

Summary of Other Human Activities in the Coastal and Marine Environment

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Opposite page: Commuting in the Likoni ferry at the entrance of Kilindini Harbour, Mombasa, Kenya. © José Paula.

The Western Indian Ocean (WIO) offers a wealth of opportunity for the profitable and beneficial use of coastal and marine resources – a prospect for a true ocean economy. These benefits are derived from a range of human activities in the coastal and marine environment. Shipping moves, by a large margin, the bulk of the goods to the region, through many of the ecosystems described in this book. The region is also a source of, amongst others, fossil fuels for the generation of energy, and minerals for manufacturing and other uses. These extractive and non-renewable resources offer substantial economic benefit, if the negative environmental and social impacts can be mitigated. Coastal land as a resource allows for development, settlement and recreation opportunities, but is also a source of biodiversity and ecosystem services. These services contribute to the wellbeing of coastal communities. Urbanisation and coastal development result in permanent conversion of this resource and often the loss of most of the freely provided ecosystem goods and services. The exploitation of WIO genetic resources is a largely unexplored opportunity for the benefit of the regional and indeed the global population. Furthermore, the attractive and desirable coastal and marine habitats of the WIO, a non-extractive and renewable resource, are the basis for a growing tourism industry in the region.

Maritime activities, particularly shipping, are predicted to increase in the WIO. Seaborne trade volumes in Eastern Africa grew from 16.4 to 54 million tonnes between 1970 and 2012. Merchant shipping is the lifeblood of the

region's economies and includes freight carried by general cargo ships, oil tankers, gas carriers, chemical tankers, bulk carriers, ferries and passenger ships, and containerships. This, together with factors such as climate change, heightens the environmental risks brought on by operational pollution from ships, shipping accidents, invasive alien species, and impacts from port operations. Piracy, illegal dumping and climate change are some of the current management issues that require policy interventions. Not only is it important for WIO countries to monitor environmental impacts of maritime activities, they also have to develop and maintain the capacity to regulate ships, provide them with appropriate maritime services (such as navigational aids) and respond to shipping accidents.

All countries in the region rely on the importation of oil to fuel power stations to generate electricity. **Energy supply** is needed in WIO countries for local industry, commerce and their citizens, and is a critical element for growth and development of their national economies. The WIO also has various energy sources located in, or accessed from the coastal and marine environment, eg natural gas has for over ten years been extracted from below the seabed and utilised for energy in countries such as Tanzania and Mozambique. The latter, with 100 trillion cubic feet (tcfg) of deep water gas, is ranked third overall of the African gas reserves, and Tanzania natural gas deposits are estimated at 50 tcfg. There are other less obvious alternatives to fossil fuels, notably energy derived from tides, currents and waves and the thermal differential in deep ocean water. In

the WIO these remain largely unexplored as a viable and sustainable source of energy. Structures in the ocean, marine geological exploration and fossil fuel production all potentially have a deleterious impact on the coastal and marine environment.

The coastal regions of mainland East Africa and Madagascar are endowed with a wealth of non-renewable mineral resources such as gypsum, manganese and titanium-rich dune fields and sandy shores. Even so, geological exploration of the region has been far from comprehensive and unknown deposits are likely to exist. **Mining** results in major environmental changes and degradation. The types of coastal mining activities in the WIO countries include the quarrying of coral rock and limestone for cement manufacture; aggregates for concrete and road-building; artisanal sand mining from catchments, floodplains, river banks, estuaries and lagoons; and industrial mining of titanium sand. The production of sea salt in salt pans, typically located on estuary flood plains, is also considered a mining activity. There remain significant opportunities for the exploitation of mineral resources to benefit national economies. These opportunities are offset by the potential for environmental degradation and loss of ecosystem services where mitigation and restoration is not a priority.

The WIO region provides a range of unique attractions and recreational activities for local and international **coastal and marine tourism**. Mainstays of the regional coastal tourism industry include sandy beaches, clean water, abundant sunshine, mangrove forests, lagoons and seas for sunbathing, snorkelling, dolphin and whale watching, ecotourism, fishing and other water sports. The contributions of tourism to the national economies of WIO countries range from 6.8 to 63 per cent for the island states (Comoros and Seychelles, respectively), and 7.5 to 13.5 per cent for mainland states (Mozambique and Tanzania, respectively). Tourism has immense potential to enhance socio-economic development, and contribute to environmental rehabilitation. This is a priority sector for development in all WIO countries. There are also a range of negative social and environmental impacts that require mitigation concomitant with the growth and development of the industry. Some of these include prostitution and sex tourism, a lack of integrated development planning, the need for community development and involvement, and habitat degradation. The lack of socio-political stability in countries in the region detracts from the potential benefits of a healthy coastal and marine tourism industry.

Urbanisation is a highly contextual, multifaceted, heterogeneous and complex phenomenon. The urbanisation of WIO countries, coupled with rapid development of the coastal margin translates into increased socio-economic vulnerability. Coastal cities of the region are desirable places to live and work in, and draw the population to the coast. For example, Dar es Salaam is projected to reach megacity status within the next generation. Populations in urban areas in the region are vulnerable to natural disasters within the coastal area. Urbanisation has direct effects on biodiversity and the state of the coastal environment. Expansion in the built environment results in some of the most irreversible human impacts on the global biosphere. Urban land-use change remains one of the primary drivers of habitat loss and species extinction. Some of the specific links between urbanisation and coastal environmental quality include water quality degradation, habitat and community modification and declines in living marine resources.

In addition, the interaction between **catchments** and the coastal and marine environments has been identified as one of the processes linked to environmental pressures in coastal areas of the region. The WIO region includes a total of twelve major river catchments and three of these – the Juba-Shabelle, Limpopo River and Zambezi River Catchments – count among Africa's major trans-boundary river catchments. Two major issues have been linked to river-coast interaction in the WIO: the alteration of river flows and water quality; and the alteration of sediment loads. Major challenges in maintaining the function of the ecosystem goods and services provided by catchments are directly linked to governance and management issues which need intervention at both regional and national scales.

Globally, **marine genetic resources** provide enormous commercial potential for a range of industries, including pharmaceuticals, food and beverages, cosmetics, agriculture and industrial biotechnology. The region, with its high coastal and marine biodiversity, offers considerable opportunity for the exploitation of genetic resources. Most research, development and commercialisation of such resources are currently located outside of the region, as is the ownership of associated intellectual property rights. This represents an opportunity for countries in the region, provided they can form productive investment partnerships, and navigate the associated complex legal framework which is characterised by a multiplicity of legal

regimes and national and international laws. Marine genetic resources found within the exclusive economic zone (EEZ) are subject to national laws and coastal states have the sovereign right to allow or prohibit and regulate marine bioprospecting. Exploitation of genetic resources is subject to prior informed consent from the competent national authorities, and on mutually agreed terms and the sharing of benefits. In many countries of the WIO, comprehension of this and the supporting legal frameworks are not sufficiently developed to allow for substantive benefits arising from the exploitation of genetic resources.

The development and implementation of policies for the exploitation and sustainable use of resources as part of a WIO Blue Economy, broadly grouped, are listed below. The specific recommendations can be found in the individual chapters:

- **Knowing more about the resources**, the environment, the people using and exploiting such resources, and the way in which we govern. The development of a Blue Economy relies not only on scientific data, information and knowledge in many different scientific disciplines, but also mechanisms for integrating this cross-discipline information. National and regional research agendas should recognise the need for inter- and trans-disciplinary research.

- **Understanding the value of ecosystem services** and how it is influenced by environmental change. Decisions on the trade of free ecosystem services for constructed or human infrastructure services must be made using a comprehensive suite of estimations. This includes both monetary worth and societal values that are embedded in culture, tradition and religion.

- **Equitable access**, to and benefit-sharing of coastal and marine resources should be entrenched in all national policy and legislation.

- **Understand and managing hazards, vulnerability and risk**. This includes ecological, social and economic vulnerability to hazards incurred in human activities such as shipping and mining, as well as hazards caused by the proximity of coastal communities to the

ocean climate. The consequences of global change also create vulnerability and the language of resilience, adaptation and mitigation should be reflected in policy and legislation.

- Development of mechanisms and tools for the **capture, exploration and archiving of data**, information and knowledge. Coastal and marine spatial data archiving, coastal atlases and information clearinghouses are some of the mechanisms that should be used to improve the return on investment in scientific research.

- A suite of **planning tools and mechanisms** for the management of:

- Coastal land-use and conversion at all scales – regional, national and sub-national. Forethought in coastal development and growth is a priority. Approaches such as seamless terrestrial and marine spatial planning should be part of a suite of adaptive management tools.

- Human activities and their usage and exploitation of resources. The city-port-environment interface needs to be recognised in policy. The many activities associated with shipping and tourism need careful, long-term planning to ensure compatibility with a multiplicity of coastal land- and sea-uses and users.

- An emphasis on the **production of spatial data** which will enable usage of scientific products for marine spatial planning and other similar mechanisms.

- **Relevant legal frameworks** that enable rather than frustrate efforts to develop environmental management solutions for sustainable development.

- The prioritisation of the management of coastal areas and associated human activities through the development and implementation of **integrated coastal management (ICM)**. The plethora of coastal and marine activities require management approaches that are adaptive, rely on appropriate and scientifically defensible data and information, and include the entire spectrum of users, stakeholders, decision- and policy-makers to negotiate effective and sustainable use and exploitation of coastal and marine resources. These are the pillars of ICM.