



GREEN
CLIMATE
FUND

Project/Programme Title: Transition to a Resilient Blue Economy in the Western Indian Ocean Region

Country(ies): Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania, South Africa

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Concept Note

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version number: [YYYY-MM-DD] [V.0]

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The Accredited Entity is encouraged to submit a concept note, in consultation with the National Designated Authority, to present a project or programme idea and receive early feedback and recommendation.

Notes

- The maximum number of pages should **not exceed 12 pages**, excluding annexes. Proposals exceeding the prescribed length will not be assessed within the indicative service standard time of 30 days.
- As per the Information Disclosure Policy, the concept note, and additional documents provided to the Secretariat can be disclosed unless marked by the Accredited Entity(ies) (or NDAs) as confidential.
- The relevant National Designated Authority(ies) will be informed by the Secretariat of the concept note upon receipt.
- NDA can also submit the concept note directly with or without an identified accredited entity at this stage. In this case, they can leave blank the section related to the accredited entity. The Secretariat will inform the accredited entity(ies) nominated by the NDA, if any.
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A. Project / Programme Information (max. 1 page)			
A.1. Project or programme	☒ Project ☐ Programme	A.2. Public or private sector	☒ Public sector ☐ Private sector
A.3. Is the CN submitted in response to an RFP?	Yes ☐ No ☒ If yes, specify the RFP: _____	A.4. Confidentialityⁱ	☐ Confidential ☒ Not confidential
A.5. Indicate the result areas for the project/programme	<u>Mitigation:</u> Reduced emissions from: ☐ Energy access and power generation ☐ Low emission transport ☐ Buildings, cities and industries and appliances ☐ Forestry and land use <u>Adaptation:</u> Increased resilience of: ☐ Most vulnerable people and communities ☒ Health and well-being, and food and water security ☒ Infrastructure and built environment ☒ Ecosystem and ecosystem services		
A.6. Estimated mitigation impact (tCO₂eq over lifespan)	N-A	A.7. Estimated adaptation impact (number of direct beneficiaries and % of population)	estimated 614,485 direct individual beneficiaries, as well as 180 enterprises (MSMEs) and up to 60 million indirect beneficiaries, of which at least 40% will be women and 40% will be youth
A.8. Indicative total project cost (GCF + co-finance)	Amount: USD _____	A.9. Indicative GCF funding requested	Amount: USD _45,000,000
A.10. Mark the type of financial instrument requested for the GCF funding	☒ Grant ☐ Reimbursable grant ☐ Guarantees ☐ Equity ☐ Subordinated loan ☐ Senior Loan ☐ Other: specify _____		
A.11. Estimated duration of project/ programme:	7 years	A.12. Estimated project/ Programme lifespan	7 years
A.13. Is funding from the Project Preparation Facility requested?ⁱⁱ	Yes ☒ No ☐ Other support received ☐ If so, by who: UNEP	A.14. ESS categoryⁱⁱⁱ	☐ A or I-1 ☒ B or I-2 ☐ C or I-3
A.15. Is the CN aligned with your accreditation standard?	Yes ☒ No ☐	A.16. Has the CN been shared with the NDA?	Yes ☒ No ☐
A.17. AMA signed (if submitted by AE)	Yes ☒ No ☐ If no, specify the status of AMA negotiations and expected date of signing: _____	A.18. Is the CN included in the Entity Work Programme?	Yes ☒ No ☐
A.19. Project/Programme rationale, objectives and approach of programme/project (max 100 words)	The project provides a unified and coordinated response to the current and anticipated effects of climate change on the Western Indian ecosystem and economy. This includes impacts such as sea surface temperature increases, modifications to the rainfall patterns, and increased temperatures, which are highly likely to lead to profound transformations of the ecosystem through coral bleaching, ocean acidification, increases in storms and floods, coastal erosion, impacts on marine and coastal wildlife, plant species and		

biodiversity. These impacts, taken alone of together, will lead to drastic increases in vulnerability of the nearly 60 million people who depend on the coastal economy, leading to accelerated pauperization. The project takes a science-based approach to ecosystem-based adaptation, combining interventions on the natural ecosystem with capacity building to transform economic life towards more resilient development pathways.

B. Project / Programme details (max. 8 pages)

B.1. Context and Baseline (max. 2 pages)

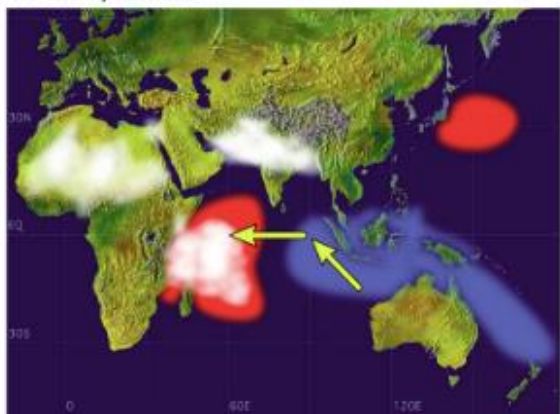
The Western Indian Ocean (WIO) region, also referred to as the Nairobi Convention area, is composed of Comoros, France (Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania and South Africa, who are also parties to the Nairobi Convention. Over 60 million people in the WIO islands and Eastern Africa coastal communities rely on the coastal and marine environment for goods and services. Coastal and island communities are largely dependent on fishing, shipping and tourism for their livelihoods. Yet the natural resources that provide sustainable livelihoods and fuel economic activity are already under pressure from threats such as poverty, overfishing, overdevelopment, pollution, and environmental degradation. The impacts of climate change are exacerbating these problems and are already presenting mounting challenges to the sustainable development of the region^{iv} as evidenced by widespread coral reef bleaching (with limited recovery), prolonged droughts, sea level rise and flooding/sedimentation which have significant potential to retard economic growth and slow realization of respective national development targets including SDGs.

Hitherto regular weather patterns have become more unpredictable in recent years, with erratic rainfall patterns and inconsistent monsoon periods.^v In particular, this has caused greater disruption to communities whose livelihood activities are closely intertwined with weather patterns, such as agriculture and fishing.

The El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) are two similar phenomena with great influence over the WIO marine environment.^{vi} The region is facing extreme rainfall anomalies that are associated with ENSO.^{vii} Regional coastal areas are confronted with irregular oscillations of Sea Surface Temperatures (SST) between ‘positive’, ‘neutral’ and ‘negative’ phases^{viii}. As illustrated in the image below^{ix}, the positive IOD event registers a trend of irregular cooling of SST in the south-eastern equatorial Indian Ocean and atypical warming of SST in the western equatorial Indian Ocean. These events impair the normal convection bringing the eastern Indian Ocean’s warm pool to the west and carrying heavy rainfall over East Africa^x.

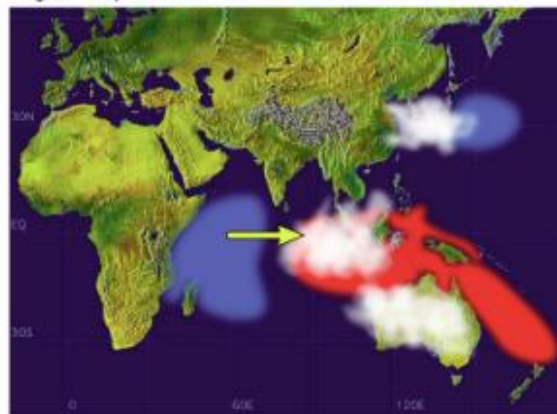
Schematic of a positive IOD event.

Positive Dipole Mode



Schematic of a negative IOD event.

Negative Dipole Mode



A clear warming trend in the Agulhas Current region over the last two decades has been observed. This warming has coincided approximately with an intensification of the subtropical gyre since the mid-1980s and the warming of the upper thermocline in the region.^{xi} The IPCC (2013) reported that ‘*The Indian Ocean Basin Mode (IOBM) has a strong warming trend (significant at 1% since the middle of the 20th century)*’.

The Intergovernmental Panel on Climate Change (IPCC) also predicts that by 2100 sea levels will have risen by between 0.26 and 2.3 metres, and there is a consensus that a climate shift will impact the frequency, intensity and temporal and spatial variability of rainfall, cyclones and tropical storms resulting in floods and the destruction of

property, high rates of coastal erosion, saline water intrusion, reduced economic opportunities and habitat loss under a business as usual (BAU) scenario.

Another impact of climate change, the acidification of oceans, is likely to have a dramatic effect on shelled organisms. Some calcifying species, such as sea urchins, shallow-water corals, oysters, clams and calcareous plankton, are at risk and, consequently, the entire food web may also be at risk, which will gravely impact food security and employment opportunities. These effects of climate change, such as elevated water temperatures, have already had a severe impact on coral fauna, as seen through occasional coral bleaching events^{xii}, such as the global events triggered by El Niño which, in 1998 killed approximately 16% of the world's coral, and occurred again in 2010, and in October 2015.^{xiii} Furthermore, the IPCC also predicts that the concentration of CO₂ will exceed 800 ppm, resulting in a 12 percent increase in surface water dissolved inorganic carbon (DIC) and a 60 percent decrease in carbonate ion concentration. Such a change in water chemistry would cause a decrease in water pH^{xiv}. Depending on the extent of CO₂ emissions and other factors, the IPCC predicted in 2007 that ocean acidity could increase by 150 percent by 2100. Evidence from experiments and observations indicate that future ocean acidification will affect many marine organisms, with implications for ecosystems and ecosystem services. Table 1 below highlights the main changes expected in the region.

Table 1. State and trends of climate change in the WIO region

	1950 – 2010	2090
Temperature	Temperature rise: +0.6 °C (Mozambique) to 1.1 °C (Mauritius)	Temperature rise: +2.8 °C (Mauritius) to + 3.9 °C (Tanzania)
Precipitation	Annual precipitations drop, except for Seychelles	Annual precipitations rise for Comoros, Kenya, Seychelles and Tanzania Annual precipitations drop for Madagascar, Mauritius and Mozambique - Longer dry season and intensification of precipitations
Sea level rise	Sea level rise: 0.4 mm/year to 1.68 mm/year	Sea level rise up to 56 cm (more than 2 m for some localities in Mozambique)
Cyclones	Increase in frequency of intense cyclones	No notable change predicted, some new areas prone to cyclone in Madagascar

Impacts and vulnerability

The impacts of these climate change dynamics have already begun to jeopardize the livelihoods of people living in coastal areas and the resilience of the natural environment throughout the region, as they will:

- Decrease the natural biological productivity of crops, forests, mangroves and marine life throughout the food chain, reducing the ecosystem services they provide;
- Cause severe and more frequent coral bleaching events, which will impact the natural productivity and ecosystem services provided by reefs;
- Intensify water-related risks from changes in rainfall patterns, including droughts, flooding and saltwater intrusion in coastal aquifers,
- Increase the likelihood of permanent inundation of low-lying coastal areas from sea-level rise and coastal erosion,^{xv}
- Increase economic uncertainty as future climate variability tends to be difficult to predict and national authorities do not have the capacities to adapt or to manage disaster risk.
- Exacerbate extreme climate events, leading to higher losses in food and property during extreme events,
- Increase the exposure of assets and infrastructure to climate extremes and hazards.

Since 2000, droughts, earthquakes, extreme temperatures, floods, landslides, storms have affected more than 85 million inhabitants in Eastern and South Africa.^{xvi} UNISDR estimate the total economic loss in infrastructure and agriculture to USD 17.2 billion for the period between 1980 -2011. According to the WWF, “The annual “gross marine product” of the Western Indian Ocean region – equivalent to a country’s annual gross domestic product (GDP) – is at least US\$20.8 billion. The total “ocean asset base” of the Western Indian Ocean region is at least US\$333.8 billion”^{xvii}. Damages to ecosystem services provided by healthy coasts have cascading impacts across all sectors, leading to an exponential increase in vulnerability.

There is an urgent need to reorient the development pathways in the region towards more resilient, adapted approaches. This requires acknowledging the root causes of vulnerability such as environmental degradation from unsustainable coastal resource use. The ideal solution would be to transition the WIO economies towards a harmonized Blue Economy Framework^{xviii} that will reduce pressures on fragile coastal and marine resources, combined with the implementation of urgent ecosystem-based adaptation measures designed to remedy the existing vulnerabilities and pre-

empt future climate change impacts.

In order to achieve this, however, a number of barriers need to be addressed, including, for example: *Scientific* barriers (to reduce the level of uncertainty and to fill key knowledge gaps regarding climate change impacts); *Policy* barriers (to create a science-based enabling national policy framework, including stronger land and coastal use planning frameworks); *Financial* barriers (to dramatically increase the level of resources available for adaptive livelihoods, while creating lasting financial structures and mechanisms for self-sustained change). Please refer to annex 1 (supporting document), Problem Tree and Theory of Change, for further explanations.

This project is a direct result of high-level guidance provided by the member countries through the development and adoption of the Nairobi Convention's Climate Change Strategy, which expresses a common vision for adaptation in the WIO region. In addition, the project is consistent with the measures and priorities for coastal adaptation listed in the participating countries national adaptation programmes of action (NAPA), national adaptation plan (NAP) and intended nationally determined contributions (INDC). Among the participating countries, 7 are LDCs, and five (5) are Highly Indebted Poor Countries (HIPC). The project also builds on lessons learned from pilot projects undertaken in the past, whose successes now need to be implemented at scale to enable region-wide adaptation. In terms of climate change vulnerability, WIO countries are generally classified as highly vulnerable thus making the proposed project critical and of high priority to regional governments.

Baseline

To date, resources invested in the targeted countries continue to focus on the baseline development priorities of economic growth and social development, often at the cost of protecting the natural resource base. Large scale fisheries and tourism concessions, along with intensified agriculture and other extractive industries, continue to be practiced in most of the countries concerned without due regard to the fragility of environmental resources, and to the vulnerability of those who depend on them. There is, in some parts, a growing emphasis on the sustainable use of ocean and coastal resources in what has become known as the "blue" or sustainable ocean economy. For example, the Government of Seychelles has adopted the Blue Economy Concept^{xix}, Mauritius is investing in the Ocean Economy^{xx} and the Republic of South Africa has developed Operation Phakisa^{xxi} to unlock the economic potential of the ocean in a sustainable manner. However, progress in shifting economies is slow to get off the ground, and risks being outmatched by the pace and scale of climate change impacts.

B.2. Project / Programme description (max. 3 pages)

The objective of the project is to increase the adaptive capacity of governments and communities in the WIO to address the impacts of climate change through a blue economy framework approach. It is designed to be achieved through three outcomes, addressing the barriers identified above.

Output 1: An improved science base informs policy-making in all sectors towards the deployment of a Blue Economy Development Approach.

A number of targeted research initiatives are underway in various countries and globally, thus provide a growing body of evidence of climate change impacts on the region. The Sustainable Oceans, Livelihoods and food Security Through Increased Capacity of Ecosystem research in the Western Indian Ocean (SOLSTICE-WIO) project aims to^{xxii} use science to address climate change impacts and to ensure ecosystem sustainability, as key science gaps remain, such as the regional effects of SST warming on biodiversity.^{xxiii} In addition, most of the information remains nationally based, yet no single country is capable of responding to the full scope of research needs. Thirdly, the information needs to be presented in a way that is conducive to lasting policy change, either at the macroeconomic policy level, at the sectoral level, or at the territorial planning level. Furthermore, key agents of change, namely the private sector, have traditionally been excluded from research. Activities under this outcome will therefore seek to address these shortcomings by promoting collaborative research and supporting effective science-policy linkages at all levels. It will be achieved through two outputs:

Activity 1.1 Increased information base to document, analyze and project climate change impacts on key sectors in the WIO countries.

To achieve this output, the project will support collaborative research programmes, in close collaboration with global research and climate observation partners (including WMO, IPCC, NOAA, others) in which communities, academic institutions, governments, private sector, will work together to determine priorities and to analyze results. An example of such a collaborative research program can be found in the Collaborative Adaptation Research Initiative in Africa and

Asia (CARIAA), which was delivered by 4 consortia and which focused on four adaptation “hotspots”. A similar model could be adopted for the WIO as a prospective adaptation hotspot. The delivery of this collaborative research will require technical capacity building (training), material capacity (observation networks and analytical tools), and the development of institutional protocols for collaboration, including addressing intellectual property rights, right to information and information sharing issues.

The expected result of this research will be added evidence and reduced uncertainty regarding specific climate change impacts on sectors such as commercial and artisanal fisheries, safety at sea, agriculture, tourism, and water. Each research programme will deliver targeted recommendations applicable to all countries in the region. Where warranted, country level or ecosystem-level case studies may also be developed. Activities include:

- Harmonized country-level coastal vulnerability assessments and implementation of critical recommendations for resilience;
- Analysis of trends, impacts and options for response to acidification;
- Improvement of coastal climate observation networks, including ocean observation, coastal erosion monitoring, SST measurement, and ongoing data collection for key climate parameters
- Strengthening of existing scientific entities to produce data of higher quality, and to harmonize data standards to enable sharing, including through training;

Activity 1.2 Strengthened policy capacity to understand and use science to develop evidence-based policies

The second activity aims to create bridges between climate science and policy development. Whereas under Output 1, governments and decision makers in all sectors would be called upon to co-design research programmes, under this output the project will strengthen their capacity to understand, analyze and act upon the results of the research. This will require building human and institutional capacities for adaptive policy development. A first step would be to strengthen multi-stakeholder platforms towards the redesign of policies in all sectors. Frameworks such as the Blue Economy Framework and Integrated Coastal Zone Management can provide useful avenues, since they have already been piloted in most countries. As a result of the project, countries should be able to make effective policy decisions on the basis of presented evidence, and to initiate lasting changes in their planning and development processes.

Activities under this output could include:

- Development of policy-relevant research findings;
- Creation or strengthening of multi-stakeholder platforms in key sectors, including fisheries, agriculture, transport, tourism, health;
- Reassessment of macroeconomic policies (e.g. EEZ) and explicit or implicit policy incentives towards adaptive economies, including the development and adoption of a “BlueTrade” standard for fair, climate-smart products originating from the WIO;
- Harmonization of land-use plans, ICZM plans, NAPs and NAPAs;
- Promoting and implementing integrated planning and development in selected locations in WIO guided by priority government policies using relevant climate science;
- Climate leadership training for senior policy makers.

Output 2: Resilient livelihoods and economic activities are pursued, in partnership with the private sector

There is an urgent need to accelerate the uptake of more resilient livelihoods activities, at scale, in all the countries of the region. These more resilient livelihoods should be based on the transfer of best available technologies and approaches, in a partnership between public and private entities. While targeted adaptation action has taken place in most countries concerned by this project, these adaptation measures have not yet fully penetrated the markets and cultures of the countries, meaning that most economic activity in the area continues to depend on outdated views, approaches and technologies. In particular, coastal land use continues to be uncontrolled and pressures from uninformed private investors often trump any precautionary policy making (e.g. in the fisheries and tourism sectors, for example). As a result, communities often find themselves relegated to marginal land or less productive zones, and prevailing poverty – combined with low enforcement capacity on behalf of government entities – leads to unsustainable natural resource use, such as mangrove degradation, coral mining, water over-extraction, deforestation, and overfishing. All of these unsustainable practices, in turn, exacerbate climate vulnerability. The project will therefore seek to create mechanisms whereby, in each sector, suitable adapted and resilient natural resource use practices can be identified, and disseminated at scale. The outcome is achieved through two outputs:

Output 2.1 A WIO Adaptation Technology Transfer Facility is established to catalyze investment and capacity towards resilience

There exists a growing body of knowledge on the most suitable technologies for adaptation. However, this knowledge is dispersed, and not always being put into practice. Given that most of the countries in the WIO region face similar issues, the project will first analyze best practices and technologies for adaptation in the region in the key economic sectors, in conjunction with the collaborative research undertaken in output 1.1. The purpose of this output is to assist countries in identifying major leapfrogging technologies and innovative approaches that can assist in implementing adaptation at scale, in a cost-effective manner, such as for example ICT for early warning and improved planning, remote sensing, precision farming, emerging technologies for land reclamation, precision fishing, etc.

An adaptation technology transfer facility will be designed, on the basis of the Climate Change Technology Network and Centre (CTCN) and building on existing initiatives, through which countries and sub-national entities will be able to access expertise, material and technical support for the implementation of adaptation technologies. The Facility would be open to all WIO entities, including governments, private sector, non-profit organizations, community-based organizations, and sub-national governments. Calls for proposals would be launched at regular intervals, and assistance requesters would need to demonstrate counterpart contributions in funds or in kind. A mechanism to make the Facility financially sustainable would be designed during project preparation and implemented under Output 2.3. Activities under this output would include:

- Undertake a census of WIO specific adaptation technology needs on the basis of existing available science and national plans such as Technology Needs Assessments, including limits and barriers to their adoption at scale;
- Create and administer a WIO adaptation technology transfer Facility designed to assist public and private stakeholders in accessing expertise, material and technical support (building on existing mechanisms);
- Implement strategies to ensure financial and operational self-sustainability of the Facility.

Activity 2.2 Barriers to the adoption of resilient and sustainable livelihoods are lifted

Using the support and technologies mobilized through Output 2.1, the project would support concrete priority adaptation interventions in participating countries, focusing on the removal of barriers to upscale. This would include addressing local adaptive capacity barriers in all sectors, for example through training, awareness raising and community mobilization, as well as through the deployment of targeted investments into productive assets. The initial sectors of focus will be fisheries, including the development of new marine-based value chains (e.g. algaculture, mariculture, aquaculture), eco-tourism and the development of sustainable tourism practices, and climate-smart coastal agriculture. In all sectors, the project will also support the use of new technologies and renewable energy sources throughout the value chains (including marine biotechnology, solar, gravity and/or wave-based energy sources). It is expected that these activities will carry significant social and economic benefits, particularly for women and youth including, improved food security, job creation, increased income, and ultimately reduced vulnerability to climate and economic shocks. This output will focus on identifying micro-, small- and medium-sized enterprises (MSMEs) that can benefit from these resilient ventures, in recognition that these types of enterprises drive markets and employ over 70% of populations in LDCs (often in the informal economy). Activities under this output include:

- Organization of national and regional value chains, producer groups and market linkages;
- Provision of technical advice, training, seed investment financing, and access to inputs for adaptation activities
- Promote certification and market linkages using fair trade/green trade or new certification schemes (see Output 1.1);
- Piloting renewable energy technologies e.g. from solar for domestic and small business consumption to reduce dependency on biomass.

Activity 2.3 Public Private Partnerships (PPP) leverage lasting and sustainable financing towards resilient coastal economies

The private sector and in particular large-scale national or multinational firms have important stakes in the economies of the region, but often fail to take environmental or climate change considerations in their investments. This includes companies in the fisheries, mining, transport and agriculture and tourism sectors, and encompasses small and medium enterprises, as well as larger private sector entities. Failure to reorient investments can lead to high levels of losses and risks being borne by private actors; conversely, there is a need to encourage compliance by the private sector with environmental laws and climate standards, and to step up corporate social responsibility initiatives in the region, while

facilitating access to markets for green finance (e.g. green/blue bonds), sustainable products and services. This requires that private sector become a partner in planning and implementation of climate-smart economies (see Output 1). Under this output, the project will support governments' capacities to engage in discussions, negotiations, and eventually to formalize partnerships with the private sector to ensure a sustainable flow of funds towards public goods. This would include assessing and tapping into the willingness to pay by private sector actors at all levels for public goods such as water, climate information, improved planning services, or access to natural resources. It would also include the ability of governments to develop innovative financial products to reorient economies towards resilience, such as for example the issuance of Blue bonds by the government of Seychelles to fund the development of sustainable fisheries. The end result of this output would be the design of innovative PPPs and financing mechanisms towards adaptive economies at national and regional levels. Activities under this output may include:

- Establish a WIO Business Council for the Blue Economy which will serve as a regional platform for identification and negotiation of PPP opportunities;
- Undertake an assessment of the willingness to pay for key ecological and information services (including valuation and Targeted Scenario Analysis^{xxiv});
- Enter into collaborative PPPs;
- Design and implement innovative public, private and PPP financing mechanisms for adaptation including exploring opportunities for Blue/Green Bonds in selected WIO countries.

Outcome 3: Ecosystems are restored, protected and sustainably managed for increased resilience to the spectrum of anticipated climate change

This third outcome is designed to restore the already damaged WIO ecosystem to full functionality and to higher levels of resilience, in order to pre-empt climate impacts and to create protective and productive ecological services. This outcome focuses on the rehabilitation, protection, sustainable use and improved management of ecosystems in the region. It will build on the outcomes of the research and improved policy making undertaken under Outcome 1, as well as from the application of emerging technologies for environmental restoration identified under Outcome 2. Reducing unsustainable natural resources uses through local level adaptation will help ensure the sustainability and long-term viability of this outcome. The outcome is delivered through two outputs.

Output 3.1 Protected areas identified, established and sustainably managed.

Under this output, the project would support MPAs whether by improving the scope of protection and management of existing MPAs or by designating and initialing the establishment of new marine protected areas, according to best practices and building on the findings of the research conducted under Outcome 1. In 2012, there were approximately 69 Marine Protected Areas and 66 Locally Managed Marine Areas (LMMAs) which represent 10.9%^{xxv} of the total WIO area (594,331km²)^{xxvi, xxvii}. According to the World Research Institute (WRI), to protect regional ecosystems, i.e. reefs, coasts, marine biodiversity, the presence of MPAs is not sufficient as many do not have the adequate resources to ensure efficient and sustainable management. They are thus unable to deliver expected level of protection and preservation. Beyond enhancing sustainability of MPAs as a critical tool for resource management, this output will also help WIO governments achieve their SDG 14.2 and 14.5 targets.

The region has a unique geology that contributes to unique biodiversity and high endemism. There are more than 2,200 species of fish, 300 species of hard coral, 10 species of mangrove, 12 species of seagrass and 1,000 species of seaweed, as well as hundreds of species of sponges, molluscs and crabs, which are found in the coastal and marine environment of the WIO.^{xxviii} Of these, 161 species continue to be threatened^{xxix}, and fragile coastal ecosystems that serve vital functions for fish reproduction and coastal protection, such as mangroves and reefs, continue to be disturbed by human activity (e.g. pollution), which jeopardizes their resilience to climate impacts.

The countries of the WIO have recognized the need to step up efforts towards conservation, as a key strategy for ensuring the long-term viability of their economies. The African Union has established Africa's Integrated Maritime Strategy (AIMS) to provide guidance to member countries in the necessity to orient their national policies towards maritime resources security and fair, responsible and sustainable exploitation.^{xxx}

The project will support collaborative work in and among countries towards designation of a set of coherent, connected, and climate-smart marine protected areas and potentially a regional MPA. Under this output, the project would support the designation and establishment of new marine protected areas, according to best practices and building on the findings of the research conducted under Outcome 1 as well as the strengthening of the management of existing MPAs

in areas that are experiencing crucial climate sensitivity (adaptation hotspots). The purpose of these MPAs would be to protect endangered species and ecosystems of key productive, cultural and economic value, as well as to create buffers against climate shocks and to ensure the maintenance of ecosystem services in the face of emerging climate trends. To support ecosystem connectivity and protection, the project will adopt guidelines to facilitate the establishment and development of MPA and increase the synergy and cooperation among the Contracting Parties of the Nairobi Convention.

Furthermore, the project will implement innovative mechanisms for financial sustainability of MPAs and LMMAs, such as private-sector co-ownership of MPAs, where private organizations partner with the public sector and impact investment among others. These partnership arrangements can leverage opportunities for the protection of ecosystems and sustainable socio-economic development^{xxxii}, including in sustainable tourism product development. However, these types of partnerships must be carefully managed. For example, there is a stronger need for enforcement towards a harmonized approach to biodiversity and sustainability issues among private and public managers and a need to ensure convergence in the legal structure among targeted countries^{xxxiii}.

During the project preparation, a comprehensive assessment will be conducted including a selection and characterization of adaptation hotspot areas that will be prioritized for conservation by the project, as well as a compilation of conservation priorities. These will also cover financial and governance mechanisms to be improved or developed. Activities under this output will include:

- Census of climate impacts on current LMMAs^{xxxiii} and MPAs and recommendations on management and legal changes, including the prioritization of adaptation hotspots^{xxxiv}.
- Designation, gazetting and setting up of climate smart, regionally/nationally connected marine protected areas.
- Improvement, development and adoption of guidelines to facilitate the establishment and development of an improved network of marine protected areas at national and regional level.
- Creation or improvement of regional MPA network focusing on resilience and connectivity for conservation of species and critical habitats.
- Overlaying ongoing planned and proposed large scale developments with current and future protected areas and working with governments on scenarios to limit environmental impacts from these developments e.g. ports, oil & gas, mining among others.
- Implementation of innovative governance and financial strategies for sustainability of MPAs (including private sector delegated MPA management and impact investment)

Activity 3.2 Degraded coastal zones are rehabilitated and protected through ecosystem-based adaptation

The economic value of coastal protection provided by coral reefs, mangroves, seagrasses and salt marshes in the Western Indian Ocean is estimated at US\$1.2 billion annually. Yet these ecosystems are the most fragile and most endangered by unfettered development and land use. Coastal estuaries, wetlands and lagoons also provide key regulating services, including processing and recycling organic waste. Appropriate design and/or protection and restoration of wetland systems can greatly enhance this function. At present, a very small proportion of the population of coastal towns and cities in the Western Indian Ocean region has access to sewage systems. There is potential to address this, and the use of wetlands in bio-treatment of waste could represent a massive growth sector with economic, environmental and public health benefits^{xxxv}. Successful examples of ecosystem-based adaptation approaches are emerging in the region, which can be usefully applied at larger scale to ensure long-term resilience of coastal ecosystems. New technologies are also emerging that can be deployed for these approaches, through the activities foreseen under Outcome 2.

The project will support country efforts to undertake the restoration of degraded protective, regulating and productive ecosystems, using a program approach. This will include the creation of a coral reef laboratory that will provide viable reef material to countries in the region and conduct experiments in resilience of reefs to bleaching events and climate change scenarios. The project will support targeted reef restoration or reef creation efforts, as well as the restoration of mangroves and seagrass beds, using best practices, which will be captured in regional ecosystem restoration guides to be developed shortly on behalf of governments by the Nairobi Convention. The project will also provide technical assistance and funding for the restoration of estuaries, wetlands and lagoons that can provide bio-treatment capacity to neighbouring towns using proven expertise/technology in constructed wetlands. Activities under this output will include:

- Creation of a WIO Coral Reef Restoration Laboratory.
- Restoration of reefs, mangroves, estuaries, wetlands and lagoons.

Output 4: – Governance and regional collaboration

Under this component, activities related to monitoring and evaluation, knowledge sharing within and among countries regional coordination and management of project activities will take place. In particular, this component will build on existing baseline efforts under the Nairobi Convention to coordinate and develop common approaches among the member countries.

Activity 4.1 Participatory Monitoring and Evaluation

Activities under this output will include the development of a regional and national M&E systems based on participatory approaches. This will include the creation of structures for the project steering and monitoring of project targets, indicators and impacts. Participatory monitoring will involve communities, local authorities, private sector as well as governments. Impact monitoring will include monitoring and reporting on the results and benefits of each activity at national and regional levels, including ensuring the impacts on gender are adequately documented. The project will also implement a regional level review at mid-term, and a terminal evaluation will be undertaken prior to financial closure. Activities include:

- Development and implementation of participatory M&E system at national and regional level;
- Capacity building in M&E for effective project design and implementation;
- Programme evaluation – Mid-term and final;
- Impact monitoring, including gender-based impact monitoring.

Output 4.2 Knowledge Sharing and Regional Bridging

Activities under this output will be designed with the view of creating lasting bridges and learning opportunities among participating countries. In particular, the project will support regional meetings and ensure regional cohesiveness in the implementation of activities. A comprehensive awareness raising/communication strategy, including the use of local media, social media, and traditional communication mechanisms will reinforce the key messages and results dissemination of this project. Activities include:

- Knowledge sharing among countries, scientific community and private sector;
- The development and deployment of an awareness raising/communication strategy;

Output 4.3 Project Coordination and Management

Under this output, project management activities will be supported, including the support of regional and national coordinating units. It is expected that each country would establish a project coordination unit, which would also be supported by a regional unit linked to the Nairobi Convention Secretariat. Coordination units would ensure adequate standards for management and financial planning are maintained for reporting and accountability. The output will also include activities related to the application of highest standards in terms of social and environmental safeguards, including provisions for gender mainstreaming and action planning, involvement of indigenous peoples, the creation and maintenance of redress and conflict resolution mechanisms, and environmental impact assessment. Project-related operational costs will include project staff, travel and translation. Activities include:

- Establishment and operationalization of the regional and national coordination units;
- Development of an upscaling strategy;
- Application of relevant social and environmental safeguards at national and regional levels.

The proposed activities are consistent with the national policies and regional strategies adopted by all member countries (see pre-feasibility study). In addition, UN Environment is uniquely placed to deliver this innovative program to member countries, given that it currently administers the Nairobi Convention Secretariat, has developed significant body of experience in Ecosystem Based Adaptation Approaches, as well as technology transfers for climate change and climate adaptation in particular.

B.3. Expected project results aligned with the GCF investment criteria (max. 3 pages)

Paradigm Shift

This project has the potential to achieve significant paradigm shift first by adopting a regional approach to complement national efforts to transition towards a Blue Economy development framework – itself a considerable change in development paradigm. As discussed during the 2017 meeting of the Nairobi Convention, there are considerable economies of scale to be achieved by pursuing common efforts, and by creating regional institutions that can cater to the needs of member countries. In addition, the project will leverage successful approaches piloted in other countries and regions to leverage impact at scale in terms of policy change as well as concrete physical impacts. This project brings significant innovations, including by ensuring a key role for the private sector as key agents of change, by creating lasting mechanisms for technology transfer, facilitating local research and the development of a stronger interface between science, economy and policy, in the service of resilience and adaptive action.

Sustainable Development

The project intends to deliver significant social and economic development benefits, and will contribute to the achievement of the SDGs regionally and in each participating country. This will include the creation of jobs in science and technology, as well as private sector employment and growth opportunities for the existing and relevant economic sectors, and the fostering of new economic opportunities, particularly for women and youth. Increased incomes and productive assets for coastal communities, as well as the creation of new enterprises in emerging technologies will also be achieved. As more reliable scientific data are produced, efficiently managed MPAs will positively influence sustainable regional development by increasing the value of goods provided by marine ecosystems. Healthier environments and more sustainably produced coastal goods and services will improve health and access to economic opportunities. Losses of lives and property during climate extremes will be reduced thanks to the foreseen improvements in protective ecosystems.

The process is aligned to the targets under SDG goal 14, in particular Targets 14.2 and 14.5 and to the Convention of Biological Diversity (CBD) Aichi Strategic Goal C, Target 11, to increase MPA coverage for coastal and marine protection in the Western Indian Ocean (WIO) region to 10% by 2020. This would include further enhancing the use of ecosystem-based and other large-scale approaches to managing the coastal and marine ecosystems.

Needs of Recipients

The project addresses the vulnerability and adaptation needs of the communities in recipient countries. All countries targeted by this project are experiencing extreme vulnerability to climate change, 4 are small island developing states, and 5 are Least Developed Countries. In all member countries, adaptive capacity among coastal communities is very low, and the degradation of coastal ecosystems severely aggravates the impacts of climate shocks and extremes. An estimated 60 million people could be endangered by climate impacts and compromise any socio-economic gains made by regional countries. The priorities expressed in this project were also the product of consultations through the member states participation in the Nairobi Convention, including through the adoption of the Climate Change Strategy, the Protocol on Land Based Sources and Activities and policy recommendations in the WIO State of the Coast Report among other Nairobi Convention inter-governmental commitments. Additionally, the priorities are also reflected in national policy documents for adaptation.

Country Ownership

The project addresses the needs of the recipients to adapt to climate change as expressed in National Adaptation Programmes of Action, INDCs, NAPs and Technology Needs assessment. The project also addresses needs and priorities for climate change articulated and agreed by all country parties to the Nairobi Convention through the Nairobi Convention Climate Change Strategy. The original intent of the Nairobi Convention's climate change strategy is to reiterate the importance of coastal and marine environments for resilience, and to counter the fact that international climate finance – such as that deployed to support NAPA implementation - has been mostly dedicated to land based adaptation (e.g. agriculture).

Efficiency and Effectiveness

The project relies on a combination of approaches that are designed to lift the barriers to upscale adaptive action. This includes lifting the policy and scientific barriers, as well as creating lasting institutional mechanisms that will enable the

countries to continue to leverage resources for adaptation. Adopting a regional approach to this project allows for cost and experience sharing and the reduction of transaction costs to most project activities, including research and scientific endeavour, technology transfer and the development of value chains that can more effectively reach markets.

Approaches for the restoration of ecosystems also follow best available and most cost-effective technologies, particularly considering the immense gains and benefits that ecosystem services can provide to the economies of the region. While significant investment is required to achieve the first stages, it is expected that project activities will become self-sustainable by the end of the funding period.

C. Indicative financing / Cost information (max. 3 pages)

C.1. Financing by components (max ½ page)

Please provide an estimate of the total cost per component and disaggregate by sources of financing.

Component	Indicative cost (USD)	GCF financing		Co-financing		
		Amount (USD)	Financial Instrument	Amount (USD)	Financial Instrument	Name of Institutions
Outcome 1	4,880,000	3,110,000	Grant	1,770,000	Grant	FFEM*
Outcome 2	19,540,000	15,540,000	Grant	5,000,000	Grant	SIDA
Outcome 3	17,900,000	12,900,000	Grant	5,000,000	Grant	SIDA
Outcome 4	17,974,000	16,974,000	Grant	1,000,000	Grant	UNEP
Indicative total cost (USD)	61,224,000					

*the FFEM contribution was earmarked as 1.5 million Euros.

C.2. Justification of GCF funding request (max 1 page)

Explain why the Project/ Programme requires GCF funding, i.e. explaining why this is not financed by the public and/ or private sector(s) of the country.

In order to successfully lift the barriers to adaptive capacity and to leverage a paradigm shift across all countries of the WIO, there is an urgent need to step up action in the realms of science, policy and to accelerate the implementation of concrete measures. The measures foreseen in this project are intended to have significant multiplying effects in terms of promoting resilient development pathways.

The level of indebtedness of the partner countries, and their degree of vulnerability, warrants a significant level of support towards the restoration of ecological services and economies that depend on them. While there is a high level of awareness of the potential losses that can be incurred from climate change, most countries are ill-equipped, financially or from limited capacity, to address these challenges head-on, in a coordinated manner. Furthermore, no country is in a position to address the scope of challenges alone, so a regional approach is preferred. The project is intended to deliver climate adaptation, economic, social and environmental benefits that exceed the purview of a single country and that cannot be leveraged by any country alone.

To ensure the project's efficiency and effectiveness and to promote natural replication, it is important that private sector participation be adequately fostered. The use of Green Climate Fund Grants to support this project is justified by the fact that it seeks to establish an enabling environment for future self-sustained, private sector-fuelled resilient growth. This cannot be achieved without significant technical assistance to build capacity among all actors.

In addition, the GCF grants are also dedicated to re-establish the functionality and resilience of regional public goods, such as the provisioning, regulating and protective services provided by ecosystems, and that will benefit at least the 60 million people living in coastal areas – and depending on these services – and in the long term, the entirety of the economies concerned. Successful implementation of this ambitious and innovative programme will also help regional countries to some extent fulfill their global commitments e.g. NDCs under the Paris 2015 agreement and SDGs 13 and 14 targets.

C.3. Sustainability and replicability of the project (exit strategy) (max. 1 page)

The interventions promoted by this project are designed to establish the basis for self-replication of outcomes by project stakeholders. For example, by removing information barriers, policy makers will be able to apply evidence-based

decisions and planning frameworks, leveraging further impact towards a paradigm shift. By setting the stage for increased private sector engagement in adaptive and resilient economic pathways, the project will generate multiplied benefits that can be replicated beyond the scope of the immediate beneficiaries, and to the entire economies of the region.

The development and implementation of sustainable financing mechanisms for all key activities included in the project, including for example science-making, public private partnerships, protected area management and technology transfer will help leverage continuation of activities beyond the project financing. The integration of capacity building for all relevant actors, and of the principles of co-design, into the project's key principles, will ensure sustainability of project outcomes.

The project is based on identified best practices, technologies, and emerging innovations in the spheres of policy, finance, and ecosystem-based adaptation. As such, these proven approaches will be implemented at scale with the help of the GCF, and can be sustained after GCF support ends, through the continued engagement of countries in the Nairobi Convention.

C.4 Engagement among the NDA, AE, and/or other relevant stakeholders in the country (max ½ page)

Please describe how engagement among the NDA, AE and/or other relevant stakeholders in the country have taken place and what further engagement will be undertaken as the concept is developed into a funding proposal.

The National Designated Authorities in all targeted countries have been consulted during the preparation of this concept note, including through electronic means and by discussions at meetings of the Nairobi Convention on April 7th 2018. A consultation plan for the development of the full proposal is included in the request for project preparation fund, which includes:

- Targeted country-level consultations and regional meetings;
- Consultations with non-governmental stakeholders including private sector, financial institutions, co-financing partners, scientific community and NGOs;
- Development of targeting strategies, selection criteria and detailed activity plans using a co-design principle with all relevant stakeholders;
- Deployment of adequate safeguard checks and balances, including gender and indigenous peoples' participation in project design;
- Studies and participatory assessments to feed in to the feasibility assessment of project activities.

D. Supporting documents submitted (OPTIONAL)

- ☒ Map indicating the location of the project/programme
- ☒ Diagram of the theory of change
- ☐ Financial Model (N-A)
- ☒ Pre-feasibility Study
- ☐ Evaluation Report of previous projects

Self-awareness check boxes

Are you aware that the full Funding Proposal and Annexes will require these documents? Yes ☒ No ☐

- Feasibility Study
- Environmental and social impact assessment or environmental and social management framework
- Stakeholder consultations at national and project level implementation including with indigenous people if relevant
- Gender assessment and action plan
- Operations and maintenance plan if relevant
- Loan or grant operation manual as appropriate
- Co-financing commitment letters

Are you aware that a funding proposal from an accredited entity without a signed AMA will be reviewed but not sent to the Board for consideration? Yes ☒ No ☐

-
- i Concept notes (or sections of) not marked as confidential may be published in accordance with the Information Disclosure Policy ([Decision B.12/35](#)) and the Review of the Initial Proposal Approval Process ([Decision B.17/18](#)).
 - ii See [here](#) for access to project preparation support request template and guidelines
 - iii Refer to the Fund's environmental and social safeguards ([Decision B.07/02](#))
 - iv <https://www.cbd.int/islands/doc/wiop/wiop-factsheet-en.pdf>
 - v A Regional Climate Change Programme for the Nairobi Convention
 - vi INCN and CORDIO East Africa. Resilience of Coastal Systems and Their Human Partners. <https://portals.iucn.org/library/sites/library/files/documents/2015-019.pdf> (Indeje *et al.* 2000)
 - vii INCN and CORDIO East Africa. Resilience of Coastal Systems and Their Human Partners. <https://portals.iucn.org/library/sites/library/files/documents/2015-019.pdf>
 - ix Japan Agency for Marine-Earth Science and Technology. Indian Ocean Dipole (IDO) http://www.jamstec.go.jp/frcgc/research/d1/iod/iod_home_s.html.en
 - x Behera *et al.* 2005
 - xi Anderson and Samoilys (2016)
 - xii A Regional Climate Change Programme for the Nairobi Convention
 - xiii Global Coral Bleaching. The 3rd Global Coral Bleaching Event – 2014-2017 <http://www.globalcoralbleaching.org>
 - xiv Le Quéré *et al.* 2012
 - xv Church, J.A., White, N.J., Hunter, J.R., 2006. Sea-level rise at tropical Pacific and Indian Ocean islands. *Global and Planetary Changes* 53, 155–168.
 - xvi EM-DAT: The Emergency Events Database - Université catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium
 - xvii WWF, REVIVING THE WESTERN INDIAN OCEAN ECONOMY Actions for a Sustainable Future, 2017
 - xviii UN - World Bank. The potential of the Blue Economy https://sustainabledevelopment.un.org/content/documents/15434Blue_EconomyJun1.pdf
 - xix <http://www.natureseychelles.org/what-we-do/blue-economy>
 - xx <http://www.oceaneconomy.mu/>, supported by Maurice Ile Durable (<http://mid.govmu.org/>)
 - xxi <http://www.operationphakisa.gov.za/operations/oel/pages/default.aspx>
 - xxii SOLSTICE. <http://www.solstice-wio.org/project-objectives>
 - xxiii The Curious Case of Indian Ocean Warming. <http://journals.ametsoc.org/doi/full/10.1175/JCLI-D-14-00471.1>
 - xxiv http://www.undp.org/content/undp/en/home/librarypage/environment-energy/ecosystems_and_biodiversity/Targeted-Scenario-Approach-2013.html
 - xxv Towards A Network of Locally Managed Marine Areas (LMMAs) in the Western Indian Ocean. <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0103000&type=printable>
 - xxvi UNISDR. Review of South-West Indian Ocean Region. http://www.unisdr.org/files/43526_southwest.pdf
 - xxvii WWF, REVIVING THE WESTERN INDIAN OCEAN ECONOMY Actions for a Sustainable Future, 2017, p.30
 - xxviii Climate Change Strategy for the Nairobi Convention
 - xxix WWF, REVIVING THE WESTERN INDIAN OCEAN ECONOMY Actions for a Sustainable Future, 2017, p.25
 - xxx African Union. 2050 Africa's Integrated Maritime Strategy. http://cggrps.org/wp-content/uploads/2050-AIM-Strategy_EN.pdf
 - xxxi Open Channels. <https://www.openchannels.org/news/mpa-news/private-sector-ownership-mpas-cases-illustrate-challenges-and-opportunities>
 - xxxii Governing Marine Protected Areas: Resilience Through Diversity. https://books.google.ca/books?id=gqnpAgAAQBAJ&pg=PA175&lpg=PA175&dq=private+MPAs&source=bl&ots=9Rsa_8gKiQ&sig=44z8M7XchRAw7QYgTz4P63bbbeo&hl=en&sa=X&ved=0ahUKEwi26pGwNLXAhXk5YMKHedtDxEQ6AEIQDAE#v=onepage&q=private%20MPAs&f=false
 - xxxiii i.e. Locally Managed Marine Areas (LMMA)
 - xxxiv Critical habitat: areas with high biodiversity conservation significance which are critically endangered or host endangered species, restricted range or endemic species that are highly threatened. UN Environment. <http://www.biodiversityz.org/content/critical-habitat>. e.g. coral reefs, seagrass bed, mangroves
 - xxxv Mohamed *et al.* 2009

ANNEX 1

Supporting document for the GCF Concept Note

Pre-Feasibility Study

Transition to a Resilient Blue Economy in the Western Indian Ocean

Submitted on: May 11, 2018

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1. Context and baseline

The Western Indian Ocean (WIO) region is composed of Comoros, France (Reunion), Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania and South Africa who are also parties to the Nairobi Convention. Approximately 30 million people in the WIO islands and East African coastal communities rely on the coastal environment for goods and services. Coastal and island communities are largely dependent on fishing, shipping and tourism for their livelihoods. The natural resources that provide sustainable livelihoods and fuel economic activity are already under pressure from threat such as poverty, overfishing, overdevelopment, pollution, and environmental degradation. The unavoidable impacts of climate change will only exacerbate these problems and present mounting challenges to the sustainable development of the region.¹

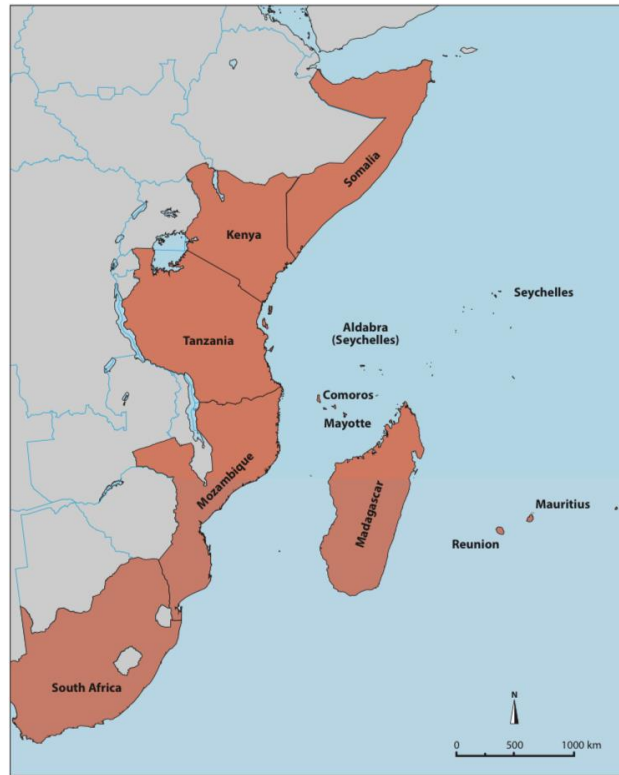


Figure 1: Participating countries

Ecological habitats of the region are dominated by exposed coastal zones, mangroves, coral reefs, seagrass beds, rocky shores and intertidal mud flats that host significant aquatic and terrestrial biodiversity (plants, animals) including populations that are particularly vulnerable to climate variations and global warming.²

The WIO is characterised by complex weather patterns, dominated by monsoon rains that drive the weather, river flows and sea conditions.³ The northern part of Mozambique, Tanzania, Kenya and southern Somalia receive long and heavy rains during March to May before the onset of strong southeast monsoon winds. Short rains occur between October and December and signal the start of the lighter northeast monsoon winds. This weather cycle has become more unpredictable in recent years, with erratic rainfall patterns and inconsistent monsoon periods.⁴ In particular, this causes greater disruption to communities whose livelihood activities are closely intertwined with weather patterns, such as agriculture and fishing. Tropical cyclones are common in the southern Mozambique Channel and often have devastating effects on infrastructure, people and economic development. The proximity of cyclones to the coast strongly affects the weather patterns

¹ <https://www.cbd.int/islands/doc/wiop/wiop-factsheet-en.pdf>

² UNEP. Nairobi Convention. A proposed Marine Transboundary Conservation Area Between Kenya and Tanzania. http://www.ioseaturtles.org/UserFiles/File/Kenya-TZ_transboundary_marine_area.pdf

³ Samoilys *et al.* (2015)

⁴ A Regional Climate Change Programme for the Nairobi Convention

over Mozambique, increasing convection and rain showers along the Intertropical Convergence Zone.⁵

1.1 Socio-economic Development Trends

Local coastal populations in the WIO area depend on fisheries, agriculture, tourism, while the broader economies in the countries are also closely tied to shipping and port facilities and off-shore natural resources exploitation (oil and gas). In 2014, the population living in the coastal regions of the WIO countries was on average over 50%, reaching 100% in the smaller island states.

COUNTRY	Population (mid-2014) in millions	Percentage of Population living along the coast
Comoros	0.7	100
Kenya	43.2	8
Madagascar	22.4	34
Mauritius	1.3	100
Mozambique	25.1	70
Reunion	0.9	100
Seychelles	0.1	100
Somalia	10.8	55
South Africa	53.7	40
Tanzania	50.8	25

Figure 2: population living near the coast in West Indian Ocean Countries.

Despite significant growth in all the countries over the past decade, artisanal/small-scale fisheries remain the main source of livelihood for many coastal communities. Other activities include tourism, agriculture, subsistence forestry, mariculture, small-scale mining (stone and sand quarrying, lime and salt production), petty trading, small livestock husbandry, trade in handicrafts, employment in services industry (including oil and gas production) and those associated with shipping and ports⁶.

The West Indian Ocean economic potential has been evaluated at US\$333,8 billion.⁷ Annual seafood exports from the region (not including South Africa) represented US \$1.3Bn in 2015, and fish supplies accounted for 50% of annual protein intake in many WIO countries. In addition, 45% of the fisheries workforce is female.

⁵ Review of the 2010/2011 and 2011/2012 cyclone seasons. World Meteorological Organization Tropical Cyclone Committee for the southwest Indian Ocean, 20th session, Maputo, Mozambique, 3–7 Sep 2012.

⁶ http://www.asclme.org/TDA/ASCLME_SWIOFP_TDA_Vol1_Electronic.pdf

⁷ WWF. Western Indian Ocean valued at US\$333.8 billion but at a crossroads. <http://wwf.panda.org/?uNewsID=290410>

Country	Fisheries (million USD)	Coastal Tourism (million USD)	Coastal Agriculture & Forestry (million USD)	Mariculture (million USD)	Mining & Energy (Coastal) (million USD)	Ports & Coastal Transport (million USD)	Total Coastal Economy (million USD)	Coastal Domestic Product per capita	TCE / Coastline (million USD / km)
Comoros	45.2	16.7	0.86	7.6	-	24	94.36	127.99	0.28
Kenya	4.6	4,153	-	0.8	179	100	4,437.50	1,357.41	8.28
Madagascar	586.6	308.2	20.5	6.7	85	36	1,043.00	83.81	0.22
Mauritius	208.1	1,190	11	0.3	-	52	1,461.40	1,112.94	8.26
Mozambique	356	145	526.5	-	82.5	60	1,170.00	84.33	0.47
Seychelles	313.7	247	5.33	9.6	-	6	581.63	6,460.83	1.18
Somalia	36.9	0	729.6	4.3	-	24	794.80	143.80	0.26
South Africa	769.3	1,743	264	7.6	1,450	1,500	5,733.90	301.99	2.05
Tanzania	31	4,008	2,097	0.8	932	30	7,098.80	771.61	4.99
TOTAL	2,351.40	11,810.90	3,654.79	37.70	2,728.50	1,832.00	22,415.29	1,160.52	2.89

Figure 3: Snapshot of coastal economies

Coastal livelihoods are also complicated by constraints in the coastal land-use and land planning systems, which have in some cases led to large-scale acquisition of land for tourism and economic investments such as port expansions, areas for economic promotion zones (EPZs) or large-scale plantations.

Table 1: Socio-economic indicators per country⁸

Country	Coastline (km)	Economic sector (% of GDP)	Population below the poverty line (%)	GDP per capita
Comoros	340	Agriculture (49.7%) Industry (incl. fishing) (11.9%)	44.8%	1,500\$
Kenya	536	Services (47.3%)	43.4%	3,400\$
Madagascar	4,828	Services (60.2%)	70.7%	1,500\$
Mauritius	177	Services (74%)	8%	20,500\$
Mozambique	2,470	Services (53.6%)	46.1%	1,200\$
Seychelles	491	Services (83.4%)	39.3%	27,200\$
Somalia	3,025	Agriculture (incl. fishing) (60.2%)	n/a	n/a
Tanzania	1,424	Services (47.3%)	22.8%	3,100\$
South Africa	2,798	Services (68.6%)	16.6%	13,300\$

⁸ CIA. The World Factbook. <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>

Poverty among these communities is widespread. With respect to the MDG goals, many of the states in the WIO region under-performed on most of the goals. In terms of the Human Development Index (HDI), Mauritius and Seychelles maintain the highest HDI records in the region and are ranked among those countries within the high (medium) Human Development Index level. In 2017, the HDI rankings were as illustrated in the Table below:

Table 2: Development data and rankings

Country	HDI Ranking (2016)⁹	Palma Ratio¹⁰ 2010-2015	Gender inequality Index
Comoros	160	n-a	n-a
Kenya	146	2.9	0.565
Madagascar	158	2.1	n-a
Mauritius	64	1.5	0.380
Mozambique	181	2.5	0.574
Seychelles	63	2.6	n-a
Somalia	n-a	n-a	n-a
Tanzania	151	1.7	0.544
South Africa	119	7.1	0.394

⁹ <http://hdr.undp.org/en/countries>

¹⁰ <http://hdr.undp.org/en/composite/IHDI>

2. Climatic Change in WIO: Risks and Impacts

2.1 General climatic conditions

The major current, running throughout the year in the WIO, is the westward-flowing South Equatorial Current (SEC) located in a band around approximately 15-20°S. The SEC is driven by a number of processes including forcing by the Indonesian through flow (ITF) and, during the SE Monsoon, by atmospheric processes associated with the heating of the Indian/South Asian landmass, as well as by equatorial oceanic heating and the formation of Hadley Cells¹¹. During the boreal summer, with significant heating of the Indian subcontinent and Asia, the SEC is at its strongest, reaching velocities of ~1.5-2.0 m/s¹².

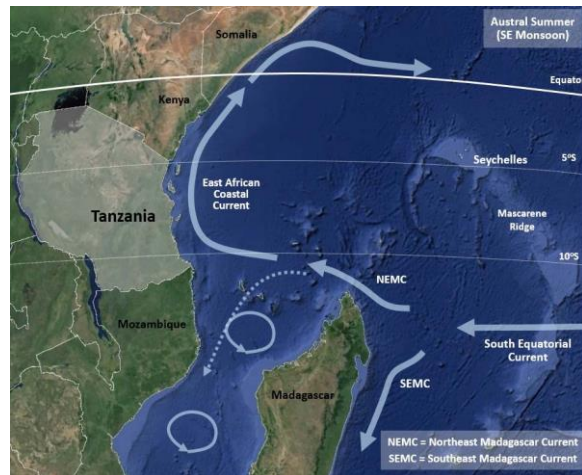


Figure 4: Representation of currents during SE Monsoon (Adapted from: Schott et al., 2009)

In Figure 4 the SEC is seen to be deflected both to the north (NEMC) and to the south of Madagascar (SEMC) and impacts on the coast of Africa around southern Tanzania, where it is split to form the East African Coastal Current (EACC) running north, and the Mozambique Current (to form the Agulhas Current) running south into the Mozambique Channel. The EACC continues to run north, subsequently forming the Somali Current (SC) along the coast as a result of the strong airflow towards the Indian subcontinent. Strong coastal gyres also develop with the Somali Current and upwelling takes place off the coast of Somalia. The EACC eventually turns east to form an easterly-flowing current north of the equator.

In the NE Monsoon configuration, during the boreal winter, the monsoon reverses due to significant cooling of the Indian Subcontinent and Asia. The SEC (and the SE Trades) therefore also weakens as a result of this to a mean velocity of ~0.5 m/s, while the Somali Current effectively reverses, and can flow south as far as about 4°S, before both the currents turn east, and from the South Equatorial Countercurrent (SECC). During the NE Monsoon, the direction of the meridional Ekman Transport reverses.”

The most relevant climate phenomena affecting the WIO marine environment are the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). Some extreme rainfall anomalies in East Africa have been associated with ENSO.¹³ The IOD involves a periodic oscillation of SST between ‘positive’, ‘neutral’ and ‘negative’ phases. The positive

¹¹ The atmosphere transports heat throughout the globe extremely well, but present-day atmospheric characteristics prevent heat from being carried directly from the equator to the poles. Currently, there are three distinct wind cells - Hadley Cells, Ferrel Cells, and Polar Cells - that divide the troposphere into regions of essentially closed wind circulations. In this arrangement, heat from the equator generally sinks around 30° latitude where the Hadley Cells end. As a result, the warmest air does not reach the poles. If atmospheric dynamics were different, however, it is plausible that one large overturning circulation per hemisphere could exist and that wind from the low-latitudes could transport heat to the high-latitudes. (Farrell, 1990). Source: <https://www.seas.harvard.edu/climate/eli/research/equable/hadley.html>

¹² Transboundary Diagnostic Analysis of the Large Marine Ecosystems of the western Indian Ocean, 2012. 2

¹³ (Indeje et al. 2000)

phase is normally characterised by anomalous cooling of SST in the south-eastern equatorial Indian Ocean and anomalous warming of SST in the western equatorial Indian Ocean. Associated with these changes the normal convection situated over the eastern Indian Ocean warm pool shifts to the west and brings heavy rainfall over East Africa.¹⁴

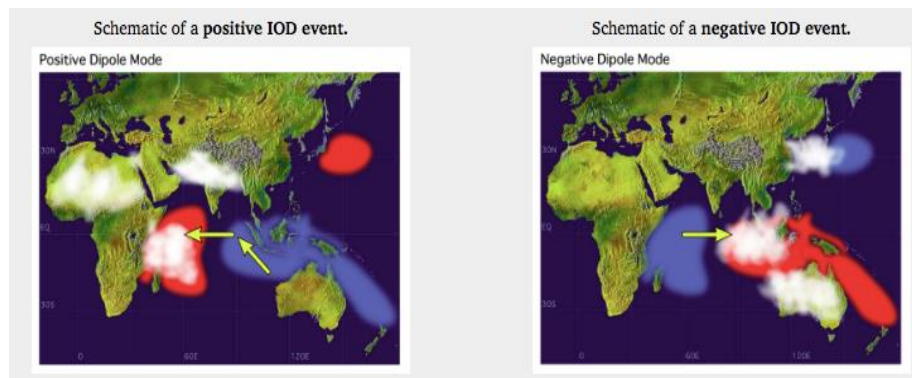


Figure 5: Schematic of IOD events

In parallel, sea surface temperature recorded anomalies (Figure 5) are affecting the biochemistry of the ocean.¹⁵ Additionally, there is a close interrelation between the SST, especially the increase of temperature of the ocean (warmer ocean), with extreme climate events. By describing the formation of a cyclone in the region, scientist has stated that SST constitutes a favourable condition to intensify storms.¹⁶

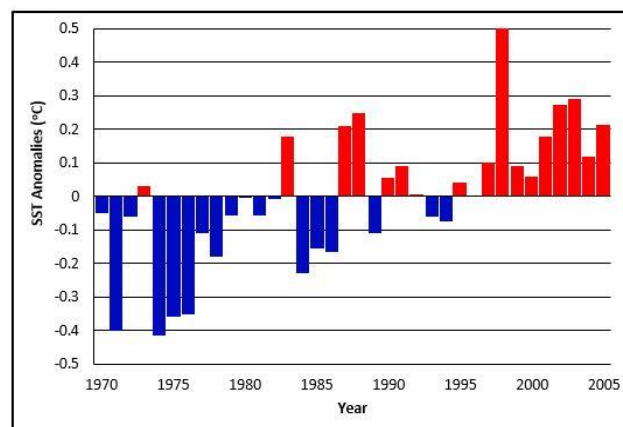


Figure 6: SST Anomalies (relative to 1970-2005 climatology)

Tropical cyclones are common in the southern Mozambique Channel and often have devastating effects on infrastructure, people and economic development. The proximity of cyclones to the coast strongly affects the weather patterns over Mozambique, increasing convection and rain showers along the Intertropical Convergence Zone¹⁷. Figure 5 shows

¹⁴ Behera *et al.* 2005

¹⁵ Nairobi Convention (2016). Climate Change Strategy for the Nairobi Convention. Nairobi Convention. Pp 63

¹⁶ U.C. Mohanty *et al.* (eds.), Monitoring and Prediction of Tropical Cyclones in the Indian Ocean 309 and Climate Change, DOI 10.1007/978-94-007-7720-0_27, © 2014 Capital Publishing Company

¹⁷ Review of the 2010/2011 and 2011/2012 cyclone seasons. World Meteorological Organization Tropical Cyclone Committee for the southwest Indian Ocean, 20th session, Maputo, Mozambique, 3–7 Sep 2012.

the WIO Tropical Cyclone Track lines between 2004 and 2014¹⁸. During this period, the region has registered over 70 tropical cyclones.¹⁹

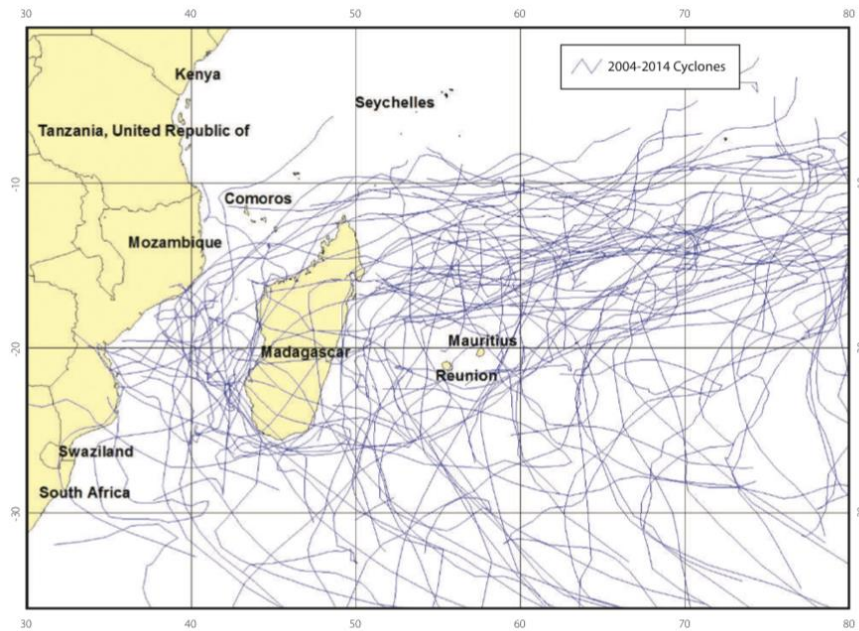


Figure 7: WIO Tropical Cyclone Track lines between 2004 and 2014

Current assessments indicate that climate change in the WIO, like in other regions, is increasing environmental variability, with ramifications for weather, fisheries and biodiversity. Oceanographic effects from climate change such as elevated water temperatures have had a severe impact on coral fauna, with episodic coral bleaching events²⁰.

The most significant episode for coral bleaching the was the 1998 El Niño, which caused the strongest oceanic warming in recorded history. This was associated with severe coral bleaching and mortality globally, with the greatest devastation in the WIO (Enfield 2001; Sheppard 2003; Ateweberhan and McClanahan 2010).

A clear warming trend in the Agulhas Current region over the last two decades has been observed. This warming has coincided approximately with an intensification of the subtropical gyre since the mid-1980s and a warming of the upper thermocline in the region.²¹ The IPCC (2013) reported that '*The Indian Ocean Basin Mode (IOBM) has a strong warming trend (significant at 1% since the middle of the 20th century)*'.

Climate data reported in the IPCC's 4th assessment report noted that "The upper Indian Ocean had been warming everywhere except in a band centred at about 12°S (South Equatorial Current) ... In the tropical and eastern subtropical Indian Ocean (north of 10°S), warming in the upper 100 m (Qian et al., 2003) was consistent with the significant warming

¹⁸ Regional State of the Coast Report – Western Indian Ocean.
http://web.unep.org/nairobiconvention/sites/unep.org.nairobiconvention/files/rsocr_printedition.compressed.pdf

¹⁹ South-West Indian Ocean tropical cyclone. https://en.wikipedia.org/wiki/South-West_Indian_Ocean_tropical_cyclone#cite_note-ss-1

²⁰ A Regional Climate Change Programme for the Nairobi Convention

²¹ Anderson and Samoilys (2016)

of the sea surface from 1900 to 1999... The surface warming trend during the period 1900 to 1970 was relatively weak, but increased significantly in the 1970 to 1999 period, with some regions exceeding 0.2°C per decade.

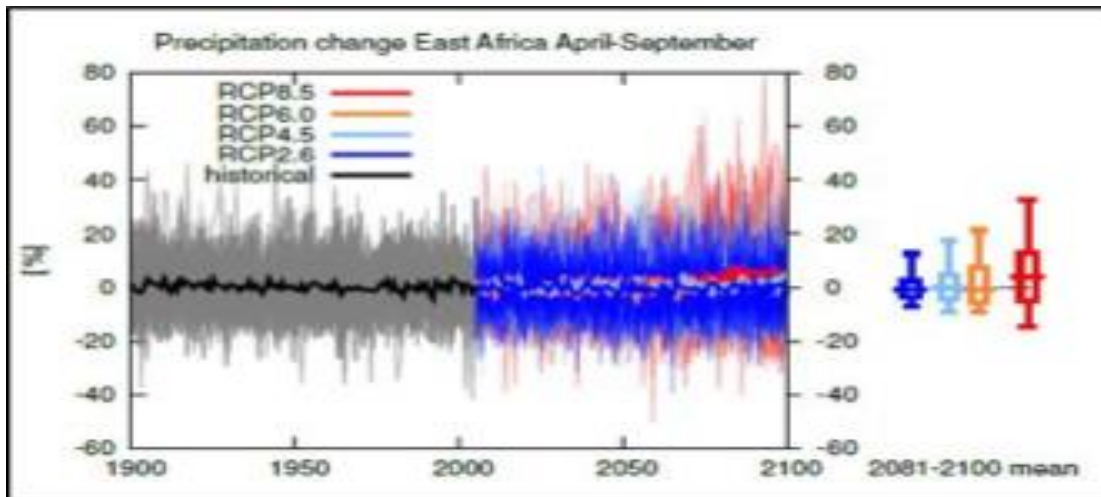


Figure 8: Precipitation changes (SE Monsoon) in East Africa (IPCC, 2013)

2.2 Climate Change Projections

The Intergovernmental Panel on Climate Change (IPCC) predicts that by 2100 sea levels will have risen by between 0.26 and 2.3 metres, and there is a consensus that a climate shift will alter the frequency, intensity and temporal and spatial variability of rainfall, cyclones and tropical storms. An increase in the frequency and amplitude of tidal ranges, storms and cyclones will result in floods and the destruction of property, high rates of coastal erosion, saline water intrusion, reduced economic opportunities and habitat loss. Another impact of climate change, the acidification of oceans, is likely to have a dramatic effect on shelled organisms. Some calcifying species, such as sea urchins, shallow-water corals, oysters, clams and calcareous plankton, are at risk and, consequently, the entire food web may also be at risk.

The IPCC estimates suggest that by 2100 the concentration of CO₂ will exceed 800 ppm, resulting in a 12 percent increase in surface water dissolved inorganic carbon (DIC) and a 60 percent decrease in carbonate ion concentration. Such a change in water chemistry would cause a decrease in the pH of about 0.4 units.²² Depending on the extent of future carbon dioxide emissions and other factors, the IPCC (2007) predicts that ocean acidity could increase by 150 percent by 2100. The main changes expected in the region are highlighted below. Another impact of climate change is that the subtropical southern-ocean region sees lower biological productivity, due to the lack of supply of nutrients to the surface layer. The warm surface layer in subtropics creates a large density gradient which inhibits the vertical mixing of nutrient waters from deeper ocean.²³

²² Le Quéré *et al.* 2012

²³ Centre for Climate Change Research, Indian Institute of Tropical Meteorology, Pune 411008, India

Table 3: State and trends of climate change in the WIO region

	1950 – 2010	2090
Temperature	Temperature raise: +0.6 °C (Mozambique) to 1.1 °C (Mauritius)	Temperature raise: +2.8 °C (Mauritius) to + 3.9 °C (Tanzania)
Precipitation	Annual precipitation drops, except for Seychelles	Annual precipitation rises for Comoros, Kenya, Seychelles and Tanzania - Annual precipitation drop for Madagascar, Mauritius and Mozambique - Longer dry season and intensification of precipitations
Sea level rise	Sea level rise: 0.4 mm/year to 1.68 mm/year	Sea level rise up to 56 cm (more than 2 m for some localities in Mozambique)
Cyclones	Increase in frequency of intense cyclones	No notable change predicted, some new areas prone to cyclone in Madagascar

Evidence from experiments and observations indicate that future ocean acidification will affect many marine organisms, with implications for ecosystems and ecosystem services. Attention to date has mostly focused on species-specific responses, revealing high taxonomic variability. For instance, adult marine fish are generally tolerant of high CO₂ conditions but responses by juveniles and larvae include diminished olfactory and auditory ability which affects predator detection. Some species may be unaffected, at least directly, while the most sensitive ones may experience near total recruitment failure.²⁴ There may also be indirect effects mediated through food webs, together with interactions with other stressors and combined effects that could be additive, synergistic or antagonistic. More optimistically, there might also be inter-generational adaptation to high CO₂ conditions, by at least some groups of species.

The impact of ocean acidification on coral is reduced calcification and growth. Even an increase in the CO₂ concentration to just 560 ppm may reduce calcification and growth by up to 40 percent. Acidification is also believed to play a role in determining coral bleaching sensitivity.²⁵

The acidification of the oceans is an area of climate change that is attracting increased attention and there is particular concern about the saturation rates of CaCO₃ (both aragonite and calcite forms) which is essential to, for example, *coccolithophore* and *foraminifer* groups of calcareous plankton.

²⁴ Barton *et al.* 2012

²⁵ Hoegh-Guldberg, 2005

2.3 Impacts of climate change

Available information indicates that the western Indian Ocean region (WIO) will follow global trends with regards to changes predicted as a result of climate change including the frequency, intensity, and temporal and spatial variability of rainfall, cyclones and tropical storms. An increase in the frequency and amplitude of tidal ranges, storms and cyclones will result in floods and the destruction of property, high rates of coastal erosion, saline water intrusion, reduced economic opportunities and habitat loss. Other impacts of climate change such as increased sea temperatures and the acidification of the oceans are likely to have a dramatic effect on species and ecosystems.²⁶

The impacts of these climate change dynamics will endanger the livelihoods of people and the natural environment throughout the region:

a) Decreased livelihoods and income from climate change impacts on marine life throughout the food chain (fisheries). As one of the primary food for corals, fishes, sea mammals and birds, plankton has been severely affected in quality (nutritional properties) and quantity (number of specimens) by climate variations. It constitutes the basis for marine food chains.²⁷ Although they are recognised as a major food source, few published studies have been released to assess and confirm the direct impacts on the ecosystem more precisely on marine and human populations.²⁸ By extension, one can argue that fewer plankton specimen will increase the stress on marine fauna and flora which will directly impact coastal populations to access such resources. Predicted climate change impacts will drastically challenge the base of the food chain and disturb considerably population livelihoods, incomes as well as food security.

b) Increased water-related vulnerability from changes in rainfall patterns, flooding, droughts, water salinization, and the foreseen permanent inundation of low-lying coastal areas (tourism, infrastructure, agriculture). Climate change effects on rainfall regimes across the region are highly likely to affect access to fresh water as rainfall diminishes, inland aquifers recharge more slowly, and water extraction rates increase to meet higher demand. Freshwater flows to the sea are also likely to decrease, leading to a modification of coastal ecosystems, such as mangroves and estuaries.²⁹ The disruption of the functioning of habitats such as mangroves, seagrass beds or coral reefs will in turn have repercussions on coastal plans and animals, which will ultimately create high levels of compounded impacts on coastal societies.³⁰ In addition, sea level rise, flooding and inundation can increase soil salinization and alter fresh water availability for the local populations. Many countries have already experienced increased saltwater intrusion in coastal aquifers.

c) Increased exposure to physical deterioration of coasts and climate extremes. The combined effect of all climate trends will lead to the increased exposure of people, infrastructure and productive assets to physical disruptions, including for example

²⁶ A Regional Climate Change Programme for the Nairobi Convention

²⁷ WWF. Marine problems: climate change.

http://wwf.panda.org/about_our_earth/blue_planet/problems/climate_change/

²⁸ R.R. Hood et al. / Progress in Oceanography 156 (2017) 290–325

²⁹ International Union for Conservation of Nature and WIOMSA. Resilience of Coastal Systems and their human partners. <https://www.iucn.org/content/resilience-coastal-systems-and-their-human-partners>

³⁰ International Union for Conservation of Nature and WIOMSA. Resilience of Coastal Systems and their human partners. <https://www.iucn.org/content/resilience-coastal-systems-and-their-human-partners>

accelerated coastal erosion, inundation of low-lying areas and built environments, particularly coastal cities. Many countries have experienced the destruction and degradation of coastal productive assets, including roads, buildings, and ecosystems during high tides, cyclones, severe rainfall events or storm surges; and these are likely to increase in frequency and intensity, not to mention the potential losses of lives and economic setbacks. In the absence of adaptation, coastal infrastructure will remain at risk.

According to the IPCC, the most impacted regions of West Indian Ocean vulnerability to climate change are the small islands.³¹ In its report on small islands, the IPCC characterised the projected scenarios as follow: coastal, terrestrial and human systems (figure 9).

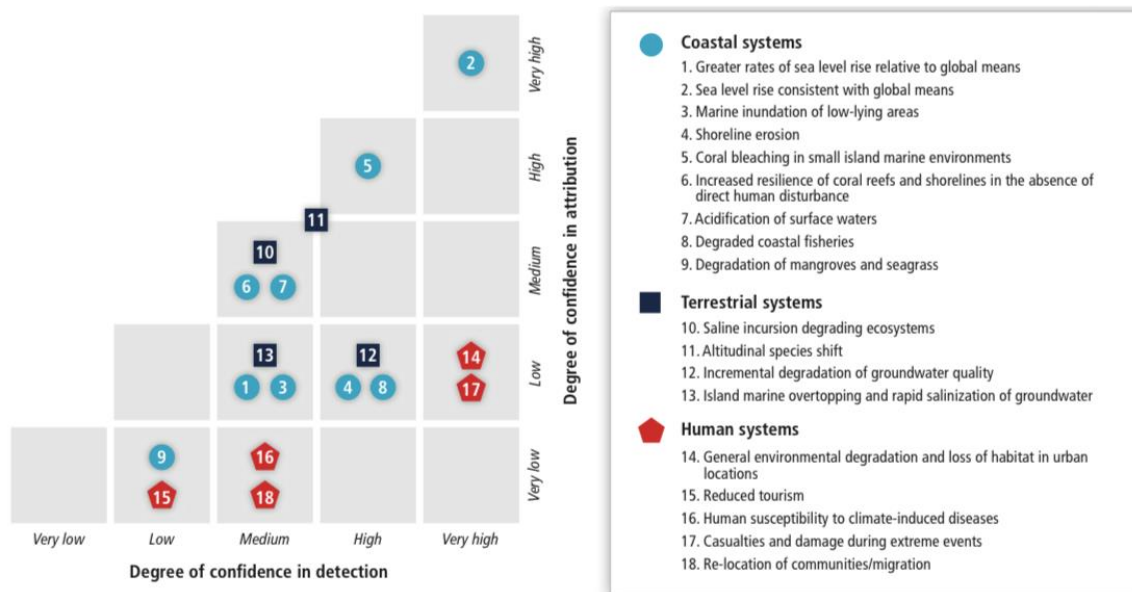


Figure 9: “A comparison of the degree of confidence in the detection of observed impacts of climate change on tropical small islands with the degree of confidence in attribution to climate change drivers at this time.”

2.4 Factors of vulnerability

Vulnerability depends on the combination of exposure, risk and adaptive capacity. As seen above, exposure to climate impacts and climate extremes are likely to increase in all climate models; risks are also likely to increase, as the economic assets represented by coastal economies grow. Adaptive capacity varies across countries in the region, but remains insufficient compared to the scope of the needs. While the WIO region is not a monolithic bloc, many countries share similar conditions, and are experiencing similar factors of vulnerability.

2.4.1 Natural resources loss and degradation

Healthy coastal ecosystems act as buffers against climate extremes, including coastal erosion, sea level rise, storms and cyclones. They also provide productive ecological

³¹ IPCC. Small Islands (2014). https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap29_FINAL.pdf

services, including fisheries development, tourism, and support many forms of economic activity. Finally, they also provide regulating ecological services, including temperature control and carbon sequestration³². Yet throughout the region, all fragile ecosystems are experiencing pressures and degradation, which is preventing them from delivering these ecosystem services.

Coral Reefs

Although they represent “less than one quarter of 1% of the marine environment”³³, coral reefs play a role in the development and conservation of approximately 25% of the pelagic fisheries.³⁴ Their role is vital for the planet ecosystem balance as they act as coast protecting barrier against waves and storms, they assist in carbon and nitrogen fixing.

In 1998, the coral reefs in the Pacific, Indian Ocean as well as in the Caribbean faced extensive bleaching events that caused high coral mortality. Studies demonstrate that coral mortality rate in 1998 reached 90% in the Sri Lanka, Maldives, India, Kenya, Tanzania and the Seychelles.³⁵

Reefs are particularly vulnerable to climate change especially with regards to sea temperature increases, but their fragility is compounded by human activities namely such as destructive fishing practices, overfishing, pollution (urban, industrial), and mining.

However, recent studies show that “bio-remediation” technologies and practices could help speed up reef recovery, by building on the tendency of ‘encrusting communities’ (ie marine calcifying organisms, including coralline algae, bryozoans, calcareous worms, foraminifera and oysters) to add meaningful quantities of carbonate to reefs. Findings have shown that the increased expression of such communities often occurs following declines in coral health, which could offset negative impacts on reefs and aid future reef recovery by facilitating coral settlement³⁶.

³² Queensland museum.

³³ WWF. Fast fact: why coral reefs are important to people (2017).
http://www.panda.org/about_our_earth/blue_planet/coasts/coral_reefs/coral_facts/

³⁴ WWF. Coral reefs: importance (2017).
http://www.panda.org/about_our_earth/blue_planet/coasts/coral_reefs/coral_importance/

³⁵ Japanese Coral Reef Society (2002). The extent and intensity of the 1998 mass bleaching event on the reefs of Mauritius, Indian Ocean. https://www.jstage.jst.go.jp/article/jcrs1999/2002/4/2002_4_43/_pdf

³⁶ K.M. Morgan, P.S. Kench, [Corrigendum to “New rates of Indian Ocean carbonate production by encrusting coral reef calcifiers: Periodic expansions following disturbance influence reef-building” \[Mar. Geol. 390 \(2017\) 72–79\]](#), Marine Geology, Volume 395, 1 January 2018, Pages 346

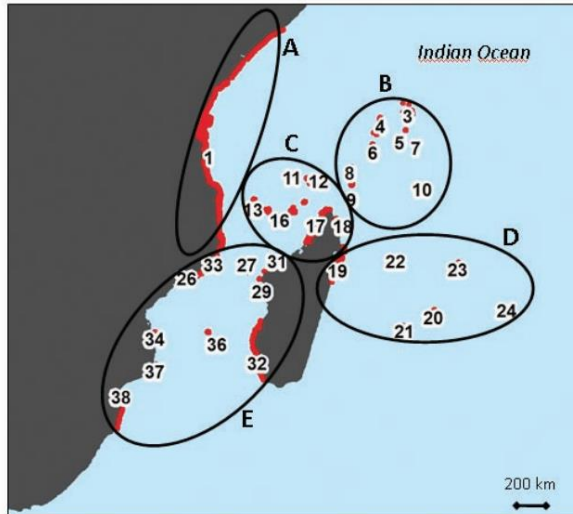


Figure 10: groups of connected reefs in the region

Mangroves

Mangrove forests act as a neutral zone between terrestrial and marine areas. This ecosystem offers shelter for a wide diversity of animals (fish, shellfish, birds, mammals, amphibians), and it often serves as a nursery for marine species.³⁷ Healthy mangrove forests have a positive impact on the environment as the trees and especially the dense roots protect the coastline from erosion from tidal waves, storms, or cyclones. As a result of protective and productive services they provide, mangroves bear significant economic

³⁷ WWF. Mangrove forests: ecosystems (2017).
http://www.panda.org/about_our_earth/blue_planet/coasts/mangroves/mangrove_ecosystems/

potential³⁸, which is often – unfortunately – ignored in decision-making. The total coverage of mangroves in the WIO area, was estimated in the late 1990s at around 1,000,000 ha mostly concentrated in the estuaries and deltas of Mozambique, Madagascar, Tanzania and Kenya, and consisting of approximately 10 species. There is a lack of recent,

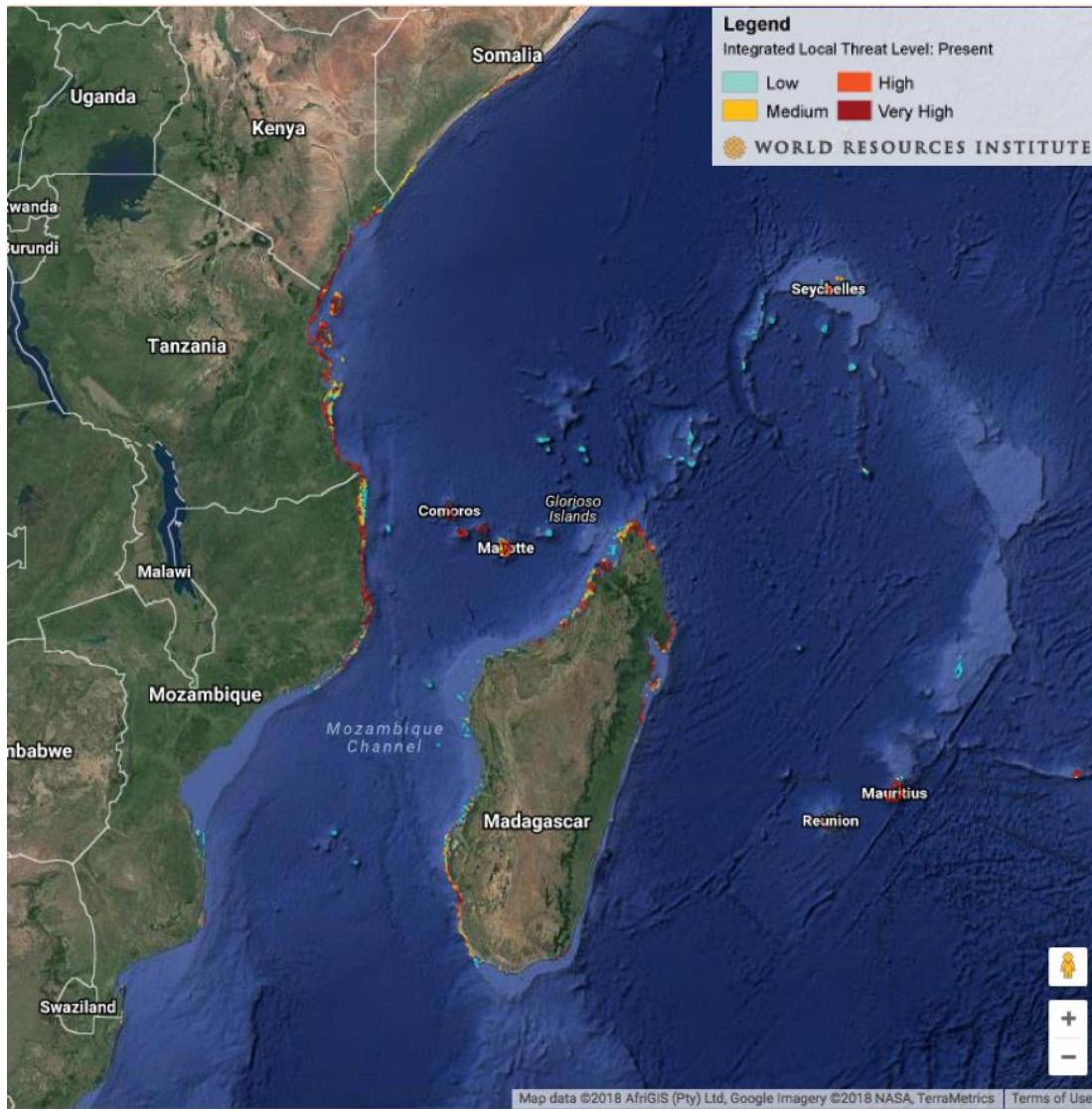


Figure 11: threats to mangroves in the WIO area

harmonized regional data, but recent country-level estimates and studies show most of these mangroves are experiencing significant degradation and encroachment, often to the point of disappearance. Some countries have experienced nearly 30% decreases in mangrove areas, and the remaining areas are showing signs of stress³⁹. The main threats observed are the clearing of mangrove forests for agriculture or salt production, to build

³⁸ WWF. Mangrove importance (2017).
http://wwf.panda.org/about_our_earth/blue_planet/coasts/mangroves/mangrove_importance/

³⁹ Regional State of the Coast Report,

aquaculture facilities, for tourism development, pollution from agro-chemicals, or felling of trees for construction.

Biodiversity

The region has a unique geology that contributes to unique biodiversity and high endemism. There are more than 2,200 species of fish, 300 species of hard coral, 10 species of mangrove, 12 species of seagrass and 1,000 species of seaweed, as well as hundreds of species of sponges, molluscs and crabs, which are found in the coastal and marine environment of the WIO.⁴⁰

According to the 2015 State of the Coast Report for the WIO region, the Western Indian Ocean is recognised as a distinct bio-geographic region. “Overall, some 2000 species of reef fish and 400 hard coral species have been reported for the area. In corals, 10 per cent of the species found in the WIO are endemic to the West & North Indian Ocean, with the balance (90 per cent) being widespread in the broader Indo-Pacific, a proportion also reflected in the fish”. “The total number of species in the WIO region is not precisely known, but the estimated range is between 11 000 and 20 000 or more, with estimates varying depending on the water depth and organism size, mindful that invertebrate fauna in most deep-sea environments are the least known⁴¹. Drawing upon the IUCN Red List, 161 species are listed as threatened, with 126 listed as vulnerable and 8 listed as critically endangered.

Major taxa	Vulnerable (VU)	Endangered (EN)	Critically Endangered (CE)	Totals
Seagrasses	1	0	0	1
Corals	76	8	0	84
Gastropods	2	0	0	2
Holothurians	6	4	0	10
Rays	7	4	3	14
Sharks	22	4	1	27
Fish	9	2	2	13
Marine Turtles	1	2	2	5
Marine Mammals	2	3	0	5
Totals	126	27	8	161

Figure 12: Vulnerable and endangered taxonomic groups⁴²

According to the SOLSTICE project of the Global Challenges Research Fund, the region has seen some “dramatic and often poorly understood reductions in key fisheries (...) For

⁴⁰ Climate Change Strategy for the Nairobi Convention

⁴¹ Regional State of the Coast Report

⁴² Regional State of the Coast Report, p.130

example, in South Africa, the Chokka Squid fishery, responsible for delivering £30M annually ... collapsed in 2011, with devastating effect on fishers and fishing industries. Although the fishery has since recovered, the causes of both the collapse and subsequent recovery (we)re unclear.” These drastic changes were attributed to ecosystem shifts driven by climate change. In Tanzania, there is concern that climate change may also lead to ecosystem changes that could impact the fishery for ‘small pelagics’ (e.g. mackerel, sardines and anchovies) that provide “a source of livelihood support, food security and nutrition, particularly for low-income households, which cannot afford larger, more expensive fish species”⁴³.

In 2012, there were approximately 69 Marine Protected Areas and 66 Locally Managed Marine Areas (LMMAs) which represent 10.9%⁴⁴ of the total WIO area (594,331km²)^{45, 46}.

2.4.2 Socio-economic factors of vulnerability

Approximately 60 million people live within 100 km from the coast in the WIO region. As they depend to a large extent on natural resources to live, they also exert a growing pressure on these resources.⁴⁷ Without adequate form of exploitation and sustainable economic development coastal deterioration could accelerate to the point where the area would be hardly liveable. However, implementing these sustainable and resilient economic pathways requires a paradigm change that is beyond the capacity of local communities due to a number of underlying drivers, including poverty, food insecurity and inadequate coastal governance and planning mechanisms.

As seen in section 1, poverty and inequality remain widespread in most of the WIO countries, and the WIO region is highly dependent on the ocean for economic stability. Over the past few years, reduction in key fisheries – attributed to the combined impacts of climate change, overfishing and degradation of marine habitats – have placed coastal livelihoods at risk. The first to suffer from decreases in fisheries are the small, artisanal, often family-based micro-enterprises that depend on them.

It is widely recognized there is a mutual cause and effect relationship between poverty and environmental degradation, particularly in economies that depend directly on natural resources for livelihoods. Degradation of resources reduces the productivity of the poor who most rely on them, and makes poor people even more vulnerable to external shocks (weather, economic, and civil strife). Poorer communities are usually less resilient because their adaptive capacity and coping mechanisms are limited. The shorter time-horizons and usually less secure access to natural resources faced by poor communities also limit the ability to invest in or sustain adequate natural resource management.

In addition to these root causes of vulnerability, governance processes in the region have been generally inadequate to deal with the complexities of coastal and ocean ecosystems,

⁴³ <http://www.solstice-wio.org/science>

⁴⁴ Towards A Network of Locally Managed Marine Areas (LMMAs) in the Western Indian Ocean. <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0103000&type=printable>

⁴⁵ UNISDR. Review of South-West Indian Ocean Region. http://www.unisdr.org/files/43526_southwest.pdf

⁴⁶ WWF, REVIVING THE WESTERN INDIAN OCEAN ECONOMY Actions for a Sustainable Future, 2017, p.30

⁴⁷ CORDIO-East Africa (2018). Western Indian Ocean – Ocean Economy Report. <http://cordioea.net/wio-ocean-economy/>

mostly because plans and policies remain sector-based, rather than focusing on an integrated geographic unit or landscape. The Nairobi Convention and WIOMSA have recognized some governance weaknesses such as policy and legislative inadequacies, limited institutional capacities, inadequate awareness, inadequate financial resources and mechanisms, as well as poor knowledge management. Lack of data and scientific information also underlies the inadequacy of policy decisions. Studies note that WIO countries have all ratified the major multilateral and regional agreements, however there are gaps in the translation of these agreements into national law and practice. Other governance related limitations include ineffective mechanisms for effective coordination among the institutions involved in the management and use of the coastal and marine environment and the inadequacy of human and technical resources and capacity in responsible institutions.

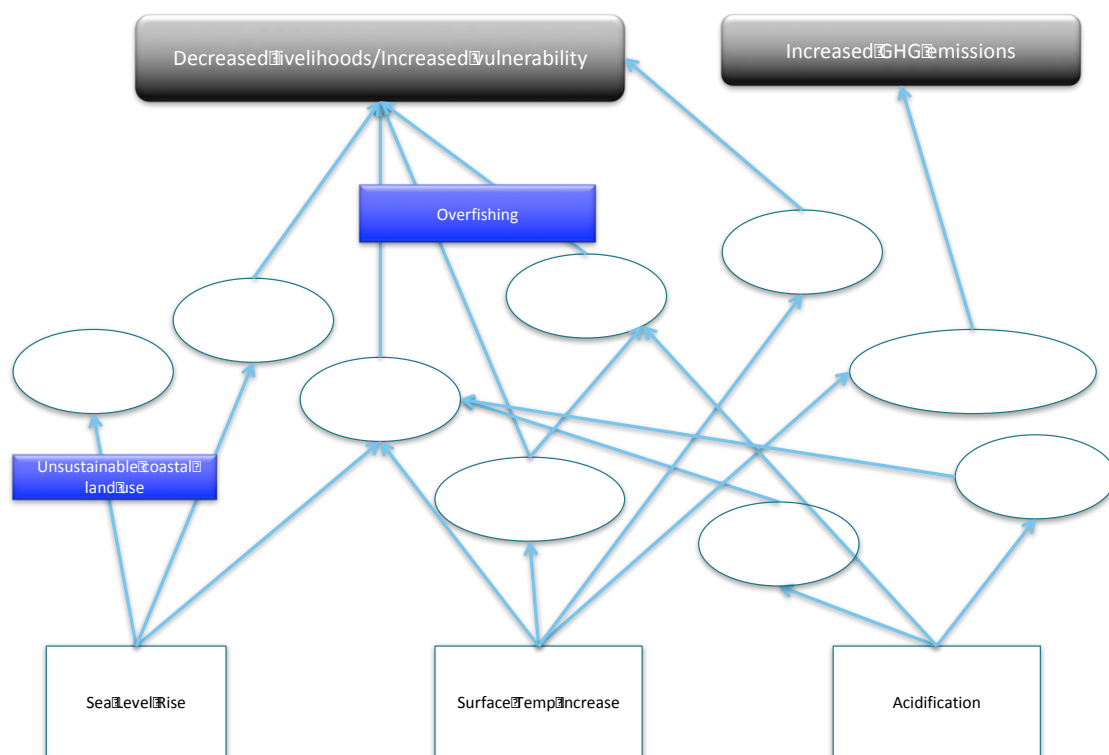


Figure 13: Problem tree - the climate change problem

3. Baseline Situation and initiatives

A number of ongoing initiatives aim at addressing the fundamental development problems faced by WIO countries. In addition to publicly funded projects and initiatives, including those supported by multilateral and regional development banks, private sector investments are also influencing the deployment of local economies in the coastal space. In parallel, there are also a number of targeted initiatives that seek to address environmental degradation, and an increasing number of national adaptation initiatives are being implemented in coastal areas. These create a backdrop against which the proposed project will take place and on which it intends to build to generate a scalable transformational impact.

There is, in some parts, a growing emphasis on the sustainable use of ocean and coastal resources in what has become known as the “blue” or sustainable ocean economy. For example, the Government of Seychelles has adopted the Blue Economy Concept⁴⁸, Mauritius is investing in the Ocean Economy⁴⁹ and the Republic of South Africa has developed Operation Phakisa⁵⁰ to unlock the economic potential of the ocean in a sustainable manner. However, progress in shifting economies is slow to get off the ground, and risks being outmatched by the pace and scale of climate change impacts. A more thorough assessment of national baselines will be provided during project preparation.

Project	Summary	Area of Implementation
Third South West Indian Ocean Fisheries Governance and Shared growth project (SWIOFish3)	With sub-projects at regional and national levels, the purpose of the support provided by World Bank is to improve management of marine areas and fisheries in targeted zones and strengthen fisheries value chains. The first component, expansion of sustainable-use marine protected areas will support the Government of the Seychelles (GOS) in implementing its pledge to protect an increasing share of its maritime space. The second component, improved governance of priority fisheries will have a greater focus on fisheries management at a national level. The third component, sustainable development of the blue economy will help finance the sustainable development of the Seychelles blue economy and support increased value addition in the aquaculture, industrial, semi-industrial, and artisanal fishing and processing sectors.	Regional plus Seychelles, Madagascar, Comoros, Maldives,
Solstice – WIO	The project aims to use science to address climate change impacts and to ensure ecosystem sustainability, as key science gaps remain, such as the regional effects of SST warming on biodiversity. ⁵¹ SOLSTICE-WIO is one of several four-year projects funded by the Global Challenges Research Fund (GCRF), with the aim of growing the capacity of UK and overseas research organisation to address the challenges facing developing countries. The project	Regional

⁴⁸ <http://www.natureseychelles.org/what-we-do/blue-economy>

⁴⁹ <http://www.oceaneconomy.mu/>, supported by Maurice Ile Durable (<http://mid.govmu.org/>)

⁵⁰ <http://www.operationphakisa.gov.za/operations/oel/pages/default.aspx>

⁵¹ The Curious Case of Indian Ocean Warming. <http://journals.ametsoc.org/doi/full/10.1175/JCLI-D-14-00471.1>

	addresses three of the many challenges identified by GCRF: • Secure and resilient food systems; • Resilience and action on short-term environmental shocks and long-term environmental change; • Reduce poverty and inequality.	
ACCLIMATE ⁵²	The project was implemented by the Indian Ocean Commission and included the development of climate vulnerability studies for all the IOC countries, the development of a regional adaptation strategy and action plan, and achieved progress towards the harmonization of regional climate data and the determination of climate change indices. The project was funded by the Fonds français pour l'Environnement Mondial (FFEM), le ministère des Affaires étrangères de la France, l'Agence française de Développement (AFD) et la Région Réunion.	Regional

In addition to the above listed projects, a number of **regional bodies** are working to expand coordination on key topics and sectors. These include:

- the Nairobi Convention,
- the South-West Indian Ocean Fisheries Commission
- Indian Ocean Commission,
- Western Indian Ocean Marine Science Association (WIOMSA)
- Common Market for East and Southern Africa (COMESA), the
- East Africa Community (EAC) and the
- Inter-Governmental Authority on Development (IGAD).
- Indian Ocean Tuna Commission (IOTC),
- South West Indian Climate Outlook Forum
- Coastal Oceans Research and Development – Indian Ocean

The WIO countries have come together to articulate the Climate Change Strategy for the Western Indian Ocean region, developed by the Western Indian Ocean Marine Science Association and the Secretariat of the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean (Nairobi Convention).⁵³

⁵² <http://www.acclimate-oi.net/etudes-et-rapports-projet.html>

⁵³ Climate Change Strategy for the Nairobi Convention

3.1 Gaps and barriers

The analysis of current threats and baseline situation shows that in the face of climate change, there is an urgent need to reorient the development pathways in the region towards more resilient, adapted approaches. In order to achieve this, however, a number of barriers need to be addressed, including, for example:

Scientific barriers: As noted above, there is a lack of data on the state of local natural resources, including recent data on fisheries and analysis of the climate change impacts on fishery fluctuations. The causes of fishery collapse and the options for recovery are not well understood.

There are research needs on the evolution of biodiversity and the state of threatened species, that can better inform the management and creation of protected areas and that can help orient activities in sectors such as fisheries and tourism. There is also a need to harmonize national and local data to ensure information of relevance to the region is shared appropriately. More specifically, the impacts of climate change on oceans and ocean life are not yet fully known. Observation networks for coastal and ocean ecosystems remain weak and dependent on external project funding. Academic institutions who conduct high caliber research do not see their efforts integrated into the mainstream of policy-making, and as a result, there is a profound disconnect between coastal management decisions and the current state of knowledge.

Policy barriers: Partly as a result of the science and knowledge barriers above, but also partly because national and local policy makers continue to operate along the outdated sector-based approach, policy frameworks that govern coastal resource use are inadequate. Overlapping mandates, lack of coordination at national and regional levels, short-term profit-based decisions on the part of private investors, and the urgent need to ensure basic development and economic growth, all contribute to the unsustainable management of coastal zones. While efforts have been made in a lot of countries to adopt Integrated Coastal Zone Management or Integration Coastal Area Management frameworks, these have yet to translate into any significant changes. This is in part because financial resources for implementation are lacking, and because the re-orientation of development policies that is required, has not yet been achieved due to low institutional capacity, resistance to change, and lack of political will.

Furthermore, this reorientation of development policies would require the establishment of lasting mechanisms for the inclusion of private sector actors into decision-making, as well as the adoption of clear regulatory frameworks that set boundaries for coastal zone management. This is hard to achieve at national level, and harder still at regional level, despite the existence of coordinating and consensus-building bodies such as the IOC or the Nairobi Convention.

Financial barriers: Finally, across all countries, there is a lack of financial resources to assist in re-orienting development and to invest in the rehabilitation and sustainable management of coastal resources. National finance is scarce – most of the countries concerned are highly indebted and have a weak income base – and for the countries who are higher on the development scale, competing priorities and the grip exerted by foreign investment and private sector interests, limits the ability of governments to act. National fiscal policies and economic instruments need to be redeployed to support and incentivize sustainable management practices, particularly in terms of fisheries, tourism and conservation. There is also a need to leverage private sector investment into low-carbon, resilient activities.

4. Theory of Change

The project proposes a comprehensive approach to address these barriers in order to leverage concrete adaptation action in the west Indian ocean region. The WIO countries are committed to take remedial and proactive action for the protection of the marine and coastal environment. The proposed approach provides responses to both climate and non-climate stressors that promote the dual goals of climate resilience and sustainable development.

While there are inherent uncertainties associated with the magnitude and timing of future climate changes and their impact on ecosystems, it is both possible and essential for adaptation to proceed using the best available knowledge.⁵⁴ The proposed solution includes the implementation at regional scale of a Blue Economy Framework⁵⁵ that will reduce pressures on fragile coastal natural resources, combined with the implementation of urgent ecosystem-based adaptation measures designed to remedy the existing vulnerabilities and pre-empt future climate change impacts.

4.1 Project Goal and Objective

The *goal* of the project is to reduce the vulnerability and improve the resilience of the 60 million people residing in coastal communities across the WIO region. The *objective* of the project is to increase the adaptive capacity of public and private stakeholders to address the impacts of climate change, through a transformed development approach.

4.2 Project logic

The proposed project builds on the existing baseline of development including public and private investment in infrastructure, institutions and finance, to address the additional challenges posed by climate change. The project intends to promote an integrated approach to adaptive action, leveraging innovative financing mechanisms, catalyzing early adaptive action, accelerating technology transfer, and improving institutional and regulatory frameworks. The proposed project intends to leverage national and regional level action to generate multiplied benefits for the entire ecosystem of the WIO area.

⁵⁴ Climate Change Strategy for the Nairobi Convention

⁵⁵ The World Bank Group. Blue Economy development framework.
<http://pubdocs.worldbank.org/en/446441473349079068/AMCOECC-Blue-Economy-Development-Framework.pdf>

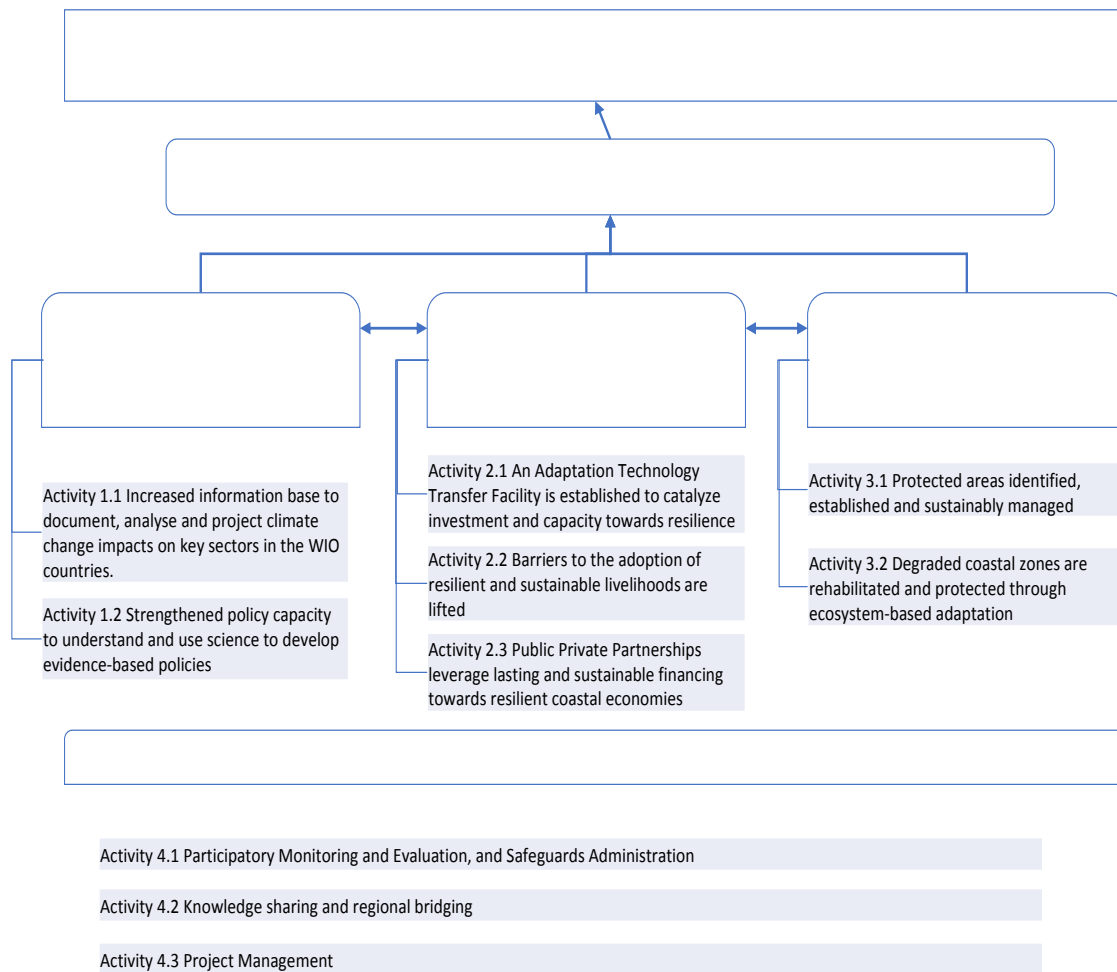


Figure 14: theory of change

5. Project Strategy

The project is delineated in three substantive Key Activities supported by 7 key activities, each comprised of a set of sub-activities, as described and analysed below. Each of the three Key activities contributes to the other two. The final Key Activity (Key Activity 4) consists in supporting effective program governance, to ensure regional synergies and impacts are adequately leveraged.

Key Activity 1: An improved science base informs policy-making in all sectors towards the deployment of a Blue Economy Development Approach.

A number of targeted research initiatives are underway in various countries and globally, that provide a growing body of evidence of climate change impacts on the region. Many

of these are based on the development of collaborative partnerships among universities and regional research centers or NGOs (e.g. WIOMSA, CORDIO).

However, much of the information on the state of coastal resources and ecosystems remains nationally based, and no single country is capable of responding to the full scope of research needs. In addition, the bridges between the available knowledge and data and policymakers is weak. To be effective, information needs to be presented in a way that is convincing enough to generate policy change, either at the macroeconomic policy level, at the sectoral level, or at the territorial planning level.

Furthermore, key agents of change, namely the private sector, have traditionally been excluded from research, although some technology developers have partnered with regional organizations to promote research activities.

Activities under this Key Activity will therefore seek to address these shortcomings by promoting collaborative research and supporting effective science-policy linkages at all levels. The Key Activity is delivered through two Key Activities focused on generating additional knowledge on climate change impacts in the WIO and on improving policy making capacity on the basis of that knowledge.

Key Activity 1.1 Increased information base to document, analyze and project climate change impacts on key sectors in the WIO countries.

Under this Key Activity, the project will support collaborative research programmes, in close collaboration with global research and climate observation partners (including WMO, IPCC, NOAA, others) in which communities, academic institutions, governments, private sector, will work together to determine priorities and to analyze results. An example of collaborative research focusing on adaptation that could be followed includes the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAS). The CARIAS was delivered by 4 research consortia each focusing on one of four “adaptation hotspots”. Building on, and continuing, the results and partnerships of the SOLSTICE-WIO project, a similar approach could be adopted for the WIO as whole, as an adaptation hotspot or to sub-regional areas (for example southwest Indian ocean).

The research would be delivered using the SOLSTICE-WIO governance mechanisms, in order to continue working with locally-based institutions. Additional research institutions and partners could also be invited to join and form consortia around specific themes. All research would focus on identifying, understanding and communicating the impacts of climate change in policy-relevant sectors. The expected result of this research will be added evidence and reduced uncertainty regarding specific climate change impacts on sectors such as commercial and artisanal fisheries, safety at sea, agriculture, tourism, and water. Each research initiative will deliver targeted recommendations applicable to all countries in the region. Where warranted, country level or sub-system case studies may also be developed.

While specific implementation and operational arrangements will be finalized during project preparation, essential elements of the research program will include the following:

- A collaborative governance system whereby policy and science meet to discuss research priorities;
- A focus on climate change and action-oriented research to support adaptation and low-carbon development pathways;
- A structure whereby research grants are allocated according to a merit-based competitive process.

The delivery of this collaborative research will require technical capacity building (training), material capacity (observation networks and analytical tools), and the development of institutional protocols for collaboration, including addressing intellectual property rights, right to information and information sharing issues as well as the capacity of scientific institutions to produce data of higher quality.

Sub-activities could include:

- Updated and harmonized country-level coastal vulnerability assessments: This would include building on the work conducted under the ACCLIMATE project (IOC) in 2010 where a single framework was applied to the south-west sub-region.
- Analysis of trends, impacts and options for response to acidification;
- Improvement of coastal climate observation networks, including ocean observation, coastal erosion monitoring, SST measurement, and ongoing data collection for key climate parameters
- Strengthening of existing scientific entities to produce data of higher quality, and to harmonize data standards to enable sharing, including through training;

Key activity 1.2 Strengthened policy capacity to understand and use science to develop evidence-based policies

The second activity aims to create bridges between climate science and policy development. Whereas under Activity 1.1, governments and decision makers in all sectors would be called upon to co-design research programmes, under this activity the project will strengthen their capacity to understand, analyze and act upon the results of the research. This will require building human and institutional capacities for adaptive policy development. A first step would be to strengthen multi-stakeholder platforms towards the redesign of policies in all sectors. Frameworks such as the Blue Economy Framework and Integrated Coastal Zone Management can provide useful avenues, since they have already been piloted in most countries. As a result of the project, countries should be able to make effective policy decisions on the basis of presented evidence, and to initiate lasting changes in their planning and development processes.

Activities under this Key Activity could include:

- Development of policy-relevant research findings;
- Creation or strengthening of multi-stakeholder platforms in key sectors, including fisheries, agriculture, transport, tourism, health;
- Reassessment of macroeconomic policies (e.g. EEZ) and explicit or implicit policy incentives towards adaptive economies, including the development and adoption of a “BlueTrade” standard for fair, climate-smart products originating from the WIO;
- Harmonization of land-use plans, ICZM plans, NAPs and NAPAs;
- Climate leadership training for senior policy makers.

Output 2: Resilient livelihoods and economic activities are pursued, in partnership with the private sector

There is an urgent need to accelerate the uptake of more resilient livelihoods activities, at scale, in all the countries of the region. These more resilient livelihoods should be based on the transfer of best available technologies and approaches, in a partnership between

public and private entities. While targeted adaptation action has taken place in most countries concerned by this project, these adaptation measures have not yet fully penetrated the markets and cultures of the countries, meaning that most economic activity in the area continues to depend on outdated views, approaches and technologies. In particular, coastal land use continues to be uncontrolled and pressures from uninformed private investors often trump any precautionary policy making (e.g. in the fisheries and tourism sectors, for example). As a result, communities often find themselves relegated to marginal land or less productive zones, and prevailing poverty – combined with low enforcement capacity on behalf of government entities – leads to unsustainable natural resource use, such as mangrove degradation, coral mining, water over-extraction, deforestation, and overfishing. All of these unsustainable practices, in turn, exacerbate climate vulnerability. The project will therefore seek to create mechanisms whereby, in each sector, suitable adapted and resilient natural resource use practices can be identified, and disseminated at scale. The Output is achieved through two Key activities:

Key Activity 2.1 An WIO Adaptation Technology Transfer Facility is established to catalyze investment and capacity towards resilience

There exists a growing body of knowledge on the most suitable technologies for adaptation. However, this knowledge is dispersed, and not always being put into practice. Given that most of the countries in the WIO region face similar issues, the project will first analyze best practices and technologies for adaptation in the region in the key economic sectors, in conjunction with the collaborative research undertaken in Key Activity 1.1. The purpose of this Key Activity is to assist countries in identifying major leapfrogging technologies and innovative approaches that can assist in implementing adaptation at scale, in a cost-effective manner, such as for example ICT for early warning and improved planning, remote sensing, precision farming, emerging technologies for land reclamation, precision fishing, etc.

An adaptation technology transfer facility will be designed, on the basis of the Climate Change Technology Network and Centre (CTCN) and building on existing initiatives, through which countries and sub-national entities will be able to access expertise, material and technical support for the implementation of adaptation technologies. The Facility would be open to all WIO entities, including governments, private sector, non-profit organizations, community-based organizations, and sub-national governments. Calls for proposals would be launched at regular intervals, and assistance requesters would need to demonstrate counterpart contributions in funds or in kind. A mechanism to make the Facility financially sustainable would be designed during project preparation and implemented under Key Activity 2.3.

Activities under this Key Activity would include:

- Undertake a census of WIO specific adaptation technology needs on the basis of existing available science and national plans such as Technology Needs Assessments, including limits and barriers to their adoption at scale;
- Create and administer a WIO adaptation technology transfer facility designed to assist public and private stakeholders in accessing expertise, material and technical support (building on existing mechanisms);
- Implement strategies to ensure financial and operational self-sustainability of the Facility.

Key Activity 2.2 Barriers to the adoption of resilient and sustainable livelihoods are lifted

Using the support and technologies mobilized through Key Activity 2.1, the project would support concrete priority adaptation interventions in participating countries, focusing on the removal of barriers to upscale. This would include addressing local adaptive capacity barriers in all sectors, for example through training, awareness raising and community mobilization, as well as through the deployment of targeted investments into productive assets. The initial sectors of focus will be fisheries, including the development of new marine-based value chains (e.g. algaculture, mariculture, aquaculture), eco-tourism and the development of sustainable tourism practices, and climate-smart coastal agriculture. In all sectors, the project will also support the use of new technologies and renewable energy sources throughout the value chains (including marine biotechnology, solar, gravity and/or wave-based energy sources). It is expected that these activities will carry significant social and economic benefits, particularly for women and youth including, improved food security, job creation, increased income, and ultimately reduced vulnerability to climate and economic shocks. This Key Activity will focus on identifying micro-, small- and medium-sized enterprises (MSMEs) that can benefit from these resilient ventures, in recognition that these types of enterprises drive markets and employ over 70% of populations in LDCs (often in the informal economy).

Activities under this Key Activity include:

- Organization of national and regional value chains, producer groups and market linkages;
- Provision of technical advice, training, seed investment financing, and access to inputs for adaptation activities
- Promote certification and market linkages using fair trade/green trade or new certification schemes (see Key Activity 1.1)

Key Activity 2.3 Public Private Partnerships (PPP) leverage lasting and sustainable financing towards resilient coastal economies

The private sector, and in particular large-scale national or multinational firms have important stakes in the economies of the region, but often fail to take environmental or climate change considerations in their investments. This includes companies in the fisheries, mining, transport and agriculture and tourism sectors, and encompasses small and medium enterprises, as well as larger private sector entities. Failure to reorient investments can lead to high levels of losses and risks being borne by private actors; conversely, there is a need to encourage compliance by the private sector with environmental laws and climate standards, and to step up corporate social responsibility initiatives in the region, while facilitating access to markets for green finance (e.g. green/blue bonds), sustainable products and services.

This requires that private sector become a partner in planning and implementation of climate-smart economies (see Key Activity 1). Under this Key Activity, the project will support governments' capacities to engage in discussions, negotiations, and eventually to formalize partnerships with the private sector to ensure a sustainable flow of funds towards public goods. This would include assessing and tapping into the willingness to pay by private sector actors at all levels for public goods such as water, climate information, improved planning services, or access to natural resources. It would also include the

ability of governments to develop innovative financial products to reorient economies towards resilience, such as for example the issuance of Blue bonds by the government of Seychelles to fund the development of sustainable fisheries. The end result of this Key Activity would be the design of innovative PPPs and financing mechanisms towards adaptive economies at national and regional levels.

Activities under this Key Activity may include:

- Establish a WIO Business Council for the Blue Economy which will serve as a regional platform for identification and negotiation of PPP opportunities;
- Undertake an assessment of the willingness to pay for key ecological and information services (including valuation and Targeted Scenario Analysis⁵⁶)
- Enter into collaborative PPPs
- Design and implement innovative public, private and PPP financing mechanisms for adaptation

Output 3: Ecosystems are restored, protected and sustainably managed for increased resilience to the spectrum of anticipated climate change

This third Output is designed to restore the already damaged WIO ecosystem to full functionality and to higher levels of resilience, in order to pre-empt climate impacts and to create protective and productive ecological services. This Output focuses on the rehabilitation, protection, sustainable use and improved management of ecosystems in the region. It will build on the Outputs of the research and improved policy making undertaken under Output 1, as well as from the application of emerging technologies for environmental restoration identified under Output 2. Reducing unsustainable natural resources uses through local level adaptation will help ensure the sustainability and long-term viability of this Output. The Output is delivered through two Key Activities.

Key Activity 3.1 Protected areas identified, established and sustainably managed.

Under this Key Activity, the project would support MPAs whether by improving the scope of protection and management of existing MPAs, or by designating and initializing the establishment of new marine protected areas, according to best practices and building on the findings of the research conducted under Output 1. The purpose of these MPAs would be to protect endangered species and ecosystems of key productive, cultural and economic value, as well as to create buffers against climate shocks and to ensure the maintenance of ecosystem services in the face of emerging climate trends. To support ecosystem connectivity and protection, the project will adopt guidelines to facilitate the establishment and development of resilient MPA and increase the synergy and cooperation among the Contracting Parties of the Nairobi Convention.

⁵⁶ Aplizar, F. and Bovarnick, A. (2013). Targeted Scenario Analysis: A new approach to capturing and presenting ecosystem service values for decision making. UNDP
http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/biodiversity/UNDP_Targeted%20Scenario%20Analysis_2013.pdf

The countries of the WIO have recognized the need to step up efforts towards conservation, as a key strategy for ensuring the long-term viability of their economies. The African Union has established Africa's Integrated Maritime Strategy (AIMS) to provide guidance to member countries in the necessity to orient their national policies towards maritime resources security and fair, responsible and sustainable exploitation.⁵⁷ The process would align activities to the targets under SDG goal 14, in particular Targets 14.2 and 14.5. The process would be informed by the obligation under the Convention of Biological Diversity (CBD) Aichi Strategic Goal C, Target 11, to increase MPA coverage for coastal and marine protection in the Western Indian Ocean (WIO) region to 10% by 2020. This would include further enhancing the use of ecosystem-based and other large-scale approaches to managing the coastal and marine ecosystems.

The project will support collaborative work in and among countries towards designation of a set of coherent, connected, and climate-smart marine protected areas and potentially a regional MPA. Under this Key Activity, the project would support the designation and establishment of new marine protected areas, according to best practices and building on the findings of the research conducted under Output 1 as well as the strengthening of the management of existing MPAs in areas that are experiencing crucial climate sensitivity (adaptation hotspots).

Furthermore, the project will implement innovative mechanisms for financial sustainability of MPAs and LMMAs, such as private-sector co-ownership of MPAs, where private organizations partner with the public sector. These partnership arrangements can leverage à opportunities for the protection of ecosystems and sustainable socio-economic development⁵⁸, including in sustainable tourism product development. However, these types of partnerships must be carefully managed. For example, there is a stronger need for enforcement towards a harmonized approach to biodiversity and sustainability issues among private and public managers and a need to ensure convergence in the legal structure among targeted countries⁵⁹.

During the project preparation, a comprehensive assessment will be conducted including a selection and characterization of adaptation hotspot areas that will be prioritized for conservation by the project, as well as a compilation of conservation priorities. This will also cover financial and governance mechanisms to be improved or developed.

Activities under this Key Activity will include:

- Census of climate impacts on current LMMAs⁶⁰ and MPAs and recommendations on management and legal changes, including the prioritization of adaptation hotspots⁶¹.
- Designation, gazetting and setting up of climate smart, regionally connected marine protected areas.

57 African Union. 2050 Africa's Integrated Maritime Strategy . http://cggrps.org/wp-content/uploads/2050-AIM-Strategy_EN.pdf

58 Open Channels. <https://www.openchannels.org/news/mpa-news/private-sector-ownership-mpas-cases-illustrate-challenges-and-opportunities>

59 Governing Marine Protected Areas: Resilience Through Diversity. https://books.google.ca/books?id=gqnpAgAAQBAJ&pg=PA175&lpg=PA175&dq=private+MPAs&source=bl&ots=9Rsa_8gKiQ&sig=44z8M7XchRAw7QYgTz4P63bbbeo&hl=en&sa=X&ved=0ahUKEwi26pvGwNLXAhXk5YMKHedrDXEQ6AEIQDAE#v=onepage&q=private%20MPAs&f=false

60 i.e. Locally Managed Marine Areas (LMA)

61 Critical habitat: areas with high biodiversity conservation significance which are critically endangered or host endangered species, restricted range or endemic species that are highly threatened. UN Environment . http://www.biodiversity-a-z.org/content/critical-habitat_e.g. coral reefs, seagrass bed, mangroves

- Improvement, development and adoption of guidelines to facilitate the establishment and development of an improved network of marine protected areas at national and regional level.
- Creation or improvement of regional MPA network focusing on resilience and connectivity for conservation of species and critical habitats.
- Implementation of innovative governance and financial strategies for sustainability of MPAs.

Key Activity 3.2 Degraded coastal zones are rehabilitated and protected through ecosystem-based adaptation

The economic value of coastal protection provided by coral reefs, mangroves, seagrasses and salt marshes in the Western Indian Ocean is estimated at US\$1.2 billion annually. Yet these ecosystems are the most fragile and most endangered by unfettered development and land use. Coastal estuaries, wetlands and lagoons also provide key regulating services, including processing and recycling organic waste. Appropriate design and/or protection and restoration of wetland systems can greatly enhance this function. At present, a very small proportion of the population of coastal towns and cities in the Western Indian Ocean region has access to sewage systems. There is potential to address this, and the use of wetlands in bio-treatment of waste could represent a massive growth sector with economic, environmental and public health benefits⁶². Successful examples of ecosystem-based adaptation approaches are emerging in the region, which can be usefully applied at larger scale to ensure long-term resilience of coastal ecosystems. New technologies are also emerging that can be deployed for these approaches, through the activities foreseen under Output 2.

The project will support country efforts to undertake the restoration of degraded protective, regulating and productive ecosystems, using a program approach. This will include the creation of a coral reef laboratory that will provide viable reef material to countries in the region and conduct experiments in resilience of reefs to bleaching events and climate change scenarios. The project will support targeted reef restoration or reef creation efforts, as well as the restoration of mangroves, using best practices and resilient varieties. The project will also provide technical assistance and funding for the restoration of estuaries, wetlands and lagoons that can provide bio-treatment capacity to neighbouring towns.

Activities under this Key Activity will include:

- Creation of a WIO Coral Reef Restoration Laboratory.
- Restoration of reefs, mangroves, estuaries, wetlands and lagoons.

Output 4: – Governance and regional collaboration

Under this Output, activities related to monitoring and evaluation, knowledge sharing within and among countries regional coordination and management of project activities will take place. In particular, this component will build on existing baseline efforts under

⁶² Mohamed et al. 2009

the Nairobi Convention to coordinate and develop common approaches among the member countries.

Key Activity 4.1 Participatory Monitoring and Evaluation

Activities under this Key Activity will include the development of a regional and national M&E systems based on participatory approaches. This will include the creation of structures for the project steering and monitoring of project targets, indicators and impacts. Participatory monitoring will involve communities, local authorities, private sector as well as governments. Impact monitoring will include monitoring and reporting on the results and benefits of each activity at national and regional levels, including ensuring the impact on gender are adequately documented. The project will also implement a regional level review at mid-term, and a terminal evaluation will be undertaken prior to financial closure.

- Development and implementation of participatory M&E system at national and regional level
- Programme evaluation – Mid-term and final
- Impact monitoring, including gender-based impact monitoring

Key Activity 4.2 Knowledge Sharing and Regional Bridging

Activities under this Key Activity will be designed with the view of creating lasting bridges and learning opportunities among participating countries. In particular, the project will support regional meetings and ensure regional cohesiveness in the implementation of activities. A comprehensive awareness raising strategy, including the use of local media, social media, and traditional communication mechanisms will reinforce the key messages and results dissemination of this project. Activities include:

- Knowledge sharing among countries, scientific community and private sector.
- The development and deployment of an awareness raising strategy

Key Activity 4.3 Project Coordination and Management

Under this Key Activity, project management activities will be supported, including the support of regional and national coordinating units. It is expected that each country would establish a project coordination unit, which would also be supported by a regional unit linked to the Nairobi Convention Secretariat. Coordination units would ensure adequate standards for management and financial planning are maintained, reporting and accountability. The Key Activity will also include activities related of the application of highest standards in terms of social and environmental safeguards, including provisions for gender mainstreaming and action planning, involvement of indigenous peoples, the creation and maintenance of redress and conflict resolution mechanisms, and environmental impact assessment. Project-related operational costs will include project staff, travel and translation. Activities include:

- Establishment and operationalization of the regional and national coordination units.
- Development of an upscaling strategy
- Application of relevant social and environmental safeguards at national and regional levels.

The proposed activities are consistent with the national policies and regional strategies adopted by all member countries (see pre-feasibility study). In addition, UN Environment is uniquely placed to deliver this innovative program to member countries, given that it currently administers the Nairobi Convention Secretariat, has developed significant body of experience in Ecosystem Based Adaptation Approaches, as well as technology transfers for climate change and climate adaptation in particular.

6. Consistency with national development policies and strategies

As noted earlier, the project is a direct result of the high-level guidance and strategic framework included in the Nairobi Convention's Climate Change Strategy, which was approved by all country Parties. In addition, the project addresses the key threats and challenges highlighted in the 2015 State of the Coast Report for the region. The project also addresses the climate change priorities as expressed in the Indian Ocean Commission's Climate Change Adaptation Strategy and Action Plan (2016-2020), and the IOC Disaster Risk Reduction Program (2015).

The following table illustrates the main policy frameworks to which this project is making a contribution.

Countries	Policies, regulations, strategies
Comoros	Accelerated Growth and Sustainable Development Strategy (2015-2019)
Kenya	Green Economy Strategy and Implementation Plan (2016-2030) Vision 2030 Country Strategy Paper (2014-2018)
Madagascar ⁶³	National Development Plan (2015-2019) Madagascar's environment Charter National Environmental Action Plan (2010) National Strategy for Sustainable Management of Biological Diversity (2007) National Strategy for the Sustainable Development of Coastal and Marine Zones (2009) Climate change Policy (2010) Pollution Management Policy (2010)

⁶³ Madagascar.
<https://info.undp.org/docs/pdc/Documents/MDG/2503%20Madagascar%20NCSA%20FRAP-141212-final.pdf>

Mauritius	National environment policy National Physical Development Plan (urban, housing, Country Strategy Paper (2014-2018)
Mozambique	Vision 2025 and 5-year program (2015-2019) Poverty Reduction Strategy Paper National Climate Change Adaptation and Mitigation Strategy (2012)
Seychelles	Seychelles Strategic and Land Use Plan 2040 Sustainable Development Strategy 2012-2020 National Climate Change Strategy Environmental Management Plans Tourism Strategy
Somalia	Somalia National Development Plan 2017-2019 Environmental Policy 2016
South Africa	Integrated Coastal Area Management Act National Climate Change Adaptation Strategy
Tanzania	Tanzania Development Plan and Vision 2025 and 5-year development plans

In addition to these broad development policies, the project will contribute to the implementation of objectives and priorities in the sectors of agriculture and fisheries, tourism, energy, and private sector development.

The project is consistent with the measures and priorities for coastal adaptation listed in the participating countries NAPAs, NAPs⁶⁴ and INDCs, and with regional and international environmental instruments signed and ratified by the member countries..

⁶⁴ “u” for under development

	Comoros	Kenya	Madagascar	Mauritius	Mozambique	Seychelles	Somalia	Tanzania	South Africa
NAPA	✓		✓		✓		✓	✓	
NAP	u	✓	u	✓	✓	✓			✓
INDC		✓				✓	✓	✓	✓
National Climate Change Action Plan		✓			✓	✓	✓	✓	✓

Conventions	Comoros	Kenya	Madagascar	Mauritius	Mozambique	Seychelles	Somalia	Tanzania	South Africa
UN Convention on the Law of the Sea	1994	1989	2001	1996	1997	1991	1989	1985	1997
Convention of Biological Diversity	1994	1994	1996	1992	1995	1992	2009	1996	1995
UNFCCC	1994	1994	1999	1992	1995	1992	2009	1996	1997
Kyoto Protocol to the UNFCCC	2008	2005	2003	2001	2005	2002	2010	2002	2002
Convention of Wetlands of International Importance (Ramsar Convention)	1995	1990	1999	2001	2004	2005		2000	1975
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1994	1979	1975	1975	1981	1977	1985	1979	1975
African Convention on Conservation of Nature and Natural Resources	2004	s	s		s		s	s	2013
Convention on the Protection of the Underwater Cultural Heritage			2015						2015
Convention on the Prevention of marine Pollution by Dumping of Wares and Other Matter (London Convention)		y				y		y	y
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	y	y	y	y	y			y	y
Convention on Persistent Organic Pollutants (Stockholm Convention)	2007	2004	2005	2004	2005	2008	2010	2004	2002

7. Pre-feasibility considerations

Most of the activities foreseen under this project fall within the broad category of capacity building, scientific research and institutional reform. However, a few key interventions require some specific feasibility considerations, which will be further explored during the Project Development Phase.

Key Activity 1.2 Policy incentives towards adaptive economies.

Under this activity the project would build on existing structures, institutions and processes to develop new, promising and niche markets for products originating from the WIO countries. This would first require an assessment of existing value chains on the domestic, regional and international markets, to determine options for increasing resilience and for the integration of low-carbon strategies. Based on preliminary assessments, the following have been highlighted for further exploration:

- Fisheries and related processed products
- Spices and agri-food
- Textiles and clothing
- Tourism products and services
- Arts, crafts

The next step would be to work with national standards emitting organizations (NSBs) and international standard emitting organizations to assess the potential for applicability of existing standards to products or the opportunity of creating a new BlueTrade Standard. Such a BlueTrade standard would include criteria such as those already being enforced related to social safeguards (e.g. FairTrade, FairMined), environmental safeguards (e.g. Organic and Green certification), but also include carbon neutrality, and resilience-related indicators which would be defined through the project. Products targeted for certification and potential value chain development would also be subject to eligibility criteria related to international treaties and safeguards (ABS, CITES, IAS, etc.).

Key Activity 2.1 - Adaptation Technology Transfer Facility

The project would build on successes and experience of similar facilities or mechanisms to design a facility that would cater to the specific needs of the region, while creating an attractive vehicle for investment and private sector engagement. Examples of similar mechanisms that could be learned from include:

- The Climate Change Technology Center and Network (CTCN)
- The Global Mechanism of the UNCCD
- The UNFCCC Expert Group on Technology Transfer

The facility would enable the identification of technology needs and providers, as well as the design of suitable transfer mechanisms including Sale of rights to a particular patent or technology, brokering, licensing, technology assistance and consultancy contracts, joint venture agreements, Memoranda of understandings. The terms of reference of the facility would include the following tasks:

- a. Conduct regular consultations in countries towards the formulation of concrete technology transfer needs and requests
- b. Identify, through participating in trade shows, climate venues, industry forums and consultations with national chambers of commerce, technology providers and service providers.
- c. Broker agreements between private sector, governments (at national and sub-national levels), and NGOS
- d. Identify private sector technology driven investment opportunities
- e. Share knowledge and information through trainings, webinars, and communications outreach.

Sectors in which the facility would focus its activities will include: climate smart agriculture, resilient and sustainable fisheries, ecosystem restoration and management, renewable energy and waste to energy technologies.

The Facility could be adjoined to an existing organization or institution, such as for example the Nairobi Convention Secretariat or the Indian Ocean Commission. It would be staffed by at least 3 experienced professionals and management personnel.

Operating costs and the delivery of workplans would be covered by the project at a decreasing rate over the duration of the project, to be fully replaced by a cost-recovery mechanism by the end of the project, with a view to making the facility fully self-sustained in the post-project phase. (100% for year 1, 2 and 3, and 75% year 4, 50% year 5, 25% year 6).

Key Activity 2.3 – Public Private Partnerships

The activities of the facility would also be closely linked to the West Indian Ocean Business Council for the Blue Economy which would be established under this activity. This Business Council would be established as a network institution which would bring together national chambers of commerce, regional financing partners and donors, private sector entities and national financial institutions (e.g. banks and micro-credit facilities) to engage in dialogue on PPPs for climate change.

The project would organize meetings, workshops and symposia, as well as offer trainings and an on-line platform for information sharing among public and private entities. It is expected that representation in this business council will be open to high-level government decision-makers and business leaders in the region. Meetings may be organized on the margins of trade shows or other regional meetings to maximize attendance and reduce costs.

Output 3 – Ecosystem Restoration

Activities under Output 3 propose a range of technical options for the restoration of climate damaged ecosystems and ecosystem services. A full technical feasibility assessment will be conducted during preparation phase. The following elements can be considered at present:

Marine protected areas and Large Marine Managed Areas. There is longstanding practice in the designation and management of MPAs in the region and within UNE as a whole. The project will build on such experience and practice, leveraging ongoing projects and programs and relying on in-house capacity within countries and within UN Environment. The project will support a census of climate change impacts on existing protected areas and make recommendations on changes to be enacted for the ongoing protection of critical habitats, species and ecosystem services. This will be undertaken as a regional initiative, although each country will bear responsibility for enacting the required changes.

Management (METT) scores for existing PAs will be compiled according to the most recent evaluation formats, and the project will also support the integration of a resilience-related indicator to assess efficiency of management systems for existing PAs. Importantly, the project will support countries in identifying opportunities for linking MPAs and in identifying sustainable financing mechanisms for long-term maintenance of protection.

The feasibility study will explore further the potential location, content, function and purpose of a regional MPA network that addresses connectivity and resilience issues.

Coral Reef Research Laboratory. Various techniques and approaches are proposed for this activity; the project will create a coral reef restoration laboratory, which will be housed within an existing scientific institution in the region. The laboratory will deliver a targeted research program which will end at the end of the project and which will focus on identifying best practices for dealing with climate change impacts on Indian Ocean reef systems. The Laboratory will be closely linked to other existing research institutions and programs.

The project will cover 90% operating expenses of the laboratory during the delivery of the program, including materials, transport, travel and salaries for scientists, with the remainder covered through a cofinancing arrangement with the housing institution (e.g. administrative services). The research program and questions will be defined during the feasibility study on the basis of an analysis of current research findings and availability.

Ecosystem Restoration. The project will support partial costs of undertaking ecosystem restoration to ensure the rehabilitation of key services in the face of climate change impacts. Restoration will focus on reefs, mangroves, estuaries, wetlands and lagoons. This will require the identification of specific climate-impacted sites in each country and the development of indicators required to prioritize interventions. Key adaptation options for each of the sites will be explored, and any restoration activity will be associated with agreement by governments and communities to establish appropriate management systems.

Restoration techniques may include the following:

For Reefs⁶⁵

- Structural restoration in areas where the reef has been lost due to disturbance. This is less applicable to bleaching affected reefs, however the technique can also be used to expand reef limits or to re-create a reef where its protective services may be needed for climate change resilience. Structural restoration involves the construction of artificial reefs, sinking of wrecks, or relocation of rocks/dead coral heads. The goal is to increase the amount of reef structure and habitat available for the corals and other reef organisms to grow on.
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- Biological restoration entails increasing the amount of living corals on the reef in areas where structure is already available. This is achieved through methods such as collecting and rehabilitating naturally broken coral fragments, propagating coral colonies, culturing coral larvae, or transplanting living coral colonies. The general goal of biological restoration is to regrow corals in areas where populations have been diminished or lost. This is most applicable in areas which have been impacted by bleaching, disease, predation, algae overgrowth, sedimentation, etc. Biological restoration may also include integrating fish, giant clam, or other

⁶⁵ <https://www.newheavenreefconservation.org/learning-resources/explore-topics/reef-restoration-methods>

nurseries and aggregation devices to restore reef balance and return vital symbiosis necessary for reef health.

- Physical restoration involves addressing the conditions in which the corals are growing to improve their health, growth rates, or fecundity (reproductive ability). Methods include mid-water coral nurseries or mineral accretion devices. Mid-water nurseries are used as a staging area for rehabilitation of damaged or propagated corals before they are placed back out onto artificial or natural substrates. Generally, corals growing on mid-water nurseries have very high survival rates and tend to grow faster than similar colonies on the natural reef due to decreased stress caused by sedimentation, eutrophication, predation, or pollution.
- Mineral accretion devices are an advanced reef restoration technology which uses low voltage electrical energy to change the water chemistry directly around the structure. The process of electrolysis utilized by the technology increases sea water pH and causes carbonate salts to precipitate out of the water (CaCO_3 , MgCO_3 , etc). In these conditions, corals can devote less energy to forming skeletal structure and divert that energy into other processes such as tissue growth/repair, immune system, mucus production, lipid storage, or reproduction. Corals growing on these devices tend to grow 3-5 times faster than their natural counterparts, and will survive in an extended range of physical conditions. This means that corals can thrive in areas where temperature, water quality, or light levels would otherwise be outside the range for that specific coral's survival.

For estuaries: Restoration is generally needed to overcome reductions in the following elements of an ecosystem: (1) habitat fragmentation; (2) habitat and species diversity; (3) population size, dynamics and range of species; and (4) goods and services. Restoration of estuaries may take various forms such as revegetating salt marsh, mangrove, and seagrass habitats, repopulating shellfish beds, removing contaminated bottom sediments and hardened shoreline structures, installing oyster reef substrate, re-establishing freshwater inflow, removing invasive species, and improving water quality of land runoff.

For wetlands and tidal marshes: various measures can be implemented to stabilize eroding shorelines of tidal marshes using natural intertidal reef communities comprised of shellfish, coconut fiber biologs and mats, bagged culch, and wooden stakes positioned at high and mid intertidal zones.

For mangroves: Mangrove restoration often involves reforestation using appropriate species, for example red mangrove *Rhizophora spp.* It usually follows three main stages: sorting propagules, supplying propagules to planters and planting. Methods also include the Ecological Mangrove Restoration Methodology (EMR) which focuses on restoring not only plant cover but also the mangrove hydrology, which is crucial to ensuring survival rates and resilience. Natural regeneration assisted by limited replanting may be privileged in areas with relatively moderate degradation, as some studies have shown that intensive replanting mangrove rehabilitation initiatives have experienced high mortality rates.

A detailed ecosystem restoration feasibility assessment and plan will be developed during the project preparation phase with a long-list of sites, the set of criteria used to prioritize interventions,

⁶⁶ Madgwick and Jones (2002) and Elliott *et al.* (2007), as cited in <https://www.nature.com/scitable/knowledge/library/restoration-of-estuaries-82965822>

and technical options. Sub-projects will be selected during implementation by the Regional Project Steering Committee.

7.1 Beneficiaries and targeting

Based on an initial assessment of activities, the following estimates of beneficiaries have been calculated. The largest group of beneficiaries is the private sector, informal economy, small and micro-enterprises and individual producers. The detailed targeting strategy and beneficiary calculations will be further detailed in the feasibility study once sites are selected. The targeting strategy will also ensure that adequate participation of women and youth is maintained through all activities and sub-activities. The initial targets, subject to feasibility, is that 60% of direct beneficiaries will be women, and 50% will be youth (18-29).

Output/Activity	Type of Beneficiary	# of Direct Beneficiaries	# of indirect beneficiaries
Output 1: An improved science base informs policy-making in all sectors towards the deployment of a Blue Economy Development Approach.			
KA 1.1 Increased information base to document, analyse and project climate change impacts on key sectors in the WIO countries.	Scientists	100 people trained	All
KA 1.2 Strengthened policy capacity to understand and use science to develop evidence-based policies	Private sector government officials	450 people (50 people per multi-stakeholder platform per country) 135 Senior government officials trained on climate leadership (15 per country)	All
Output 2: Resilient livelihoods and economic activities are pursued, in partnership with the private sector			
KA 2.1 An Adaptation Technology Transfer Facility is established to catalyze investment and capacity towards resilience	Private Sector	1000 enterprises (MSMEs) of approximately 3 people each: 3000 people	assuming a scaling up factor of 1:1, 1000 enterprises.
KA 2.2 Barriers to the adoption of resilient and sustainable livelihoods are lifted	Private sector (small or informal enterprises)	120 groups of 10 people, in 9 countries = 10,800 organized into producer	assuming a scaling up factor of 2.5 = 27,000 people

		groups for resilient value chains	
KA 2.3 Public Private Partnerships leverage lasting and sustainable financing towards resilient coastal economies	Private Sector	20 enterprises in each country = 180 companies	
Output 3: Ecosystems are restored, protected and sustainably managed for increased resilience to the spectrum of anticipated climate change			
KA 3.1 Protected areas identified, established and sustainably managed		600,000 (assuming a proxy of 10% of the coastal population deriving direct livelihoods from within MPAs)	60,000,000 (total estimated coastal population)

8. Implementation arrangements and stakeholder engagement

The UN Environment Agency will act as accredited entity and executing entity for this project. Funds will flow from the GCF and cofinancing partners to UNE, with a project management unit established within the Secretariat of the Nairobi Convention. UNE will enter into partnerships with individual countries, suppliers, NGOs and research institutions according to project plans.

A regional project steering committee will be established that will include all participating countries, relevant international organizations (e.g. Indian Ocean Commission), academic partners and NGOS and private sector. The Project Steering Committee will meet twice a year on the margins of Nairobi Convention meetings.

The PSC provides overall coordination, strategic advice and support to the project. The Regional Coordination Unit will be housed at UNEP and the Nairobi Convention Secretariat will serve as its Secretariat. The PSC shall meet once a year. More precisely, the PSC will:

- Approve Annual Work Plans and Budgets, procurement plans and program implementation plans.
- Approve any significant revisions to the program plan and maintain records of adaptive management decisions;
- Provide support for program monitoring and evaluation, by assuring quality of processes and products, and supervising evaluations for performance improvement, accountability and learning;
- Review and approve reports submitted from National implementation units.
- Ensuring that resources are committed to the programs' objective;
- Arbitrate on any conflicts within the program;
- Undertake coordination with external bodies and partners;
- Ensure full participation of stakeholders in project activities;
- Maintain adequate implementation of program safeguards and checks and balances.

Representation from civil society, women's groups and indigenous peoples will be mandatory.

Project Coordination Unit

The **Project Coordination Unit (PCU)** is responsible for day-to-day management and delivery of program activities, including financial management and controls. The PCU will be comprised of a Coordinator, supported by officers in charge of Procurement, Safeguards, M&E, Public Relations & Media, as well as an Administration & Logistics Assistant.

The Program Coordinator will:

- Provide overall leadership towards implementing the program;
- Ensure coordination and uniformity of approach with the National coordination units;
- Oversee the preparation and updates of the program work plan and budget;
- Oversee procurement according to the procurement plan and UNE procedures, including development of terms of reference, tender notices, purchase orders;
- Maintain the overall financial integrity of the program and bear responsibility for adequate financial controls;
- Participate in the negotiation with suppliers, stakeholders, partners and cofinancers;
- Execute the monitoring and evaluation plan, document results and report to the PSC and GCF;
- Assist in the dissemination of the program findings.

The Coordinator will also monitor the ongoing initiatives associated with climate and building resilience in the region to avoid duplication of efforts.

The **Procurement Officer** will develop, implement, manage, control and update procurement processes in line with the program procurement plan:

- Develop, review and update procurement process at regional level;
- Develop terms of reference, bills of goods, purchase orders and all required documents towards the acquisition of goods and services as applicable (at regional level);

- Liaise with national procurement officers to ensure clarity of processes and procedures and supervise execution of national procurement plans.;
- Conduct the assessment of offers for goods and services, including through committees as required by UN Environment procedures and lead negotiations with suppliers and vendors;
- Participate in the review of suppliers' performance against contract specifications and obligations;
- Participate in the financial approval of travel arrangements and DSA.

The **Safeguards Officer's** mandate will be to ensure that implementation, at both national and regional levels, is compliant with GCF and UN Environment safeguards policies. This will include:

- Monitoring of the implementation of the Gender Action Plan;
- Monitoring and supervising application of the Environmental Screening and environmental impact safeguards;
- Ensuring compliance with the stakeholder engagement plan and the integration of local communities, including where procedures related to indigenous people, prior informed consent;
- Promote best practices and participate in the monitoring and evaluation of the program;
- Provide guidance to national implementation units on the application of safeguards policies.

The **Monitoring and Evaluation Officer** will develop, implement, maintain, and update the program's M&E system, in coordination with national M&E officers. Tasks will include:

- Provide guidance to national M&E officers on the development of the monitoring and evaluation plan;
- Conduct the data collection, validation and reporting against workplans, activities, and key program indicators;
- Maintain a database of program and national-level results, ensure adequate documentation
- Develop lessons learned and other results-oriented communications products.
- Develop annual performance reports to the PSC for submission to the GCF.

Finally, the **Administration and Logistics Assistant** will perform general administrative tasks, support the officers in compiling, analyzing and generating reports, manage Board meetings, ensure documentation of decisions, maintain project records, and assist in organizing events including trainings, workshops and travel.

Stakeholder Consultation

This proposal was developed with the full participation of Nairobi Convention Focal points. Consultations were organized on the margins of meetings, with a final concept presented at the Focal point meeting in Nosy Be, Madagascar on April 7th, 2018. Comments received at this latest meeting were incorporated into the design of the concept note. The main comment concerned the coordination of this proposal with another tentative submission to GCF, which is led by the AFD and the Indian Ocean Commission, and which proposes similar interventions, although focused on government beneficiaries in only 3 countries. Detailed coordination arrangements will be provided once clarity is obtained on that proposal's interventions and sites, which were unknown at the time of writing. Below is a list of 46 participants.

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National designated authorities were engaged in the development of this concept note through national Nairobi Convention focal points. All no objection letters have been secured (see attached) and a continued engagement plan will be maintained throughout project development (please refer to project preparation facility request).

9. Initial Results Framework

The table below illustrates the tentative results framework along with indicators and targets. Baseline values for key indicators will be determined during project preparation, and targets may be adjusted accordingly. The table also indicates the tentative number and type of beneficiaries for each Key activity and sub-activity.

			Indicators	Baseline	Target	# and type of direct beneficiaries	# and type of indirect beneficiaries
		Output 1: An improved science base informs policy-making in all sectors towards the deployment of a Blue Economy Development Approach.	Level of increased evidence to support analysis on the impacts of climate change in the WIO region; Number of new or revised macro- and sectoral policies addressing climate impacts and trends	There are many studies available (at least 6) but they are dispersed. No new sectoral or macro-policies; no new standards	There exists ongoing scientific assessment, supported by multi-stakeholder platforms in each country and at the regional level; each country reviews and modifies its EEZ and incentives schemes; A 'BlueTrade' standard is approved and enforced by end of project		
		KA 1.1 Increased information base to document, analyse and project climate change impacts on key sectors in the WIO countries.					
		Harmonized country-level coastal vulnerability assessments;					

		Analysis of trends, impacts and options for response to acidification;		
		Improvement of coastal climate observation networks, including ocean observation, coastal erosion monitoring, SST measurement, and ongoing data collection for key climate parameters;		
		Strengthening of existing scientific entities to produce data of higher quality, and to harmonize data standards to enabling sharing, including through training;	100 people trained	
	KA 1.2 Strengthened policy capacity to understand and use science to develop evidence-based policies			
		Development of policy-relevant research findings;		
		Creation or strengthening of multi-stakeholder platforms in key sectors, including fisheries, agriculture, transport, tourism, health	450 institutional participants (50 per country)	
		Reassessment of macro-economic policies (e.g. EEZ) and explicit or implicit policy incentives towards adaptive economies, including the development and adoption of a “BlueTrade ” standard for fair, climate-smart products originating from the WIO.		
		Harmonization of land use plans, ICZM plans, NAPs and NAPAs.		
		Climate leadership training for senior policy makers	135 people (15 per country)	

Output 2: Resilient livelihoods and economic activities are pursued, in partnership with the private sector		Number of people (% women) benefitting from increased income through the pursuit of resilient livelihoods; Number of jobs created (% for women); level of funding leveraged through PPPs	0; 0; 0.	At least 10,000 people (60% of which are women, and 50% of which are youth) are benefitting from increased resilient incomes; 900 jobs are created, including 50% for women and 30% for youth; The project succeeds in leveraging an annual income of 1 million USD per country through PPPs.	
KA 2.1 An Adaptation Technology Transfer Facility is established to catalyze investment and capacity towards resilience					
		Undertake a census of WIO specific adaptation technology needs on the basis of existing available science and national plans such as Technology Needs Assessments, including limits and barriers to their adoption at scale;			
		Create and administer a WIO adaptation technology transfer facility designed to assist public and private stakeholders in accessing expertise, material and technical support .		1000 enterprises (MSMEs) of approximately 3 people each: 3000 people	assuming a scaling up factor of 1:1, 1000 enterprises .
		Implement strategies to ensure financial and operational self-sustainability of the Facility.			
KA 2.2 Barriers to the adoption of resilient and sustainable livelihoods are lifted					

		Organization of national and regional value chains, producer groups and market linkages;		
		Provision of technical advice, training, seed investment financing, and access to inputs for adaptation activities		
		Promote certification and market linkages using fair trade/green trade or new certification schemes (see Output 1.1)	120 groups of 10 people, in 9 countries = 10,800	assuming a scaling up factor of 2.5 = 27,000 people
	KA 2.3 Public Private Partnerships leverage lasting and sustainable financing towards resilient coastal economies			
		Establish a WIO Business Council for the Blue Economy which will serve as a regional platform for identification and negotiation of PPP opportunities;		
		Undertake an assessment of the willingness to pay for key ecological and information services (including valuation and Targeted Scenario Analysis)		
		Enter into collaborative PPPs	20 enterprises in each country = 180 companies	Assuming each company creates an average 8 jobs, 900 jobs in total
		Design and implement innovative public-private financing mechanisms for adaptation at local level		
		Sub-Total		

Output 3: Ecosystems are restored, protected and sustainably managed for increased resilience to the spectrum of anticipated climate change		% area under conservation and sustainable management and % improvement in METT score of MPAs; Ha of reefs, mangroves, estuaries, and lagoons restored to full ecosystemic function	2.4% currently under conservation, with a combined METT score to be assessed; no reefs, mangroves, estuaries, or lagoons restored	at least 10% is under conservation with METT scores averaging X; X ha of reefs, mangroves, estuaries, or lagoons restored		
	KA 3.1 Protected areas identified, established and sustainably managed					
		Census of climate impacts on current LMMAs and MPAs and recommendations on management and legal changes, including the validation of critical habitats			600,000 (assuming a proxy of 10% of the coastal population deriving direct livelihoods from within MPAs)	60 million (total estimated coastal population)
		Designation, gazetting and setting up of climate smart, regionally connected marine protected areas				
		Improvement, development and adoption of guidelines to facilitate the establishment and development of an improved network of marine protected areas at national and regional level.				
		Creation or improvement of regional MPA network focusing on resilience and connectivity for conservation of species and critical habitat				
		Implementation of innovative governance and financial strategies for sustainability of MPAs.				
	KA 3.2 Degraded coastal zones are rehabilitated and protected through ecosystem-based adaptation					
		Creation of a WIO Coral Reef Restoration Laboratory				
		Restoration of reefs, mangroves, estuaries, wetlands and lagoons				

Outcome 4. Project Coordination, Knowledge sharing and management		Evidence to support project replication and upscaling is documented; Number of knowledge sharing and participatory monitoring/evaluation events to which member countries participate (% women)	0 project results documented; 0 M&E events	At least 2 M&E events at national level annually, and 2 regional events per year.		
	Output 4.1 Participatory Monitoring and Evaluation, and Safeguards Administration					
	Development and implementation of participatory M&E system					
	Programme evaluation – Mid-term and final					
	Impact monitoring, including gender-based impact monitoring					
	Output 4.2 Knowledge sharing and regional bridging					
	Knowledge sharing platform among countries, scientific community and technology private sector.					
	Awareness raising and public relations					
	Output 4.3 Project Management					
	Establish and support the regional and national coordination unit.					
	Development of upscaling strategy					
	Assurance of social and environmental standards.					