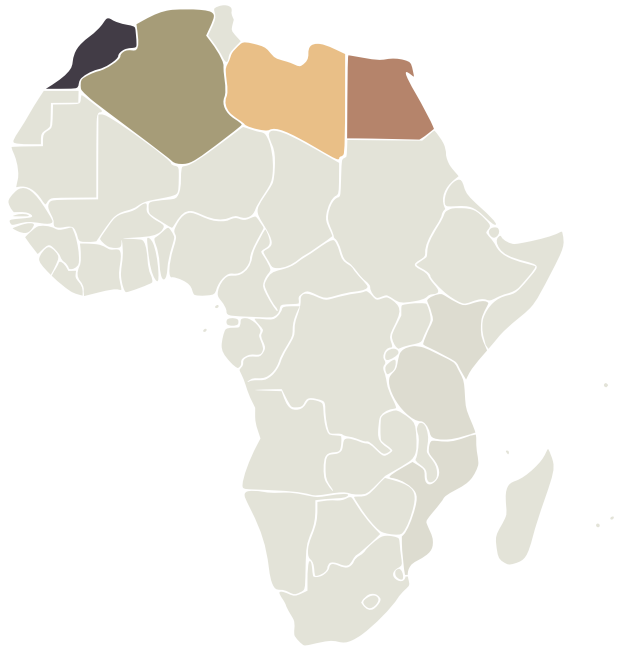
Algeria's coastline, like that of neighboring countries, hosts various coastal ecosystems that are critical for biodiversity and local communities. Conservation initiatives often involve habitat restoration, sustainable resource management, and protection of important marine areas.

4 MOROCCO:

Coastal protection and ecosystem restoration projects in Morocco might focus on dunes, beaches, and other coastal habitats. These initiatives help prevent erosion, support local economies through tourism, and preserve the unique ecosystems along the Moroccan coast.

It's important to note that while there may not be specific mangrove restoration projects in North Africa due to the absence of mangrove habitats, coastal ecosystem restoration and conservation are still important aspects of environmental stewardship in the region. These efforts help maintain biodiversity, provide habitat for wildlife, and support the well-being of coastal communities.

In areas where mangroves are not naturally occurring, the focus shifts to protecting and rehabilitating other coastal ecosystems that offer similar ecological functions and benefits. Each North African country's approach to coastal conservation may vary based on its unique coastal geography, environmental challenges, and local priorities.



5. Lessons from other climate-change hotspots

Similarly, other countries facing water-based climate change have implemented successful interventions to address them. By examining experiences and successful practices from different regions, valuable insights can be gained to inform climate change policies, strategies, and actions.

→ ECOSYSTEM-BASED APPROACHES:

Adopting ecosystem-based approaches has proven effective in climate change mitigation and adaptation. Ecosystem-based approaches focus on the conservation, restoration, and sustainable management of ecosystems to enhance resilience and reduce vulnerabilities to climate change impacts. Lessons from hotspots like the Sundarbans in Bangladesh and the Great Barrier Reef in Australia demonstrate the importance of preserving and restoring coastal ecosystems, such as mangroves, coral reefs, and wetlands, as they provide multiple benefits, including carbon sequestration, coastal protection, and habitat preservation. [11] [12]

→ INDIGENOUS AND LOCAL KNOWLEDGE SYSTEMS:

Incorporating indigenous and local knowledge systems into climate change strategies can contribute to more effective and contextually appropriate solutions. Indigenous communities possess valuable traditional knowledge and practices that have been developed over generations, offering insights into climate patterns, adaptation measures, and sustainable resource management. Drawing lessons from hotspots like the Arctic and the Amazon rainforest, integrating indigenous knowledge with scientific research can lead to innovative and holistic approaches to address climate change.

→ MULTI-STAKEHOLDER COLLABORATION:

Climate change responses require strong collaboration and partnerships among various stakeholders, including governments, NGOs, local communities, and the private sector. Lessons from hotspots such as the Mesoamerican Reef in Mexico and Central America highlight the importance of multi-stakeholder engagement in the design, implementation, and monitoring of climate change initiatives. Collaborative approaches facilitate knowledge sharing, resource mobilization, and collective decision-making, leading to more inclusive and impactful outcomes[13].

→ POLICY INTEGRATION AND MAINSTREAMING:

Integrating climate change considerations into national policies, plans, and sectors is crucial for effective climate change action. Lessons from hotspots like the Netherlands and the Maldives demonstrate the significance of mainstreaming climate change into various sectors, including agriculture, energy, transport, and urban planning. Mainstreaming climate change ensures that adaptation and mitigation measures are systematically incorporated into decision-making processes, enhancing their long-term sustainability and resilience (OECD, 2020; UNDP, 2020). [14]

By leveraging these lessons from other climate change hotspots, Madagascar and other African countries can enhance their climate change responses and increase their chances of success in mitigating and adapting to the impacts of climate change.

5. SCALING UP MANGROVE RESTORATION GLOBALLY

1. Global Challenges to Scaling-up Mangrove Restoration

While mangrove restoration efforts have demonstrated significant success in regions like Madagascar, scaling these efforts globally presents several unique challenges:

→ RESOURCE CONSTRAINTS:
Many regions lack the financial resources necessary to implement large-scale mangrove restoration projects. Securing sustained funding for long-term projects is a major hurdle, especially in countries with limited budgets for environmental conservation.

→ POLITICAL AND INSTITUTIONAL BARRIERS:
Weak governance, lack of coherent policies, and insufficient enforcement mechanisms can undermine restoration efforts. Political instability complicates the ability to maintain momentum and scale up successful projects.

→ SOCIO-ECONOMIC INEQUALITIES:
Disparities in wealth and access to resources can limit the involvement of local communities in restoration initiatives. Ensuring equitable participation across different socio-economic groups remains a challenge, especially when the benefits of restoration efforts are not immediately visible to all stakeholders.

→ TECHNOLOGICAL GAPS:
In many regions, there is insufficient access to modern technologies for monitoring and maintaining restored ecosystems. A lack of data and effective evaluation systems impedes the ability to track progress, measure success, and make necessary adjustments to restoration strategies.

→ COMPETING LAND USES:
Rapid urbanization, agriculture expansion, and infrastructure development often compete with mangrove restoration efforts for land use, particularly in coastal areas. Addressing these competing interests and balancing economic growth with environmental sustainability is a persistent challenge.

2. Key Success Factors for Global Scaling

To successfully scale mangrove restoration on a global scale, the following key factors can be prioritized:

→ COMMUNITY ENGAGEMENT AND EMPOWERMENT:

As demonstrated in Madagascar, engaging local communities is crucial for the success of mangrove restoration projects. Globally, initiatives can ensure that local populations have ownership over the projects. Training programs, capacity building, and incentives for sustainable resource management will help build community support and ensure long-term sustainability.

→ FINANCIAL INNOVATION:

New and innovative financial mechanisms are essential to drive large-scale mangrove restoration. Blended finance models—combining public funds, private investment, and international grants—can provide the necessary resources to launch and sustain projects. Additionally, integrating mangrove restoration into global carbon markets can generate revenue from carbon credits, incentivizing conservation.

→ TECHNOLOGY AND DATA UTILIZATION:

Leveraging cutting-edge technologies like satellite monitoring, AI, and Big Data will be key to scaling up mangrove restoration. These tools can provide valuable insights into ecosystem health, help track progress, and optimize resource allocation. Governments and NGOs can invest in technology transfer programs that bring these tools to the regions where they are most needed.

→ POLICY INTEGRATION AND CROSS-BORDER COLLABORATION:

National governments can integrate mangrove restoration into broader environmental and climate policies. Cross-border collaboration is also critical, particularly in regions where ecosystems span multiple countries. Joint policies and regional cooperation can ensure that mangrove ecosystems are restored and protected on a large scale.

→ PUBLIC-PRIVATE PARTNERSHIPS:

Establishing strong partnerships between governments, NGOs, and the private sector is crucial for scaling mangrove restoration globally. The private sector, particularly industries that rely on coastal ecosystems (e.g., tourism, fisheries), can be encouraged to invest in restoration efforts. Governments can incentivize this through tax breaks, subsidies, or corporate social responsibility (CSR) initiatives.

3. Examples of Global Scaling Initiatives

Several global examples offer valuable insights into how mangrove restoration efforts can be scaled up across different regions:

SOUTHEAST ASIA:

Countries like Indonesia and the Philippines have launched large-scale mangrove restoration projects to combat coastal erosion, enhance biodiversity, and mitigate climate change. These projects have involved international organizations like the World Bank and UNEP, alongside local communities, demonstrating the value of multi-stakeholder collaboration.

LATIN AMERICA:

Countries like Mexico and Belize are pioneering ecosystem-based approaches to coastal management, which include large-scale mangrove restoration. These initiatives are integrated into national climate adaptation plans, providing a framework that other countries can emulate.

OCEANIA:

The Pacific Islands have also embraced mangrove restoration as part of their climate resilience strategies, focusing on protecting their shorelines from rising sea levels. Regional cooperation has been key to these efforts, with countries sharing best practices and resources to protect their coastal environments.

4. Incentivizing Global Markets and Ecosystem Services

A critical component of scaling mangrove restoration globally is creating economic incentives through the valuation of ecosystem services. Mangroves provide significant benefits, such as carbon sequestration, coastal protection, and biodiversity support. Incorporating these services into global markets—such as carbon credits for carbon sequestration—can unlock new funding streams and create financial incentives for conservation.

Additionally, the development of sustainable tourism models around mangrove ecosystems can generate local economic benefits. Ecotourism, which highlights the importance of mangroves in coastal protection and biodiversity conservation, can draw global interest and investment. Governments and international organizations can work to create frameworks that monetize these ecosystem services in ways that benefit local communities and encourage broader restoration efforts.

5. Strengthening International Governance

The success of global mangrove restoration efforts will depend on robust international governance structures. Global frameworks can prioritize mangrove restoration as a critical component of climate resilience strategies. International organizations like the United Nations, World Bank, and International Union for Conservation of Nature (IUCN) can work together to provide the financial, technical, and policy support necessary to scale up mangrove restoration projects around the world.

6. How organizations can catalyze interventions

Key actors need to coordinate efforts to prioritize mangrove restoration, foster innovation, and enable implementation and investments in climate change solutions

	1. PRIORITIZE RESILIENCE THROUGH WATER AND NATURE	**2.** FOSTER INNOVATION ACROSS VALUE CHAIN	**3.** ENABLE IMPLEMENTATION OF MANGROVE RESTORATION	**4.** SCALE INVESTMENTS IN MANGROVE RESTORATION
PUBLIC SECTOR AGENCIES	Value and price water correctly through classification systems like the EU taxonomy	Create an enabling policy environment for collective action, such as public-private partnerships and NbS implementation consortiums	Transition to adaptive policies that enable NbS across infrastructure engineering, procurement and construction	Stimulate private investment through blended finance solutions
PRIVATE SECTOR	Develop water resilient business strategies	Harness the power of technology, including AI and Big Data, to identify new water growth opportunities	Measure, disclose and report on water impacts e.g., using TNFD[1] & SBTN[2]	Invest in NbS for water security to build supply chain resilience
FINANCIAL INSTITUTIONS	Understand investment portfolios from a water risk and opportunities perspective	Prioritize financial innovation to promote market-based mechanisms for NbS	Identify blended finance opportunities to de-risk investment	Build capabilities to identify and scale impactful water investments
NGOS	Integrate multiple values of water and prioritize NbS for water security such as ecosystems, WASH[3], disaster risk reduction	Generate guidance that improve impact metrics on NbS for water security and demonstrate the multiple values of water	Improve capabilities to identify clear revenue streams for NbS and offer technical support local implementing partners	De-risk NbS projects by convening stakeholders early in the project process and offer early-stage investment for NbS implementation

[1] Water, sanitation & hygiene
[2] Taskforce on Nature-related Financial Disclosures
[3] Science Based Targets for Nature

6. CONCLUSION

The restoration of mangrove ecosystems in Madagascar provides a model for sustainable environmental stewardship and climate resilience that can inspire global action. By empowering local communities through the MIHARI network, Madagascar has shown that community-led management can not only protect fragile ecosystems but also secure livelihoods and promote social equity. To scale up this approach, both in Madagascar and around the world, stakeholders can address resource constraints, invest in capacity building, and leverage both traditional knowledge and modern technologies.

Through innovative funding mechanisms, international cooperation, and strong governance frameworks, the lessons learned from Madagascar's success can be adapted and implemented globally. Mangrove restoration holds immense potential to combat climate change, protect biodiversity, and enhance the well-being of millions of coastal inhabitants. Now is the time to scale these efforts to ensure a resilient and sustainable future for coastal communities worldwide.

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BCG works with clients to accelerate their climate and sustainability journey. We help them identify and harness climate innovation, embed sustainability at scale into their business, and capture the value they create. Our work is as far-reaching as the challenge.

Schneider Electric collaborates with organizations to accelerate their climate and sustainability journey. Leveraging our expertise in all-electric and all-digital solutions, we help partners embrace climate innovation, integrate energy efficiency and sustainability at scale into their operations, and unlock the value it creates. Our efforts match the scale and ambition of the challenges we face.

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