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# Part I

## Summary

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# Executive Summary

The Western Indian Ocean (WIO) region spans across a large latitudinal range, from the Somalia region, influenced by the strong monsoon regime of the northern Indian Ocean, to the southern temperate regime of the tip of South Africa, where the Agulhas current diverges from the northward moving Atlantic Benguela current. It encompasses tropical and subtropical regions of diverse nature, rich stretches of coast along the mainland countries of Somalia, Kenya, Tanzania, Mozambique and South Africa, and vast oceanic areas surrounding the island states of Madagascar, Seychelles, Comoros, Mauritius and French Territories. Geomorphological and oceanographic features define the character of the WIO. The social tissue of the of the WIO, where much of the population lives at the coast, is an amalgam of diverse populations with different origins, a product of the rich and varied political history, where networks of trade interactions have generated a high ethnic and cultural diversity. The cultural heritage is thus important and matches the natural richness of the region. Most countries in the WIO have high population growth rates, and coastal development is expected to grow accordingly.

The Regional State of the Coast Report (RSOCR) derives from requirements of the Nairobi Convention and contributes to the United Nations-led production of the World Ocean Assessment (WOA) reports as well as to other global and regional processes, such as the Environment Outlooks coordinated by UNEP. The RSOCR aims to integrate the socio-economic and ecological systems of the WIO region by using a uniform methodology based on the

Opportunities Framework and the DPSIR (Drivers, Pressures, Status, Impacts, Responses) approach. The RSOCR's approach has been adapted from the WOA framework, however the content and organization of the concluding chapters are based on the distinct needs of the WIO region. While the political agenda included the Contracting Parties and their National Focal Points to the Nairobi Convention, the technical process was guided by WIOMSA (Western Indian Ocean Marine Science Association) and involved a representative set of scientists with broad experience in the region. The RSOCR's main objectives are to i) provide a comprehensive baseline, ii) highlight main opportunities, iii) describe successes and challenges, iv) identify capacity building needs, v) identify knowledge gaps, and vi) propose policy options.

The WIO region is characterised by high biodiversity, both in terms of species and ecosystems, which places it as one of the most rich and interesting ocean regions of the world. The regional countries have in general low income, and as such a large fraction of the population is dependent on coastal and marine resources and ecosystem services. The biodiversity of these systems is thus under direct and indirect pressures through resource exploitation and anthropogenically-driven habitat degradation. The effects and impacts of global climate change add further pressures to local-acting sources of disturbance. The assessment of biodiversity (developed in Part III of the report) addresses the main ecosystems that constitute the major support for biodiversity and living resources, such as the nearshore

habitats, mangroves, salt marshes and seagrass beds, coral reefs, rocky reefs, sediments and pelagic and deep sea environments. The assessment further includes a summary of threatened marine species, as well as the significant social and economic aspects of biodiversity conservation. Regarding the biodiversity assessment it is apparent that marine ecosystems in the WIO region are in a fairly good condition, but the pressures from global climate change acting synergistically with the local anthropogenically-induced drivers are increasingly challenging the natural processes.

Sectorial and specific recommendations have arisen from the RSO CR that target the sustainable use of biodiversity resources and the maintenance of ecosystem quality and associated biodiversity, as derived from the goals of the Convention for the Biological Diversity and its 2020 targets. These relate firstly to the efforts of addressing the engagement of the civil society (such as promoting awareness on the value and vulnerability of the WIO natural marine and coastal capital at varying levels including by resource users and managers, public, politicians and authorities). Secondly, it is recommended that higher levels of funding for marine research are considered, especially targeting knowledge gaps such as the continental shelf and the deep ocean, conservation areas, resilience and habitat restoration and rehabilitation, but also aiming to increase the level of management processes. Another recommendation for the short term is the establishment of comprehensive monitoring schemes for the marine environment, while in the longer term there is a need of a progressively better integration of regional policies and the promotion of cross-sectorial linkages, allowing for more coherent approaches to ecosystem management and transboundary issues.

Over 60 million people inhabit the coastal zone in the WIO region, which has very high rate of population growth and urbanization. Invariably many of the coastal communities rely on the sea for their economic, social and cultural security. Assessment of services from the marine environment, other than provisioning services, is developed in Part IV of the report. The non-provisioning services provided by the WIO may be categorized into regulating, supporting and cultural services. The assessment includes the role of oceans' in the hydrological cycle, sea/air interaction, phytoplankton primary production, ocean-sourced carbonate production and cultural and derived services from the marine environment. The assessment of ecosystems ser-

vices, other than provisioning services, emphasizes the same global challenges and the increasing pressures of the variety of human activities on the marine and coastal environment.

Ecosystem services should be addressed based on Blue Economy principles, and for this to happen appropriate holistic ecosystem services valuation should be promoted. In the short term, addressing knowledge gaps will have to involve innovative research, targeting trends of ecosystem services, their drivers of change, vulnerability and mitigation actions. A strong recommendation regards knowledge integration, namely the inclusion of traditional management systems together with modern approaches and its recognition in laws and regulations, allowing for a better engagement of communities.

The WIO region is characterised by high marine biodiversity, but contrastingly the biomass of individual species is generally low, with marine productivity depending more on nutrient input from rivers along the coasts of eastern Africa and Madagascar, than on upwelling systems. The assessment of food security from marine resources is dealt with in Part V of the RSO CR, and its most important contributions are the capture fisheries, the growing emergent mariculture activities and their socio-economic impacts. The rapid population growth and global economic expansion over the past 50 years have exponentially increased the pressure on coastal resources, and overfishing and coastal developments have put pressure on the abundance of stocks and the biological diversity. Compared to fishing, mariculture is recent in the SW Indian Ocean and it appears to have positive future prospects, particularly in Madagascar, Mozambique, Tanzania and Kenya.

Overfishing of marine resources should be addressed by authorities by appropriately quantifying fishers, methods and harvests. Evident knowledge points to the need for research to target distribution patterns, biological characteristics and reference points, stock status and the effects of fishing. Research results should be passed to managers and thus there is a need to strengthen the linkages between science and management. This way managers can provide better plans for fisheries and the main target species, adopt holistic ecosystem approaches, and promote co-management of artisanal fisheries and cooperative management of transboundary stocks. Sound management also requires that monitoring, control and surveillance capacities be increased in most WIO countries. But opportunities for increased food production from marine resources are also

present and should be addressed, such as expansion of fisheries into deeper waters and promotion of mariculture.

Assessment of other human activities in the marine environment is developed in Part VI of the RSOCR. It includes a number of important sectorial issues such as maritime activities, oil, gas and renewable energy, coastal mining and coastline stability, tourism and recreation, urbanization, coastal development and vulnerability, marine genetic resources and bio-prospecting. The adoption of a Blue Economy agenda should drive development of human activities that promote economic development and poverty alleviation, while at the same time ensuring sustainable use of resources and maintenance of environmental quality. Some of the analysed emergent activities can turn into opportunities for human development in the WIO region. Maritime activities and mineral extraction from the coast are increasing in the region, as are emergent and fast growing socioeconomic activities such as oil and gas exploration, tourism and bio-prospecting. While these sectors offer vast opportunities for economic development, their potential impacts can challenge sustainability and should be addressed through sound, integrated management strategies.

The pressures and opportunities created by emergent human activities mean that efforts should be invested in increasing our knowledge about resources, their environment and the social aspects of their exploitation. It is desirable that, in the longer term, equitable access to and benefit sharing of coastal and marine resources be promoted. But in the short term there should be an effort to develop mechanisms and tools for handling and processing data, promotion of the production of spatial data products, as well as integrated coastal management and the necessary legal frameworks.

The scenario approach of the RSOCR adopted the DPSIR framework and was integrated based on variables, links, and feedbacks relevant to dynamic modelling of marine social–ecological systems including drivers that influence human behavioural change, such as society, knowledge systems, political and institutional settings and the economy. The assessment used two main scenarios (or opposite worlds): the Conventional World Scenario (CWS) representing a business as usual pathway (BAU), and the Challenge Scenario or Sustainable World Scenario (SWS) representing the Western Indian Ocean Strategic Action Programme (WIO-SAP) aspirations and the Sustainable Development Goals (SDGs). The use of the scenario

framework must be adaptive and respond to new challenges, opportunities or threats that undoubtedly emerge. The Nairobi Convention through its management and policy platforms can promote the scenario framework for engagement between actors and also as a basis for decision-making and as tools for planning and environmental monitoring. Scenarios can be used for the creation of options for policy and management aimed at effectively managing the coasts and oceans, promote adaptive management, but also to monitor programmes set for the refining of scenarios in view of observed changes over time.

The governments of the WIO region are Parties to the Nairobi Convention, which offers a regional legal platform for the protection, management and development of the marine and coastal environment, constituting a framework of governance in the WIO region. There are several other institutions, regulatory or policy frameworks with a mandate for governance, including national and regional institutions, regional economic integration organizations, regional and international civil society organizations, and global inter-governmental institutions. Legal and institutional frameworks for addressing the marine and coastal environment include constitutional provisions, framework environmental laws and sector based laws. Governance responses and interventions are constrained by overlapping mandates of different level institutions, giving rise to inefficient use of governance instruments and resources. Nevertheless, legal, institutional and policy responses appear to converge, acknowledging that anthropogenic activities pressuring on coastal and marine zones have environmental impacts that need to be regulated. WIO countries apply Environmental Impact Assessment regulations and these are naturally merged into evolving Integrated Coastal Zone Management laws and policies.

Contrasting policy options are open to the countries of the WIO region concerning the sustainability of the coastal and marine environment, both at the national and regional levels, including: i) overarching policy instruments with sector players taking primary responsibility, ii) maintenance of sectorial policies and providing a coordinating mechanism, and iii) maintenance of sector policies as well as sectorial implementation of the policies without having a coordinating mechanism. Irrespective of these options, there are scenarios that countries of the WIO region need to consider so as to mainstream coastal and marine issues for the future: policy instruments which largely or primarily provide incentives for voluntary compliance or, alterna-

tively, countries may consider strengthening the command and control approach in their policy formulation.

The overall human capacity for governance of ocean and coasts in the region is still incipient and currently does not cover the necessary array of disciplines, their up to date methodologies and the complex and multidisciplinary issues in the coastal and marine environments. The many socioeconomic and institutional factors that constrain capacity in the WIO region include limited financial and human resources, low investment in education and training, inadequate knowledge and awareness and lack of legal expertise. Investment and innovative approaches to human capacity development remains a top priority for countries in the WIO.

The Regional State of the Coast Report for the Western Indian Ocean has used a DPSIR framework for the assessment of the relevant components pertaining to the marine and coastal environment. The analysis has highlighted the main drivers of change and the consequential pressures that are exerted on the environment and human livelihoods, described current status and trends of natural

and societal processes, and identified impacts. Responses to these challenges were summarized and further translated into recommendations under main sectors, providing linkages and integrative mechanisms for addressing them.

The WIO region is faced with strong challenges regarding the sustainability of its marine and coastal environments, both from global trends that require wider international integration, but also from regional and local sources of disturbance that governance mechanisms need to address. The path towards meeting the natural expectations of the development of the region's societies requires socioeconomic development and the use of the region's rich natural resources. Emergent opportunities are arising and regional capacities growing, both in terms of technology and human capacity, from the civil society to decision making structures. The adoption of a Blue Economy and the will to address socioeconomic development in the region, with emphasis on poverty alleviation, gives a hope for the future of the marine and coastal environment of the WIO region and the associated human wellbeing and livelihoods.



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