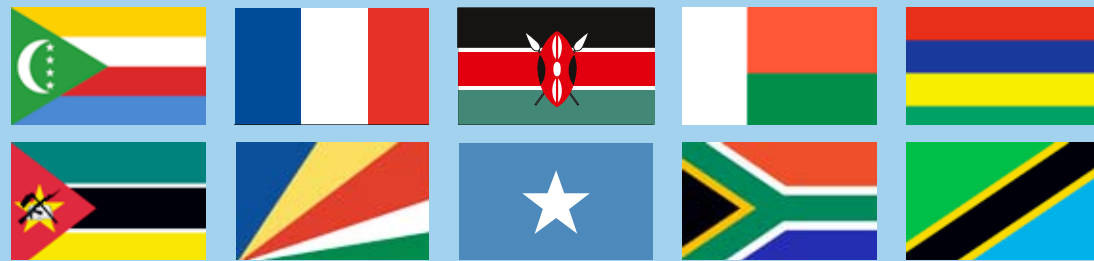




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SAP

Strategic Action Programme

Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities



SAP

Strategic Action Programme

Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities

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- International Maritime Organization (IMO)
- International Union for the Conservation of Nature (IUCN)
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- Southern African Development Community (SADC)
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- United Nations Environment Programme (UNEP)
- United Nations Industrial Development Organization (UNIDO)
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- Wetlands International
- Wildlife Conservation Society (WCS)
- World Wide Fund for Nature (WWF)

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Acronyms and Abbreviations

AfDB	African Development Bank	FAO	Food and Agricultural Organisation of the United Nations
AMCEN	African Ministerial Conference on the Environment	FARI	Forum of Academic and Research Institutions in the Western Indian Ocean
AMCOW	African Ministerial Council on Water	GEF	Global Environment Facility
ANBO	African Network of Basin Organisations	GIS	Geographical Information System
ANGAP	National Association for the Management of Marine Protected Areas of Madagascar	ICZM	Integrated Coastal Zone Management
ASCIMEs	Agulhas and Somali Current Large Marine Ecosystems	ICZRB	Integrated Coastal Zone and River Basins
BOD	Biological oxygen demand	IGBP	International Geosphere-Biosphere Programme
CI	Conservation International	IRBM	Integrated River Basin Management
COP	Conference of Parties	IGO	Inter-Governmental Organisation
CORDIO	Coastal Oceans Research and Development in the Indian Ocean	IOC	Indian Ocean Commission
COSMAR	Coastal and Marine Programme of the NEPAD Environment Initiative	IOC-ReCoMaP	Regional Coastal Zone Management Programme of the Indian Ocean Commission
DEA	Department of Environmental Affairs of South Africa	IOC-UNESCO	Inter-Governmental Oceanographic Commission of UNESCO
DNEF	National Directorate for Environment and Forestry of Comoros	IUCN	International Union for the Conservation of Nature
EAC	East African Community	IUCN-WANI	Water and Nature Initiative of the IUCN
EAME	Eastern Africa Marine Ecoregion	IWRM	Integrated Water Resources Management
EAWLS	East African Wildlife Society	LBSA	Land-based Sources and Activities of marine and coastal degradation
EFA	Environmental Flow Assessment	LOICZ	Land Ocean Interaction in the Coastal Zone
eFlowNet	Global Environmental Flows Network	MEA	Multilateral Environmental Agreement
EIA	Environmental Impact Assessment	MDG	Millennium Development Goals
EMS	Environmental Management System	MENDU	Ministry of Environment and National Development Unit of Mauritius
ESI	Environmental State Indicator	MENRT	Ministry of Environment, Natural Resources and Transport of Seychelles
EU	European Union		
EQO	Environmental Quality Objective		

MICOA	Ministry for the Coordination of Environmental Affairs of Mozambique	UNEP/GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Sources and Activities (led by the United Nations Environment Programme)
MOU	Memorandum of Understanding		
MPA	Marine Protected Area		
MWWW	Municipal Wastewater	UNEP/WCMC	World Conservation Monitoring Centre of the United Nations Environment Programme
NEMA	National Environment Management Authority of Kenya		
NEMC	National Environment Management Council of Tanzania	UNIDO	United Nations Industrial Development Organisation
NEPAD	New Partnership for Africa's Development	UNOPS	United Nations Office for Project Services
NGO	Non-governmental Organization	WB	World Bank
NPA	National Programme of Action	WCMC	World Conservation Monitoring Centre
PADH	Physical Alteration and Destruction of Habitats	WCS	World Conservation Society
PPP	Public Private Partnership	WEC	World Environment Center
RBO	River Basin Organizations	WI	Wetlands International
REC	Regional Economic Communities	WIO	Western Indian Ocean
SADC	Southern African Development Community	WIO-C	Consortium for the Conservation of the Coastal and Marine Ecosystems of the Western Indian Ocean
SAP	Strategic Action Programme	WIO-LaB	Project for Addressing Land-based Activities in the Western Indian Ocean
SEA	Strategic Environmental Assessment	WIOMER	Western Indian Ocean Marine Ecoregion Programme
SIWI	Swedish International Water Institute	WIOMSA	Western Indian Ocean Marine Science Association
SWCI	Shared Water Course Institution	WWF	World Wide Fund for Nature
SWRP	Shared Water Resources Protocol (SADC)	WCS	Wildlife Conservation Society
SWIOFP	South Western Indian Ocean Fisheries Project		
TDA	Transboundary Diagnostic Analysis		
UN	United Nations		
UN-Habitat	United Nations Agency for Human Settlements		
UNDP	United Nations Development Programme		
UNESCO	United Nations Educational, Scientific and Cultural Organisation		
UNEP	United Nations Environment Programme		

Foreword

The coastal and marine habitats of the Western Indian Ocean (WIO) region support the livelihoods of a rapidly growing population, currently estimated at over 60 million. The region is still one of the least ecologically disturbed in the world, hosting over 2,200 species of fish, including rare and endangered species, such as the dugong, coelacanths, marine turtles, sharks, birds and over 350 species of corals and a diverse assemblage of coastal forests, mangrove forests and sea grass beds. It is estimated that about 22 per cent of the species found in the WIO region are found nowhere else on earth. Major cities, ports/harbours and industries are located in the coastal zone, and these economic centers play an important role in sustaining the economies of the countries of the Western Indian ocean region. The economic value of the coastal and marine ecosystem goods and services is estimated at more than 25 billion US dollars annually.

However, increasing population, limited alternative livelihood sources, as well as other unplanned development pressures are increasing the demand for coastal and marine resources, leading to the destruction of vital habitats such as coastal lowland forests, mangrove forests, seagrass beds and coral reefs. Increasing urbanization along the coast is also associated with the discharge of untreated solid and liquid waste into the marine environment, thus causing: (a) the degradation of marine water quality, (b) loss of biological diversity, (c) increased human health problems and (d) reduction in fish stocks. Consequently, the ability of coastal and marine ecosystems to provide livelihood to the increasing population, as well as to recover from natural (climate change related) and anthropogenic perturbations is compromised.

The Strategic Action Programme for the protection of the coastal and marine environment of the Western Indian Ocean from Land-based sources and activities (SAP) has been completed at a time when it is most needed. The SAP will in particular help the governments in the WIO region to jointly or individually deal with the challenges associated with the increasing demand for coastal and marine resources and the consequent destruction and degradation of critical

habitats, changes in freshwater flow and sediments loads, as well as challenges resulting from global climate change. Decision-makers, administrators, planners, resource managers and scientists, will in particular find this document valuable in the conception, formulation and implementation of specific projects aimed at enhancing the protection of the coastal and marine environment.

I therefore welcome the SAP as a major contribution to the sustainable development of coastal and marine resources in the Western Indian Ocean and it is gratifying to note that countries that are signatories to the Nairobi Convention are committed to control the degradation of the coastal and marine ecosystems of the Western Indian Ocean region. The implementation of the SAP will contribute immensely towards the realization of objectives of the Nairobi Convention and of the overall regional vision of: People of the region prospering from a healthy Western Indian Ocean.

On behalf of the Contracting Parties to the Nairobi Convention and the Ministry of Environment and Mineral Resources of the Republic of Kenya, I would like to thank the United Nations Environment Programme (UNEP), the Nairobi Convention Secretariat, the United Nations Office for Project Services (UNOPS), the Government of Norway and the Global Environmental Facility (GEF) for supporting the process of the development of this strategy.



Hon. John Michuki, EGH, MP

Minister for Environment and Mineral Resources

Date: 31st March 2010





Photo courtesy of Peter Scheren

Executive Summary

The Western Indian Ocean (WIO) is recognized globally for its unique biological richness, natural beauty and high ecological and socio-economic value. The WIO region's coastal habitats, which include coastal forests, sand dunes, beaches, rocky shores, mangroves, seagrass beds and coral reefs, support rich and complex populations of marine species that rely on the integrity of the various ecosystems for their productivity. The region is one of the least ecologically disturbed areas of the global oceans, with diverse ecosystems that provide invaluable goods and services to its growing population. The economic value of these goods and services is estimated to be over 25 billion US dollars annually, with fisheries and tourism being the two main direct contributors to the economies of the countries in the region.

Over 60 million people inhabit the coastal areas of the WIO region, most of them dependent on the exploitation of coastal and marine natural resources for their livelihood. However, the region's rapidly growing population is exerting large pressure on the marine environment, through pollution, degradation of critical coastal habitats and changes in the freshwater flow and sediment loads from rivers draining into the western Indian Ocean. Today, the coastal zone of the region hosts major cities, harbours, industries and other development infrastructure that is increasingly posing a threat to the integrity of the coastal and marine ecosystems. Other pressures are associated with high volumes of tourism and poorly regulated inshore and offshore fishing, activities that have increased considerably in the recent past.

The WIO region is also facing various challenges due to global climate change. Significant impact of climate change in the region has been observed in the coral reef systems of the region: In 1998, up to 95% of corals in some areas in the region died following an episode of rapid warming associated with the El Niño/Southern Ocean Oscillation phenomenon. Furthermore, the region has in the recent past experienced a rise in sea level and the resultant problem of coastal erosion and flooding is already causing significant

impacts on coastal settlements, agriculture and infrastructure. In particular, the Small Island Developing States in the region are highly vulnerable to the impacts of climate change.

Considerable effort has already been expended to address the above challenges, by governments as well as their partners, including international and regional inter-governmental organisations, non-governmental organisations and bilateral donors. While the outcomes of such efforts are already visible, undoubtedly much still needs to be done in order to ensure that the integrity of the WIO region's coastal and marine ecosystems is maintained, for the sake of the present and future generations.

Recognizing that the threats to the productivity and integrity of the coastal and marine environment due to pollution and habitat degradation are not confined to national boundaries, the governments of the WIO region, in 1985, signed the Nairobi Convention. This Convention offers a vital regional platform for the protection, management and development of the marine and coastal environment in the Eastern and Southern African region. The United Nations Environment Programme (UNEP), hosting the Secretariat of the Nairobi Convention, has actively supported the efforts of the governments in Eastern and Southern Africa to develop more sustainable approaches for the management of their common marine and coastal ecosystems. One initiative in this endeavour is a project entitled "Addressing land-based Activities in the Western Indian Ocean," widely known as the "WIO-LaB Project".

The project was funded by the Global Environment Facility (GEF), the Government of Norway and UNEP, participating countries, and implemented within the framework of Nairobi Convention in the period 2005 to 2010. The broad vision of this project was to assist governments in the WIO region to build the necessary capacity for addressing the challenges faced by countries in the management and protection of their marine and coastal environment from impacts originating from land.

Over the period 2004 to 2009, the WIO-LaB project, through various technical task forces and working groups established within the framework of the Nairobi Convention, coordinated a region-wide assessment of transboundary problems and issues affecting the marine environment in the WIO region. The outputs of these assessments led to the formulation of a comprehensive Transboundary Diagnostic Analysis (TDA), detailing key problems and causes of degradation of the coastal and marine environment in the WIO region, with a special emphasis on land-based sources and activities (LBSA). The TDA, completed in late 2008, provided the basis for the formulation of the Strategic Action Programme (SAP) for addressing the challenges faced by governments in the region in dealing with increasing pollution of coastal waters, the destruction and degradation of critical habitats, changes in freshwater flow (both riverine and groundwater) and sediments loads, as well as challenges resulting from global climate change. The formulation of the TDA and SAP involved the participation of over 500 stakeholders and experts drawn from various institutions and organizations in the WIO region.



Photo courtesy of Rudy van der Elst/ORI

The SAP incorporates strategies for assisting countries to achieve an overall regional vision:

“People of the region prospering from a healthy Western Indian Ocean”

This overall vision is supported by four main objectives that are intended to be achieved by the year 2035. The objectives spell out the state or quality of the environment and its management that the SAP hopes to achieve within 25 years of its implementation. For each objective, furthermore, the SAP presents a set of specific management targets and actions that would contribute to achieving the set objectives.

The objectives and targets as defined in the SAP are outlined below.

Objective A

Critical coastal habitats in the WIO region protected, restored and managed for sustainable use



Photo courtesy of Peter Scheren

The TDA found that one of the priority transboundary problems for the WIO region is rapid, and unmanaged transformation of the coastal land- and seascape and consequent loss of critical habitats that provide essential ecosystem goods and services. Recognising the enormous value of healthy critical coastal and marine habitats to the future well-being of people of the WIO region, this long-term objective emphasises the urgent need to halt any further degradation of critical habitats, provide for restoration of degraded systems where this is required and have management activities implemented to ensure a full and sustained spectrum of ecosystem services. The focus of activities under this objective will, in the first instance, be on priority areas for conservation in the region, such as those identified through the Eastern African and Western Indian Ocean Marine Ecoregion processes, as well as nationally defined priority areas. Specific Targets defined in this regard are:

- Incentives to encourage compliance with best practice in critical habitat management established
- Coastal zoning based on integrated economic, social and environmental considerations implemented
- Critical habitat management strategies in place and contributing to ecologically sustainable ecosystem services and regional protection.
- A regional monitoring and evaluation plan established and implemented for critical habitats, coasts and shorelines
- Integrated Coastal Zone Management legislation in place in all countries
- National legislation to improve management of bilateral and regional issues strengthened
- Awareness of the importance of critical habitats raised significantly

Objective B

Water quality in the WIO region meets international standards by year 2035

Increasing levels of pollution resulting from the discharge of untreated municipal (domestic and industrial) effluents into the inshore waters of the WIO region are threatening human health and ecosystem integrity. The SAP proposes the



Photo courtesy of UNEP

establishment of regionally acceptable effluent and water quality standards for the purpose of protecting public health and maintaining ecosystem integrity. Such standards would also aid in marketing the WIO region as a safe destination to local and international tourists, as well as in sustaining export markets for fish and other marine products. Furthermore, in the medium to long term, wastewater treatment systems should be constructed to ensure adequate treatment of all municipal effluents before they are discharged into estuaries and the Ocean. The focus of such interventions will in first instance be on the pollution hot spots as identified in the TDA. Specific Targets defined in the SAP in this regard are:

- Effluent discharge standards developed and regionally harmonized
- Marine water standards developed and regionally harmonized
- Regional best practice framework models for municipal wastewater management developed and adopted
- Collection, treatment and disposal of effluents undertaken in accordance with regional standards
- Environmental Management Systems and Cleaner Production Technologies encouraged
- Stakeholders sensitized and political support harnessed in favour of pollution prevention



Photo courtesy of Rudy van der Elst/ORI

Objective C

River flows in the WIO region are wisely and sustainably managed by the year 2035

The WIO region has a number of important river systems. In many of these, poor management of river basins has resulted in changes in river flows,

a degeneration of water quality and changes in sediment loads, causing damage to critical habitats, and reducing ecosystem productivity and the ecosystem services that the rivers provide. This objective aims for healthy, functioning rivers that will assure current and future inhabitants of the WIO region of continued access to clean freshwater and a flourishing environment. A key tool for the achievement of this objective, as recognized in the SAP, is the application of Environmental Flow Assessment (EFA).

In addition to this 25-year Environmental Quality Objective, a 15-year Management Objective has been set:

Management of the Coastal Zone and River Basins is fully integrated in the WIO region

This long-term objective of integrated coastal zone and river basin management creates new opportunities for more effective management, by providing for upstream and downstream flow assessment, reduced erosion and sediment transport and better catchment management, through enhanced interactions between coastal and river-basin management institutions. Specific targets regarding the enhanced management of rivers in the WIO region as defined in the SAP are:

- Awareness of Environmental Flow Assessment (EFA) as a tool for wise river basin management raised
- Capacity for applying EFA increased amongst key stakeholders
- EFA conducted and operating rules integrated into river basin management plans for selected basins
- Methodologies agreed upon and tools developed for coherent application of EFA in both freshwater and coastal management
- Policy discussion on coastal and marine issues catalysed through collaboration between Shared Water Courses Institutions and the Nairobi Convention secretariat
- National freshwater management and coastal zone management frameworks fully integrated.

- Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented
- Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed
- Impacts of catchment management on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management

Objective D

By 2015, stakeholders will collaborate effectively at the regional level in addressing transboundary challenges

The SAP proposes that over the next five years, a key priority will be improving the capacity for Ecosystem-Based Management (EBM) and ensuring that, throughout the WIO region, appropriate legal and regulatory frameworks for land-based sources and activities (LBSA) management are put in place and



Photo courtesy of Jos van de Graaf

implemented at the national and regional levels. Other priorities are to create awareness on the importance of good marine and coastal management among policy makers and legislators, the civil society and the private sector, as well as to ensure that appropriate financial mechanisms and regional knowledge management systems are put in place. This strategic objective is based on the assumption that with regional support, national governments in the region can overcome the most significant governance-related problems within the first five years of the SAP's implementation, after which sustained effort will be required to maintain the gains achieved. The following specific Targets have been defined in this regard:

- Capacity for ecosystem-based management improved
- Appropriate legal and regulatory frameworks for LBSA management in place and implemented at the national level
- Awareness of the importance of good marine and coastal management raised among policy makers and legislators, civil society and the private sector
- Regional legal frameworks for LBSA management updated and harmonized with multilateral environmental agreements
- Regional coordination and inter-sectoral governance improved
- Appropriate financial mechanisms developed and implemented
- Knowledge management undertaken effectively

The four objectives above, and related their targets, provide the basis for the four main Strategic Components of the SAP, namely:

- Strategic Component A: Protecting, Restoring and Managing Critical Coastal Habitats
- Strategic Component B: Ensuring Water Quality
- Strategic Component C: Managing River Flows Wisely
- Strategic Component D: Strengthening Governance and Awareness

In addition to these four main components, the SAP also presents two cross-cutting themes:

- Cross-cutting Theme 1: Climate Change Adaptation and Mitigation
- Cross-cutting Theme 2: Small-Island Development States

The SAP thus brings to governments the much-needed frame of reference for collaborative action to address the challenges of sustainable management of the shared coastal and marine resources of the Western Indian Ocean region. Once adopted, the SAP will form an integral part of the Eastern Africa Action Plan as well as the Work Programme of the Nairobi Convention for the period 2010–2012 and beyond.

Implementation of the SAP will build strongly upon the partnerships with organisations and institutions developed during its development process. At the national level, furthermore, an important priority will be to mainstream the priorities of the SAP into national policy and legal frameworks, development plans and budgets. In this regard, most countries have developed or are currently in the process of developing National Action Plans, or are integrating relevant elements of the SAP into appropriate policy instruments such as Integrated Coastal Zone Management Plans or Environmental Management Plans.

Finally, the SAP also details appropriate financial mechanisms as well as a comprehensive analysis of the key national, regional and international institutions and organizations that will be involved in the implementation of specific interventions. In this regard, the SAP will provide a basis for the elaboration of detailed project documents that will help achieve its targets and objectives, toward the vision of:

“People of the region prospering from a healthy Western Indian Ocean.”





Photo courtesy of Rudy van der Elst/ORI

Part I: Background and Introduction

1.1 Celebrating the Western Indian Ocean

The Western Indian Ocean (WIO) region is characterized by high biodiversity and immense natural beauty. The region's diverse coastal and marine ecosystems, which include coastal lowland forests, mangroves, seagrass beds and coral reef, support the productivity of the large marine ecosystems, including fisheries. The coastal and marine ecosystems also provide essential sources of livelihood and income for numerous coastal inhabitants, and contribute to the growing economies of countries in the region, which include Somalia, Kenya, Tanzania, Mozambique, South Africa and the island states of Mauritius, Comoros, Seychelles, Madagascar and Réunion (France) (Figure 1).

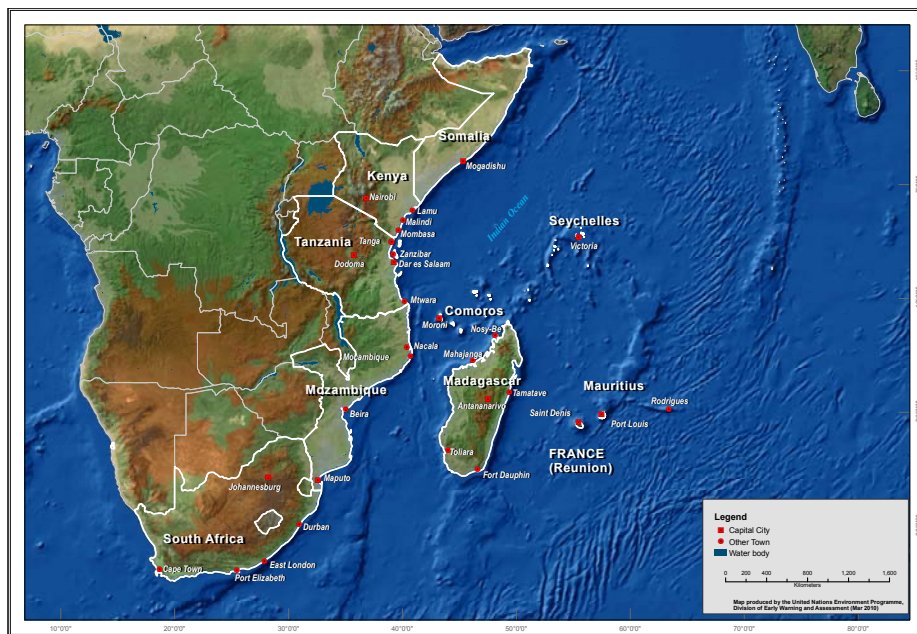


Figure 1 The Western Indian Ocean Region

With a combined coastline exceeding 15,000 km (including those of the island states) and a total continental shelf area of about 450,000 km² (GEO Data Portal, 2003), the economic value of the goods and services provided by the coastal and marine environment in the WIO region is enormous, with current conservative estimates reaching over 25 billion US dollars annually (UNEP/Nairobi Convention Secretariat, 2009d). The ecosystem service value of coral reefs in the WIO region alone is estimated to be greater than 7 billion US dollars per year, while that of mangroves is close to 9 billion US dollars per year¹. It is estimated that the direct benefits obtained from coastal goods and services in South Africa, the largest economy in the region, are equivalent to about 35% of the country's gross domestic product (DEAT, 2000).

As shown in Figure 2 below, tourism is the largest source of income that is directly linked to the coastal and marine environment; the region's beautiful sandy beaches, mangrove forests, lagoons and coral reefs attract over 20 million tourists from all over the world every year, injecting more than 6 billion US dollars per year into the economies of the countries of the WIO region.

The coastal and marine waters of the WIO, and in particular its coastal waters, lagoons, estuaries and continental shelves, are important fishing grounds. The WIO region generates about 4.8 % of the global fish catch, equivalent to about 4.5 million tonnes of fish per year (FAO, 2007), although this is likely to be an underestimate due to the under-reporting of catches by some of the countries (Van der Elst et al., 2005). While not as productive as some other well known fishing grounds in the world (particularly those

¹ It should be noticed that these initial estimates originate from a basic economic assessment undertaken as part of the WIO-LaB Transboundary Diagnostic Analysis (see section 1.5), and it is believed that the actual value of the WIO marine and coastal environment may be substantially higher; this is substantiated by recent estimates of the value of South Africa's coastal and marine environment, which exceeds 30 billion US\$ annually (Department of Environmental Affairs and Tourism, 2000).

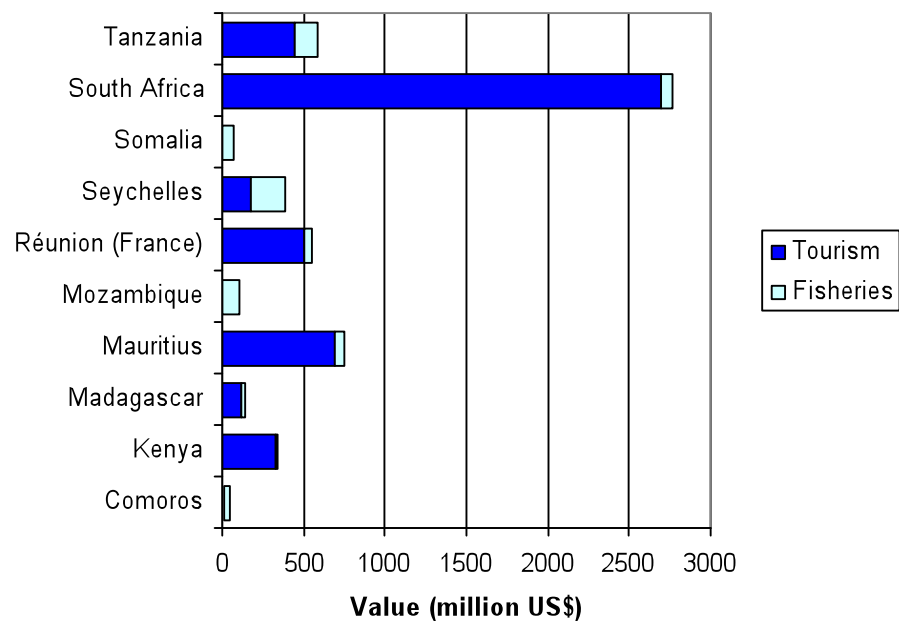


Figure 2 Direct use values represented by the fishery and tourism sectors in the WIO region².

associated with upwelling systems), the WIO fisheries sector is still of high importance in terms of food security, employment, and income generation for the growing coastal population, providing food and livelihoods for some 61 million coastal inhabitants. Furthermore, mangroves, seagrass meadows and coral reefs provide coastal protection, as well as food and shelter for fishes, crustaceans, molluscs and other organisms of immense ecological and commercial value.

² Based on an original table from WIO-LaB TDA report, Chapter 3.

Box 1 What are ecosystem goods and services?

Coastal and Marine ecosystems provide a wide range of benefits for humanity. Collectively, these benefits are known as “ecosystem services”. Various services are provided by the environment: those that provide products, such as food and water; those that regulate climate, water and disease; those that support other ecosystem services, such as nutrient cycling, refugia, erosion control; and cultural services, such as spiritual and recreational benefits.

In the WIO region, coastal and marine ecosystem goods and services support livelihoods and income generation for coastal communities and make significant contributions to national economies. Of crucial importance are the provision of clean water and air, climate regulation, erosion control and protection of coastal areas from storm surges and flooding. Other vitally important goods and services include natural products for human use, such as seafood, medicine, building materials like timber, fuelwood, honey and tannins. Recreational uses such as beach walks, snorkeling and diving over coral reefs, sport fishing, hunting of game and bird watching also play an important economic role in the region.

1.2 The Region under Threat

Although the WIO region is still one of the least ecologically disturbed areas of global ocean relative to other regions, it is increasingly threatened. In the last decade, the region’s coastal and marine environment has started showing signs of degradation, attributed to both natural factors (e.g. climate change/variability leading to coral bleaching, sea level rise, flooding, etc.) and a variety of anthropogenic activities, acting at different intensities and in various combinations (see e.g. FAO, 1999; UNEP/IMS-USM/FAO/SIDA, 1998; UNEP/GPA, 2006).

The coastal zone of the WIO region is the site of most major cities, harbours, industries and other socio-economic infrastructure that increasingly affects the marine environment (UNEP/IMS-USM/FAO/SIDA, 1998; UNEP/GPA and WIOMSA, 2004a&b). More than 60 million people inhabit the coastal

zones of the region, although the overall population density of the region as a whole is not remarkably high. Densities are lowest in the mainland countries and Madagascar, ranging from as low as 14 people per square kilometer in Somalia to 64 in Kenya, while in the small island states densities are considerably higher, varying between a minimum of 290 in Comoros and a maximum of 618 in Mauritius (World Bank, 2009). Pressures associated with urbanization are most marked in the mainland states, where major cities like Mombasa (Kenya), Dar es Salaam (Tanzania), Maputo (Mozambique) and Durban (South Africa) are located, supporting populations of 2 to 4 million each.

Box 2 A global treasure

The shores and coastal waters of the Western Indian Ocean (WIO) are recognized globally for their biological richness, natural beauty and high ecological and socio-economic value. With some of the Indian Ocean's most diverse coral reefs, mangrove forests, sand dunes and seagrass beds, the region is one of the less ecologically disturbed areas of ocean in the world. The coastal habitats support rich and complex populations of marine species that rely on this diversity for their productivity. It is estimated that there are over 2,200 species of fish, many of which occur nowhere else on earth, including rare and endangered species, such as dugong, coelacanths and marine turtles. Endemism is high, at 22% in the WIO region (compared to, for example, 13% in the Red Sea and 6% in the Eastern Indian Ocean). Five of the world's seven species of marine turtle nest on beaches in the region. These facts emphasize the need to protect the Western Indian Ocean from factors that may lead to the disappearance of this unique global treasure.

In some key hot spot areas, pollution from domestic, industrial and agricultural sources is causing the degradation of water and sediment quality, resulting in loss of biological diversity, human health problems and a reduction in fish stocks and catches (UNEP/Nairobi Convention Secretariat, 2009d). Due to the increasing population pressures and the absence of alternative resources to sustain the local populations, resource extraction is becoming unsustainable and, in some areas, coastal habitats have been converted



*Coastal urban development is threatening the marine environment
(Photo courtesy of Peter Scheren)*

to other uses such as agriculture, aquaculture, ports/harbours and urban settlements. Such developments are leading to the destruction of vital coastal habitats, such as mangrove forests, sand dunes, seagrass beds and coral reefs, as well as the physical alteration of the coastline (both erosion and accretion) due to the loss of the natural coastal protection and regulation functions of coastal habitats. Furthermore, over-fishing and unsustainable fishing practices (including dynamite fishing, the use of drag-nets, etc.) have in many areas resulted in a decline of fisheries resources and consequently, fish harvests (UNEP, 2006).

Evidently, the natural systems of the WIO region are under increasing pressure from unregulated human activities as well as climate change, which collectively threatens their ability to support livelihoods and human health. Although many pristine areas remain in substantial parts of the WIO region, this growing pressure on natural resources has the potential to cause serious degradation to the coastal and marine environment. Unchecked, the degradation will

erode socio-economic development gains, magnify problems associated with increased poverty, food shortages, ill-health and eventually also compromise social stability and security in countries in the region, some of which are listed among the least developed countries in the world.

1.3 What has been achieved thus far?

A number of important initiatives have been put in place in the region in the recent past, seeking to improve both the knowledge on and management of coastal and marine ecosystems in the WIO region. The foremost has been the establishment, in 1985, of the Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Southern and Eastern African Region. Most of the countries in the WIO region are party to this Convention, which came into force in 1996. The Convention with its protocols provides a mechanism for regional



Governments taking action: Black River Gorges National Park in Mauritius (Photo courtesy of Peter Scheren)

cooperation, coordination and collaborative actions. Over the recent years, the Convention has successfully managed to establish key partnerships with both governmental and non-governmental organizations in the WIO region. As such, the work of the Convention has over the years contributed towards keeping the coastal and marine environment on the development agendas of governments in the WIO region.

Governments in the region have considerably strengthened the management of their coastal and marine environment in recent years and there is a range of related donor-supported projects and programmes. Evidence of the cumulative effect of such initiatives includes the fact that over the past few years, all the governments in the WIO region have initiated the implementation of integrated coastal zone management, as well as the formulation of environmental impact assessment policies and legislation. In many cases governments have established dedicated units to deal with the coastal and marine environment. In addition, a number of marine protected areas have been established in priority areas³.

Important initiatives and partnerships between governments and non-governmental organizations (NGOs) have also taken place in the last 20 years. A number of major international NGOs, including the World Wide Fund for Nature (WWF), the International Union for the Conservation of Nature (IUCN), Conservation International (CI), the Wildlife Conservation Society (WCS) and Coastal Oceans Research and Development in the Indian Ocean (CORDIO) have established important marine and coastal programmes and projects in the region, supporting them with significant investments. Innovative projects have also been undertaken, demonstrating real potential for sustainable community-based marine and coastal management, restoration of coastal habitats and fish stocks, control of dynamite fishing and other destructive techniques, capacity building and improvement of coastal

³ According to Wells et al., 2007, considerable efforts to promote MPAs by many agencies have been made over the past decade. Since the first MPAs were established in the 1960s and 1970s, 8.7% of the continental shelf in Kenya, 8.1% in Tanzania and 4.0% in Mozambique has been designated MPA, with the size of recently protected sites markedly larger than earlier sites. Commitments to expand the MPA networks in these countries would, if implemented, largely achieve the 10% coverage target."

livelihoods, among others⁴. To streamline the substantial efforts undertaken by NGOs in the region, the Consortium for the Conservation of the Marine and Coastal Ecosystems of the WIO region (WIO-C) was established in September 2006.

Another important milestone was the launching, in 1993, of the Western Indian Ocean Marine Science Association (WIOMSA). During its 17 years of existence, the organization has taken great strides to promote marine science research, and supported the improvement of regional capacity to meet the challenges of coastal and marine management. In 2004, with the support of WIOMSA, the Forum of Heads of Academic/Research Institutions in the Western Indian Ocean region (FARI) was established, to facilitate information-sharing and provide the policy–practice link between researchers and decision-makers.

Partnerships between governments and the civil society have led to some important natural areas being placed under conservation management⁵, and some threatened species (such as marine turtles, whales and dugongs) have benefited from higher levels of protection. Also significant in the region are the many local NGOs, which often play an important role in environmental education and community natural resource co-management programmes.

Although these achievements are significant, they are by no means enough to ensure that the marine and coastal resources of the WIO region are sustainably managed. The challenge now is for governments in the region to sustain the momentum and build on the successes of these various initiatives. This Strategic Action Programme sets out the goals and priorities for such action.

⁴ A full overview of ongoing initiatives by some of the major NGOs operating in the region is presented in Annex 9.

⁵ Priority areas for conservation in the Eastern African component of the WIO region were identified through the Eastern African Marine Ecoregion process. Global priority sites in the region include the Lamu Archipelago, the Mida Creek – Malindi complex, the Rufiji – Mafia complex, Mtwara – Quirimbas, Greater St Lucia Wetland Park, the Maputo Bay – Machangulo complex, the Bazaruto Archipelago and the Zambezi Delta. A similar process of identification of conservation priority sites for the island states of the WIO is currently undergoing as part of the Western Indian Ocean Marine Ecoregion Programme (WIOMER).

Box 3 Consortium for Conservation of Coastal and Marine Ecosystems in the Western Indian Ocean (WIO-C)

Concern over the continued degradation of the marine and coastal environment has led a number of international and regional organizations and agencies to come together to form the Consortium for the Conservation of Coastal and Marine Ecosystems in the Western Indian Ocean, (WIO-C). WIO-C aims to support partnerships that advance the interests of marine research, conservation and management in the WIO region.

WIO-C has nine founding members; the International Union for the Conservation of Nature (IUCN), the World Wide Fund for Nature (WWF), the Western Indian Ocean Marine Science Association (WIOMSA), Coastal Oceans Research and Development in the Indian Ocean (CORDIO), Wildlife Conservation Society (WCS), United Nations Environment Programme (UNEP)-Nairobi Convention, Indian Ocean Commission (IOC), New Partnership for Africa's Development (NEPAD), and the Inter-Governmental Oceanographic Commission (IOC-UNESCO). WIO-C was formally launched at the fifth Conference of Parties (COP 5) of the Nairobi Convention, in November 2007.

1.4 A Call for Joint Action

Most countries in the WIO region currently face challenges in managing threats to the coastal and marine environment. Moreover, it is generally agreed that the protection, management and development of the shared ecosystems of the WIO region requires a regional approach, as environmental impacts are not confined to national borders—winds, ocean and tidal currents, and some transboundary rivers cover scales larger than geopolitical entities. It is equally accepted that over-exploitation of resources, habitat destruction or degeneration in water quality in one part of the WIO region has adverse impacts on one or more neighbouring countries.

Having recognized the increasing threat of degradation of coastal and marine ecosystems in the WIO region, and the urgent need for better and

more effective management of coastal and marine resources for the purpose of improving the quality of life of the people and supporting the economies of the countries in the Region, the First Meeting of the Contracting Parties to the Nairobi Convention in March 1997 called for joint action. In response, UNEP, hosting the Secretariat for the Convention, in collaboration with the participating countries and other regional partners, supported the formulation of a preliminary Transboundary Diagnostic Analysis (TDA) and Strategic Action Plan (SAP) for the WIO region, facilitated through a grant from the Global Environment Facility (GEF).

Box 4 Transboundary Diagnostic Analysis and Strategic Action Programme

Transboundary Diagnostic Analysis (TDA) – a scientific and technical fact-finding analysis of the relative importance of sources, causes and impacts of transboundary waters problems.

Strategic Action Programme (SAP) – a negotiated policy document which identifies actions in terms of policy, legal and institutional reforms and investments needed to address priority transboundary problems.



Scientists from the region taking part in a joint water and sediment quality monitoring programme (Photo courtesy of CSIR)

The preliminary TDA and SAP, which were finalized in 2002, defined a number of priority areas for intervention. It was also clear from the TDA and the SAP that there were many gaps in data and information that needed to be filled in order to support the decision-making processes for the management of the marine ecosystems of the WIO Region.

Subsequently, three regional projects were developed by UNEP, UNDP and the World Bank with the financial support of the GEF, to undertake further data collection and analysis and to define and demonstrate appropriate strategies to address priority problems in the WIO region: These three projects were

- (i) the UNEP/GEF project *Addressing Land-based Activities in the Western Indian Ocean* (WIO-LaB) which focused on land-based activities that impact on the marine and coastal environment;
- (ii) the UNDP/GEF *Agulhas and Somali Current Large Marine Ecosystems Project* (ASCLMEs), which focused on the generation of data to support an ecosystem-based management approach of the Agulhas and Somalia current Large Marine Ecosystems (LMEs); and
- (iii) the World Bank/GEF *South Western Indian Ocean Fisheries Project* (SWIOFP), which focused on issues related to offshore fisheries.

The three projects are complementary in scope, and address issues relevant to the sustainable development and management of marine ecosystems. The SAP developed under the WIO-LaB project will be implemented within the framework of the UNEP/Nairobi Convention and focuses on collaborative action at both regional and national levels on the management of land-based activities that are considered key drivers of the degradation of important coastal and marine ecosystems in the WIO region. The SAP, whose implementation will commence upon approval by the Contracting Parties of the Nairobi Convention, will also provide the building blocks for the preparation of a SAP for the Agulhas and Somali Current LMEs and the South Western Indian Ocean Fisheries Project (SWIOFP) that will result from the collective efforts undertaken as part of the three GEF collaborative projects. The delivery and endorsement of this broader, LME-wide SAP is anticipated for 2012.

Box 5 What are transboundary issues?

Transboundary issues are issues that have to do with: Resources that are shared between countries in a region; Problems caused in one country that impact on another; and Common problems (i.e. problems found in several countries).

1.5 Overview of the WIO-LaB Transboundary Diagnostic Analysis

Between 2005 and 2008, the WIO-LaB Project, implemented within the framework of the Nairobi Convention, undertook a comprehensive, region-wide analysis of priority transboundary problems related to land-based activities and sources of degradation of the coastal and marine environment. The development of the TDA involved the establishment of teams of experts drawn from leading institutions in the WIO region, with specialization in relevant fields, such as marine pollution, coastal habitats, fisheries, river-coast interactions, governance and socio-economics.

The data and information used in the preparation of the TDA was derived from various thematic assessment studies prepared under the auspices of the UNEP-GEF WIO-LaB Project. A total of 12 regional and 48 national thematic assessment studies were undertaken between 2004 and 2009, focusing on 7 thematic areas, namely:

- 1 Legal, Policy and Institutional Frameworks
- 2 Water, Sediment and Biota Quality
- 3 Physical Alteration and Destruction of Habitats
- 4 Municipal Wastewater Management
- 5 Marine Litter
- 6 Alteration in Freshwater Flows and Sediment Loads in Key River Basins, and
- 7 Environmental Impact Assessment

A list of the thematic studies that were undertaken as part of the WIO-LaB TDA formulation process is presented in Annex 1. In addition, the project



Stakeholder gather for the first WIO-LaB TDA-SAP Workshop held in Nairobi, Kenya, in April 2007

also made use of a huge body of relevant literature, including over 550 published and unpublished reports, journal papers, etc., generated through other studies and regional processes⁶. A total of 15 regional technical workshops on various thematic areas were held with the objective of providing a comprehensive analysis of transboundary problems in the WIO region, including their root causes.

The above process led to the production of the TDA, which identifies priority issues and potential areas of intervention related to land-based sources and activities that impact on the marine and coastal environment. During the process, over 500 experts and stakeholders were consulted, drawn mainly from key academic and research institutions, government agencies and regional organizations, including NGOs that are active in coastal and marine development and conservation. The review and validation of the TDA

⁶ Including, but not limited to studies conducted through the Western Indian Marine Science Association (WIOMSA)'s MARG and MASMA programmes, IGBP-LOICZ, the UNEP/Global Programme of Action for the Protection of the Marine Environment from land-based activities, the UNEP/Regional Seas Programme, the African Process, as well as publications emanating from various national research and academic institutions in the WIO region, including articles in the *Western Indian Ocean Marine Science Journal*.

was undertaken by a Scientific and Technical Review Committee established within the framework of the Forum for Academic and Research Institutions in the WIO-Region (FARI). The process of development of the TDA was led by a multi-disciplinary team of experts drawn from institutions in the WIO region. The constitution of this team is presented in Annex 2.

The TDA Task Team and other stakeholders who met during the first Nairobi Convention Regional Stakeholders Workshop on the development of TDA

Box 6 The UNEP/GEF WIO-LaB Project

The UNEP-GEF WIO-LaB Project, executed by the Nairobi Convention Secretariat and the United Nations Office for Project Services (UNOPS), serves as a demonstration project of UNEP's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). The Project was financed mainly by the Global Environment Facility (GEF), the Government of Norway, UNEP and participating countries: Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania. The three main objectives of the project were to:

- Reduce stress to coastal and marine ecosystems by improving water and sediment quality;
- Strengthen the regional legal basis for preventing land-based sources of pollution, including implementation of GPA, and
- Develop regional capacity and strengthen institutions in the WIO region for sustainable, less polluting development, including the implementation of the Nairobi Convention.

held in Nairobi, Kenya (17– 19 April 2007), identified three main clusters of land-based transboundary pressures on coastal and marine ecosystems:

- A Physical alteration and destruction of habitats
- B Water and sediment quality degeneration due to pollution; and
- C Alteration in freshwater flows and sediment loads from rivers.

The meeting also identified governance and climate change as cross-cutting issues that have relevance on the three thematic areas listed above. In the following sections, a short description of each of these problem areas is presented. A detailed prioritized overview of the problems and causes related to each of the three problem areas is presented in Annex 3. For more in-depth analysis, please refer to the detailed TDA Report.

1.5.1 Problem Area 1: Physical alteration and destruction of habitats

The TDA found that one of the priority transboundary problems for the WIO region is rapid, and unmanaged transformation of the coastal land- and seascape and consequent loss of critical habitats that provide essential ecosystem goods and services. This transformation is often driven by increased economic activities such as construction of beach hotels, resorts, marinas and ports (UNEP/GPA and WIOMSA, 2004a&b). Dredging, sand winning, beach reclamation, mining, extraction of minerals, laying of pipelines (oil, water and gas) and wastewater outfalls all add to a long list of anthropogenic activities that lead to the alteration of shorelines and habitats in the WIO region. In addition, excessive exploitation of living resources such as coastal forests, mangroves, seagrass meadows and coral reefs further degrade critical habitats that are already stressed by global climate change. Land reclamation for agriculture, aquaculture and coastal development, as well as extensive deforestation of catchment areas (watersheds), is causing acute problems for the major river systems in the region, by causing changes in the flow of freshwater and sediments to the coast (see section 1.5.3), and invasive species are claiming their place in the ecosystem structure. The cumulative impacts of these transformations and losses have led to significant physical and ecological changes and an overall deterioration in many ecosystem goods and services. Each of the participating countries has already experienced such transformation and loss of habitats, to varying degrees, and several projects and or programmes, such as the African Process (GEF/MSP, 2001) and the WWF Eastern African Marine Ecoregion Programme (EAME) (WWF, 2004), have identified "hot spots" where such loss is particularly pronounced.

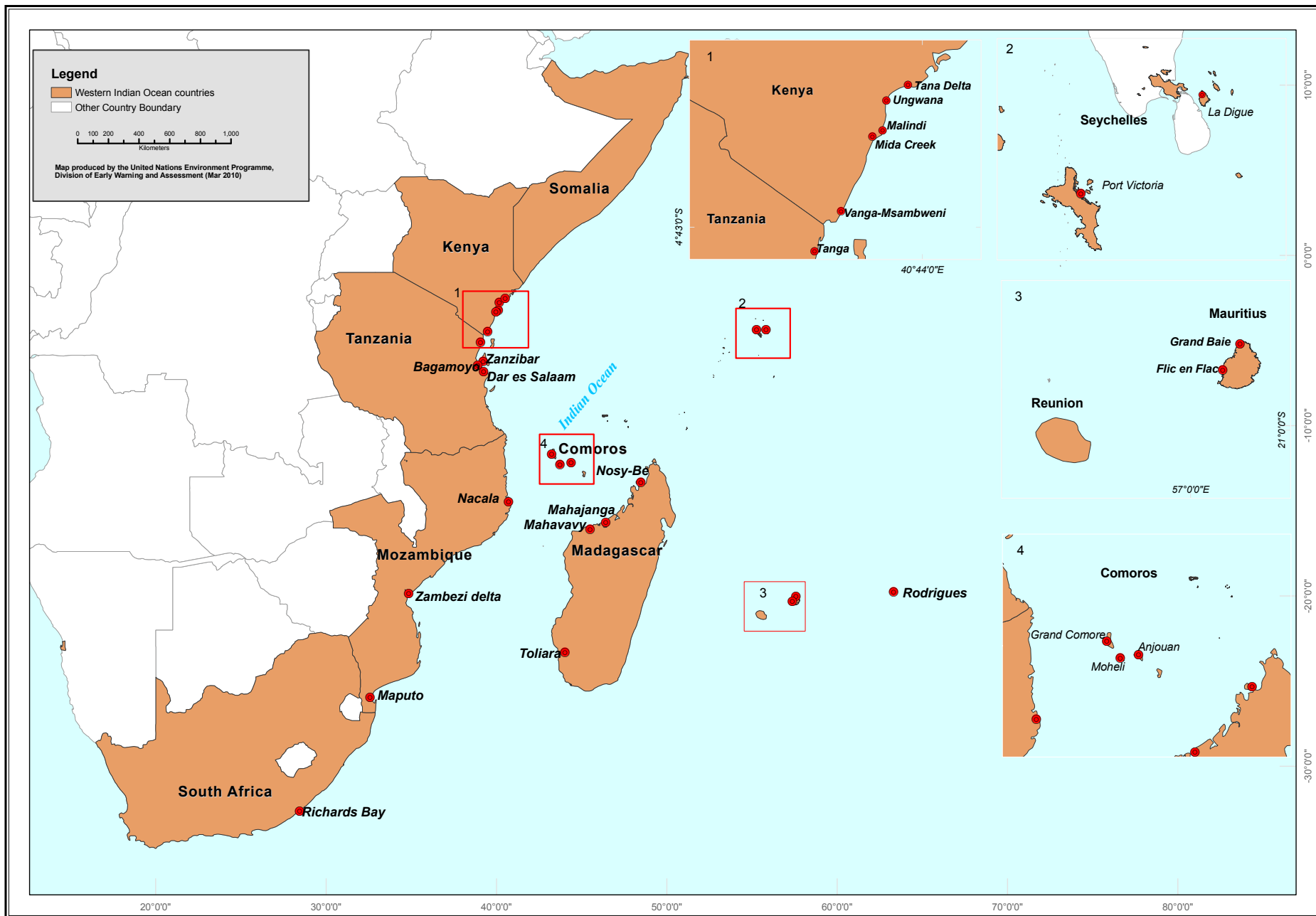


Figure 3: Hot spots of physical alteration and destruction of habitats (Source: UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d)

Box 7 Definition of Critical Habitats

Within the context of the SAP, Critical Coastal Habitats are defined as those habitats known to be crucial to the functioning and integrity of coastal and marine ecosystems, the preservation of biodiversity and/or individual species, as well as the provision of important goods and services that contribute to the livelihoods of the coastal populations. Critical coastal habitats include, but are not limited to mangrove forests, rocky shores, coral reefs, coastal forests, sandy beaches and seagrass meadows, or a combination any of these.

Equally important is the identification of areas and habitats that have escaped transformation, remaining relatively pristine and worthy of special protection to avoid degradation and secure continued ecosystem services. The most comprehensive assessment of priority areas for conservation in the Eastern African component of the WIO region has probably been done through the WWF-led Eastern African Marine Ecoregion (EAME) process; global priority sites in the region include the Lamu Archipelago, the Mida Creek–Malindi complex, the Rufiji–Mafia complex, Mtwara–Quirimbas, Greater St Lucia Wetland Park, the Maputo Bay–Machangulo complex, the Bazaruto Archipelago, and the Zambezi Delta (WWF, 2004). A similar process of identification of conservation priority sites for the island states of the WIO is currently being undertaken as part of the Western Indian Ocean Marine Ecoregion Programme (WIOMER).

The impacts of habitat transformation in the WIO can be grouped into five categories, as presented in Table 1. While shoreline changes (both erosion and accretion) are common throughout the region, other categories of impact are largely dependent on the extent to which certain habitats occur in a country, e.g. mangroves, which are found mainly in Tanzania, Kenya, Mozambique and Madagascar, and coral reefs, which are concentrated around the island states and the coastlines of Kenya, Tanzania and northern Mozambique.



*Growing demand for mangrove timber as a source of building materials and firewood can threaten forests if not managed
(Photo courtesy of Rudy van der Elst/ORI)*



*Coastal mining for heavy metals causing physical alteration of the coast
(Photo courtesy of Bronwyn Palmer/ORI)*

Table 1 Overview of the categories of habitat transformation identified in the TDA

Degradation of mangrove forests	As a dynamic zone between land and the sea, mangrove wetlands are controlled by several interacting factors such as tides, periodicity of freshwater and sediment fluxes, topography, soil and water salinity, temperature and sedimentation patterns. These factors are closely related to land- and water-use practices in the areas adjacent to and upstream of mangrove forests. Human-induced stresses range from diversion of freshwater flow, poor land use in and around mangrove forests to over-exploitation of mangrove resources. These stresses disrupt the natural equilibrium, ultimately leading to the degradation of the mangrove wetlands, which in turn not only depletes the resources within their boundaries, but also affects the productivity of adjacent coastal and marine ecosystems.
Degradation of seagrass beds	Seagrass degradation in the WIO region is generally evidenced by continued destruction and/or reduction of seagrass habitats in shallow inter-tidal and sub-tidal areas. This degradation is usually as a result of physical action (e.g. dragging of nets, or clearing), pollution or by climate change through increased discharge of sediment-laden low-salinity water derived from flooded river systems. Seagrass degradation has negative impacts on the system's productivity, biodiversity and hence food security, ultimately leading to loss of livelihood and increased poverty among coastal populations.
Degradation of coral reefs	Coral reef ecosystems face various types and levels of impact across the WIO region. In addition to anthropogenic threats such as destructive fishing activities, there is climate change, which led to severe coral bleaching during the 1997-98 El Niño/Southern Oscillation phenomenon, damaging reefs throughout the region. Continuous degradation of coral reef biodiversity lowers fisheries productivity and leaves shorelines unprotected, impacting on livelihood and incomes of local communities, thereby increasing poverty levels.
Degradation of coastal forests	Degradation of coastal forests occurs mainly in the form of land transformation through intense clearing for agriculture, mining, human settlement and coastal development, including tourism. There is also destruction associated with an increased demand for forest products such as timber and firewood. Transformation of coastal forests has a significant impact on the coastal environment through reduction of plant and faunal diversity, loss of fertile soils, increased soil erosion, and a reduction in the recharge of groundwater aquifers. Ultimately, these impacts change the dynamics of both sediment and water exchange in the coastal zone.
Shoreline changes	Erosion and accretion of coastlines can result in significant shoreline change. Episodic storm events, in part driven by climate change, have an impact on critical habitats, coastal infrastructure, agricultural land and human settlements. As many WIO shores are dominated by rapidly eroding sediments and low-lying wetlands, the impact of storms and hence shoreline changes are accentuated. Changes in accretion of the coast originate from two main sources: changes in sediment loads from rivers and the re-suspension of benthic sediments by rough seas. In addition, increased water turbidity, due to re-suspended sediments, can result in smothering of corals, seagrasses and mangroves, hence further contributing to shoreline change. Sea level rise is an additional problem for low-lying coastal areas, such as central Mozambique, the west coast of Madagascar, and the Tana and Rufiji Deltas in Kenya and Tanzania respectively.

An indicative list of hot spots of physical alteration and destruction of habitats, as identified through the TDA process, is presented in Annex 3a⁷. The TDA also identified the main causes of the five categories of habitat transformation. A prioritized overview of these causes is presented in Annex 4a.

⁷ The definition of hot spots is taken from the African Process (GEF/MSP, 2001): 'Hot spots' in this context are defined as "geographically defined coastal areas and other areas of the sea, of national, regional and/or global significance, where the conditions are such as to adversely affect human health, threaten ecosystem functioning, reduce biodiversity and/or compromise resources and amenities of economic importance." In contrast, 'sensitive areas' are defined as "geographically defined areas, of national regional and/or global significance which, although not degraded at present, are threatened with future degradation, either because of sensitivity of the receptor or the magnitude of the anthropogenic activity posing the threat". An appropriate management strategy would often incorporate management measures for both categories of priority areas, as is done, for example, in the EAME Strategy (see also footnote 5 on page 5).

1.5.2 Problem Area 2: Water and sediment quality degeneration due to pollution

A significant amount of the pollution load to the WIO emanates from land-based activities, such as domestic and industrial effluents, and contaminated surface and sub-surface runoff, from urban and agricultural areas⁸. The estimated loads of organic material (BOD), suspended solids, nitrogen and phosphorous generated from municipal wastewater in coastal areas of the WIO region are 70,000, 97,000, 18,000 and 4,000 tonnes per year, respectively (UNEP/Nairobi Convention Secretariat, 2009d). These in certain instances are released into important critical habitats such as mangroves and coral reefs, causing their degradation. It is however, important to note that pollution in the WIO region is mainly confined to hot spot areas located in and around the main urban centres such as Mombasa, Dar es Salaam, Maputo, Durban, Tuléar, Port Louis, and Port Victoria. Pollutant loads from such land-based activities are typically disposed of in the coastal zone, where they affect some of the most productive areas of the coastal and marine environment, such as estuaries and near-shore waters. Moreover, contaminants which pose risks to human health and living resources can be transported long distances by watercourses, ocean currents and atmospheric processes.

The TDA identifies five distinguishable pollution categories, brief summaries of which are presented in Table 2. The various categories of pollution are not equally common or widely spread throughout the WIO region and in



Photo courtesy of Peter Scheren

⁸ Detailed analyses are presented in the national and regional Pollution Status Report prepared under the auspices of the WIO-LaB project: Anon Madagascar, 2009; Anon Mozambique, 2007; Anon Mauritius, 2009; Munga et al., 2009; Mohammed et al., 2009; Abdallah et al., 2009; Dubula et al., 2009; Antoine et al., 2009; and UNEP/Nairobi Convention Secretariat and WIOMSA, 2009a.

many cases their impacts are confined to a limited geographical extent, but still the impacts in such areas cannot be under-estimated. Annex 3b provides an overview of the hot spots of pollution identified in the TDA, including the specific transboundary problems associated with each.

The WIO-LaB TDA found that the highest pollutant loads entering the WIO originate from the mainland states and Madagascar. South Africa and Tanzania contribute approximately 80% of the overall loading of nutrients and organic matter, attributed to material originating mainly from the discharge of untreated wastewater from the larger coastal municipalities in the two countries.

Further, the TDA concludes that the most widespread and common transboundary problem related to pollution is microbial contamination. This form of pollution also has the highest level of impact, mainly in terms of health risks to the population (through both direct contact with seawater and consumption of seafood products).

The second important issue that was recognised in the TDA is the continued inappropriate management of solid waste, in particular along the coasts of Comoros, Mozambique, Kenya and Tanzania, which contributes to the growing marine litter problem in coastal waters of the WIO region (UNEP and WIOMSA, 2008). Issues related to high levels of suspended solids, furthermore, are largely confined to urban areas and areas around the main river outlets, while chemical pollution is most common in major urban areas (with significant industrial presence) and ports. Eutrophication and the associated harmful algal blooms were generally rated as a problem of lower importance, except in Seychelles and Mauritius where cases of seasonal harmful algal blooms have been reported in some areas. The TDA identified the main causes of the five key pollution categories. A prioritized overview of these causes is presented in Annex 4b.



Photo courtesy of Peter Scheren

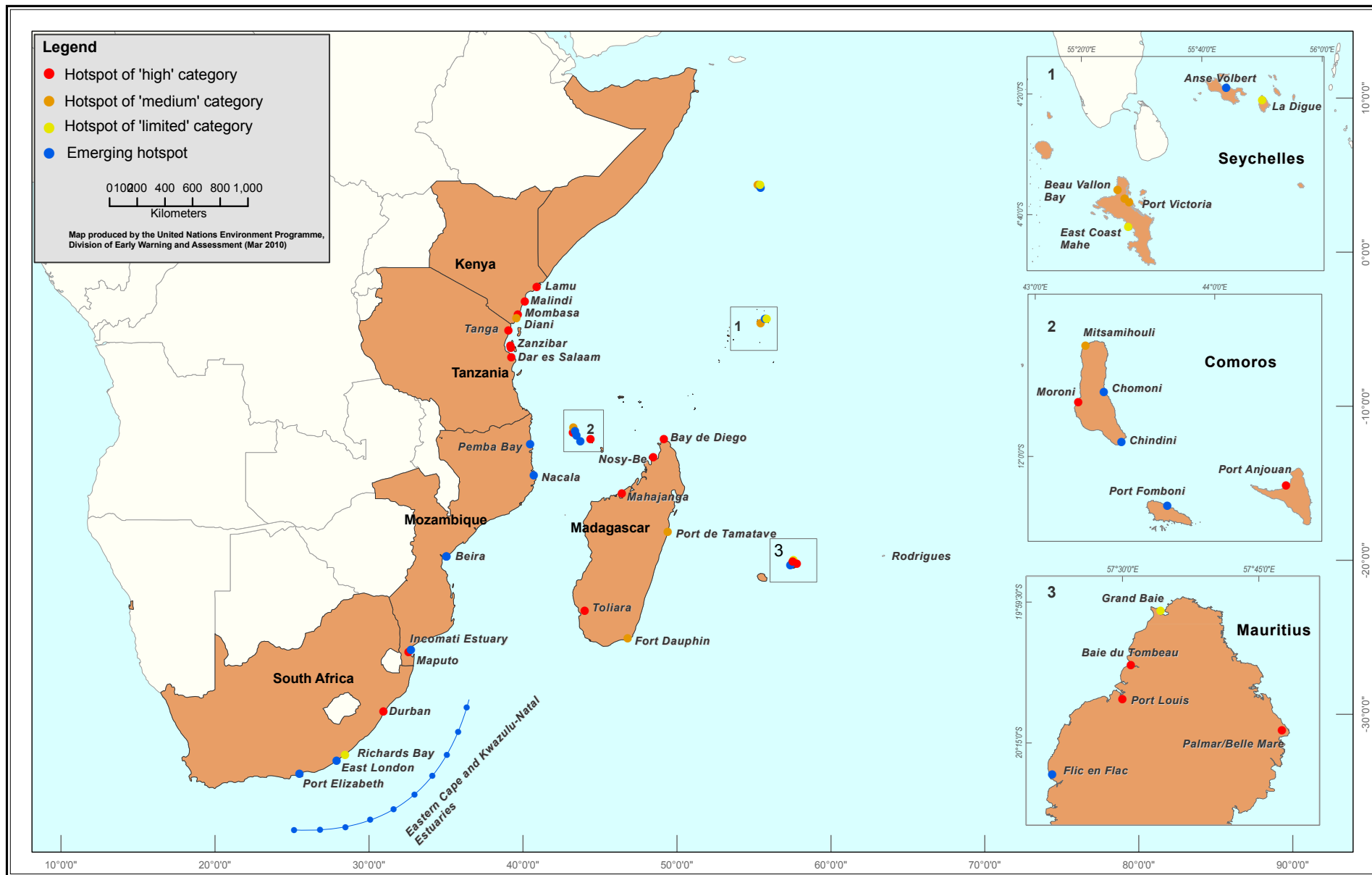


Figure 4: Hot spots of pollution
(Source: UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d)

Table 2 Overview of the key pollution categories identified in the TDA

Microbial contamination	Microbial contamination is characterized by the presence in water of pathogenic organisms (protozoa, bacteria and/or viruses) of either human or animal origin that can pose health risks to humans. In the WIO region, microbial contamination of coastal waters is typically associated with inappropriate disposal of municipal wastewater, contaminated surface and sub-surface runoff from urban areas, contaminated runoff from agricultural areas used for livestock rearing and industrial effluents (mainly from food-processing industries).
High suspended solids	High suspended solid loads from land-based sources enter WIO coastal waters mainly through municipal and industrial wastewater discharges, river discharges and surface runoff, particularly during rainy seasons. Dredging activities (usually associated with ports and harbours) can also significantly contribute to this problem.
Chemical pollution	Chemical pollution in the WIO region is characterized by the adverse effects of chemical contaminants (heavy metals, hydrocarbons and persistent organic compounds) released to the coastal environment from land-based human activities. Chemical pollutants in the WIO region are typically linked to agrochemical discharges (accidental or intentional), industrial discharges, dredging activities in ports and harbour (re-suspending sediment-bound heavy metals and hydrocarbons), and leachate from solid waste dump sites.
Marine litter/solid waste	Most of the major cities and towns found in the WIO region generate significant amounts of solid wastes, some of which reach the sea to contribute to marine litter problem. Important land-based sources of solid waste are found in major urban centres (ports, industrial and commercial areas and informal settlements) and discharges through rivers (transporting solid waste/debris from urban areas located in their watersheds).
Eutrophication	Eutrophication refers to artificially enhanced primary productivity (algal and phytoplankton growth) and organic matter loading in coastal waters as a result of the increased availability or supply of nutrients, usually as a result of inappropriate disposal of municipal wastewater or nutrient-enriched agricultural return flows.

1.5.3 Problem Area 3: Alteration in freshwater flows and sediment loads from rivers

The WIO region is endowed with a number of important rivers, including some transboundary rivers such as the Zambezi, Incomati and Ruvuma. These rivers are important not only in terms of provision of freshwater to both rural and urban areas, but also for their role in sustaining the riverine, estuarine and marine physico-chemical and ecological processes and productivity. One of the key areas of concern for the WIO region relates to the interaction between river basins and the coastal-marine environment (LOICZ, 2002). Throughout much of the region, and particularly in continental states, important transformations of the coastal and marine environment can be attributed to human activities and climatic variability occurring in the river basins.

The impacts from human activities on the river basins, such as impeded flow of freshwater, terrigenous sediment and increased organic matter, have altered the nature of the interaction between river systems and coastal processes (UNEP/Nairobi Convention Secretariat, ACWR and WIOMSA, 2009). Nutrients and pollutants from domestic sewage and industrial and agricultural chemicals have led to water quality degradation in some of the major river systems that drain into the WIO (e.g. Tana and Athi-Sabaki in Kenya, Pangani and Rufiji in Tanzania, and Maputo in Mozambique). An overview of the two main categories of river-coast interaction is presented in Table 3.

Table 3 Overview of the two categories of river-coast interaction identified in the TDA

<p>Alteration of river flows and water quality</p>	<p>The alteration of the natural river flow (whether through a drop in quality, quantity or timing of flow) is found to some degree in many of the major river basins in the WIO region. The four most frequent reasons for flow alterations are: (i) overall reduced flow due to consumptive uses of water, (ii) increase of river surface area along sections of the river due to impoundment/damming, (iii) changed seasonal flow patterns (e.g. releases for hydropower-generation during the dry season), (iv) increased floods due to wetland losses (loss of water retention capacity). These are coupled with the large-scale realities and uncertainties brought about as a consequence of climatic change, as a consequence of which some basins are predicted to receive more rainfall than the historic mean and others less.</p>
<p>Alteration of sediment loads</p>	<p>A number of factors, such as changing climate, land-use practices and dam construction, have led to changes in the sediment load transported by some of the rivers in the WIO region. The alteration of sediment loads in the WIO region rivers broadly manifests itself in three ways:</p> <ul style="list-style-type: none"> • Increased sediment loads – this has a negative impact on the coastal and marine environment, through for example the degradation (smothering) of mangroves, coral reefs and seagrass beds, as in the case of Athi-Sabaki and Mwache river in Kenya, and the Betsiboka river in Mozambique. • Decreased sediment loads – Has a negative impact on the marine environment through increased erosion of the delta mouth, and through increased salt-water intrusion, leading to a reduction of downstream habitats for mangroves and other species, as in the case of the Tana River in Kenya, and the Zambezi and Incomati rivers in Mozambique. • Variable sediment loads in different parts of the basin - in some rivers, there is both increased sediment loads from erosion in upstream areas, and reduced sediment transport downstream of dams due to trapping of the sediments behind the dam wall.

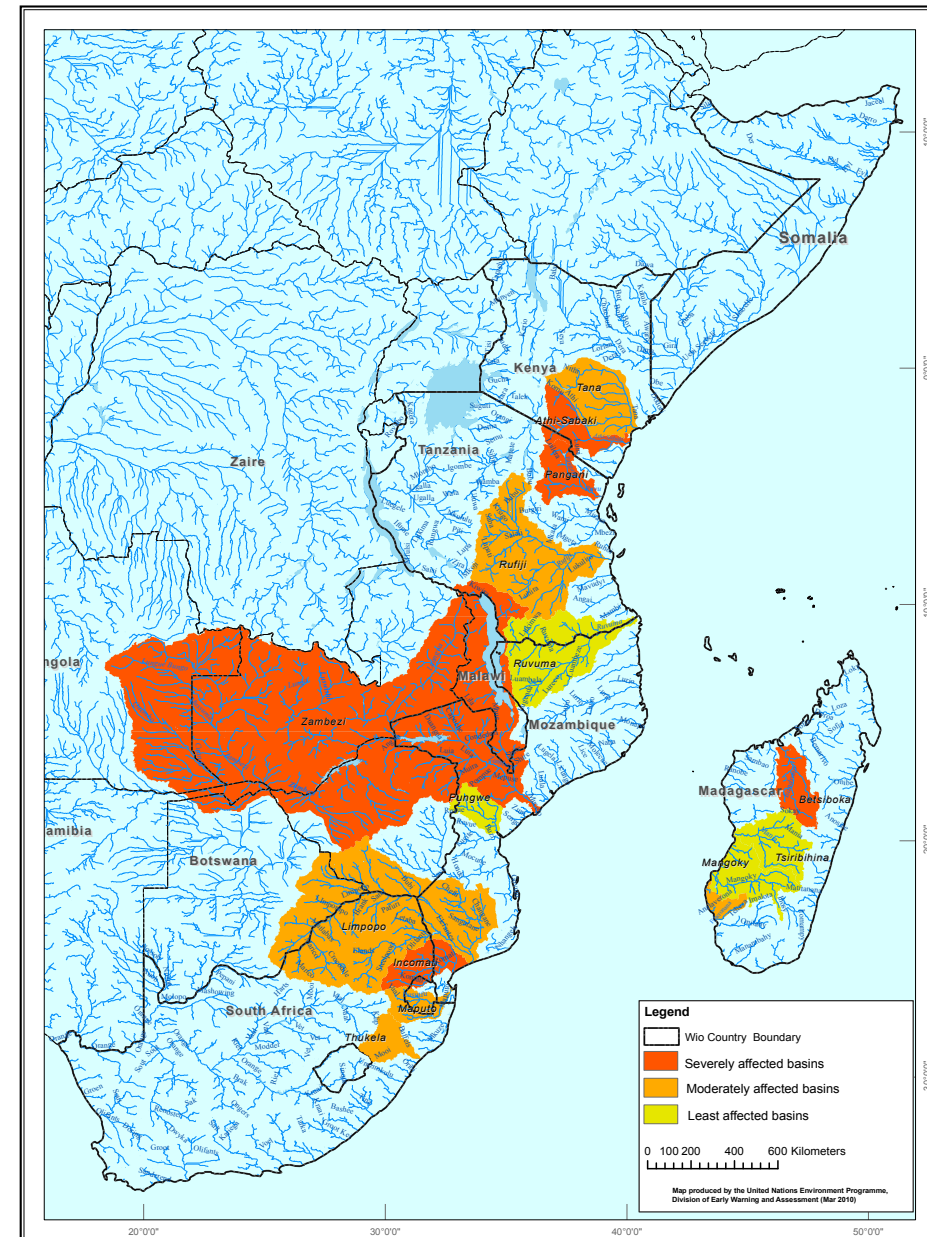


Figure 5: Hot spots of river-coast interactions (Source: UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d)

An overview of the hot spots of river-induced coastal and marine degradation for the 15 main river basins in the WIO region is presented in Annex 3c. Based on this overview, it may be concluded that in terms of severity of problems associated with these river systems, alteration of river flow is the most common one throughout the region. It occurs essentially as a result of increased water abstraction (for urban and rural water supply schemes and irrigation), damming (for hydroelectric power generation and irrigation) and land use changes that alter hydrological dynamics. Nevertheless, there are also cases where changes in sediment loading (increase or decrease) and water quality have had severe impacts on the productivity of critical coastal habitats such as mangroves, seagrass beds and coral reefs. According to the TDA, the most affected main river basins are:

- Pangani (Kenya and Tanzania);
- Athi-Sabaki (Kenya);
- Incomati (South Africa, Swaziland and Mozambique);
- Zambezi (Angola, Botswana, Democratic Republic of Congo (DRC), Malawi, Namibia, Tanzania, Zambia, Zimbabwe and Mozambique); and
- Betsiboka (Madagascar).

In addition to the above main rivers, the numerous smaller rivers found throughout the region have not escaped human influences, although the extent of alteration strongly varies.

The WIO-LaB TDA identified the main causes of the alteration of the river freshwater flows and sediment load in the WIO region. A prioritized overview of these causes is presented in Annex 4c.

1.5.4 Problems related to governance and awareness

Despite the creation of national institutions and the enactment of national laws, supported by international conventions, the management of the coastal and marine environment in the WIO region is still challenging. While most countries in the region have put in place policy, legal,

regulatory and institutional frameworks that are relevant to the protection and management of the coastal and marine environment, many have not succeeded in reversing the trend of degradation of coastal and marine ecosystems. An overview of the main limitations in LBSA governance identified in the TDA is presented in Table 4. A prioritized list of governance- and awareness-related issues is presented in Annex 4d.

Table 4 Common weaknesses in governance of land based sources and activities in the WIO region

Policy and legislative inadequacies	Inadequate updating, implementation, enforcement and monitoring of relevant legislation Inadequate ratification and domestication of relevant international and regional instruments
Limited institutional capacity	Lack of mechanisms for effective coordination and inter-sectoral governance Inadequate human resources and technical capacity in institutions charged with the responsibility of addressing LBSA-related issues
Inadequate awareness	Inadequate awareness, understanding and appreciation of the economic value of coastal/marine ecosystem goods and services among policy makers and legislators, the civil society and the private sector
Inadequate financial mechanisms	Inadequate financial mechanisms and resources for dealing with LBSA-related issues
Poor knowledge management	Lack of adequate scientific and socio-economic data and information to support policy making, monitoring and enforcement

Coastal zone users are diverse in nature, and come from various economic sectors such as fisheries and aquaculture, agriculture, forestry, tourism, mining, manufacturing industry, transport, energy, as well as coastal development and urbanisation sectors. Traditionally, the governance of these sectors was based on a sectoral approach, with each sector managed separately through dedicated legal/regulatory,

institutional and policy frameworks. It is therefore not surprising that a primary root cause of governance ineffectiveness in the WIO region is related to a lack of coordination of administrative decisions affecting the development and/or the exploitation of the coastal and marine natural resources.

A key conclusion from the governance analysis undertaken as part of the TDA process is that crosscutting governance instruments and tools need to be developed and promoted to meet the unique challenges in the coastal zone. Such instruments and tools are based on the application of Ecosystem-Based Management Approaches (EBM), including Integrated Coastal Zone Management (ICZM), Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), and Marine Protected Areas (MPAs). A positive development is that virtually all WIO countries have to a certain extent commenced, or at least considered the application of such instruments and tools in their areas of jurisdiction. However, there is still need to build capacity at the country level in these areas.

Furthermore, as many of the impacts related to land-based sources and activities are transboundary in nature, efforts should be focused on harmonizing and adopting legislative frameworks at the regional level. In this regard, the development of regional strategies for the management of land-based sources and activities and coordination between institutions is crucial. A number of international and regional inter-governmental agreements that in one way or the other support the governance of environmental resources in the region are already in place, although not all have been ratified by all countries (UNEP/Nairobi Convention Secretariat and WIOMSA, 2009c). In addition, a number of key regional institutions have been established to support the implementation of such instruments. The central challenge now is to provide effective coordination mechanisms for these governing bodies.

Finally, the socio-economic importance of the coastal and marine environment in the WIO region is rarely considered in national policy formulation.

Table 5 Generic root causes of transboundary problems in the WIO region

Generic Root Causes
<p>A. Population pressure Rapid population growth and associated urbanization in the WIO region has increased the generation of waste and concentration of waste streams. Also, population growth has led to increased demand for ecosystem goods and services.</p>
<p>B. Poverty and inequality The WIO region is characterized by high poverty levels, which result in increased reliance on the exploitation of natural resources. The consequent lack of financial resources has led to problems such as inadequate sanitation infrastructure, and institutions and regulatory bodies lacking capacity.</p>
<p>C. Inadequate governance In the countries of the WIO region there exists a weakness in policy, legal and institutional structures and building blocks for effective management of the coastal and marine environment.</p>
<p>D. Inadequate financial resources Most countries in the WIO region do not have adequate financial resources, whether in absolute terms or through inadequate priority setting, for effective management of the coastal and marine environment.</p>
<p>E. Inadequate knowledge and awareness Gaps in the knowledge base and inadequate awareness of the value of ecosystem goods and services provided by a healthy coastal and marine environment are a major cause of management inefficiencies by coastal communities and policy makers in the WIO region.</p>
<p>F. Climate change and natural variability Climate change and variability in the WIO region is already influencing rainfall patterns, evidenced by the frequency and intensity of extreme weather events, changing the flow patterns of rivers (causing floods and impacting on floodplains, deltas and coastal ecosystems) and other events such as the bleaching of corals.</p>
<p>G. Economic drivers The demand for ecosystem goods and services, including from export markets, is exceeding the availability and regeneration capacity of elements of the ecosystems in the WIO region.</p>

Consequently, destructive activities are often not costed and in certain instances are allowed to proceed without clear regulation, causing damage to critical habitats. The devastating socio-economic consequences of this lapse are hardly communicated to policy makers or to the public. As a result, environmental governance is given low priority in the national planning processes, including budgetary allocations.

1.5.5 Root causes and stakeholder sectors related to transboundary problems

The WIO LaB TDA identified the root causes of the transboundary problems related to the coastal and marine environment in the WIO region. Table 5 presents an overview of the generic root causes that were found to contribute to all the transboundary problems.

There is much communality among the various problem areas in terms of the stakeholder sectors at their root. Table 6 provides an overview of the various sectors and root causes related to each of the three main problem areas.

Table 6 Synthesis Matrix of root causes and sectors related to transboundary problems

Major transboundary problem	Transboundary elements	Major root causes							Main sectors							
		Population pressure	Poverty and inequality	Inappropriate governance	Inadequate financial resources	Inadequate knowledge and awareness	Climate change and natural processes	Economic drivers	Fisheries and aquaculture	Agriculture and forestry	Tourism	Mining	Industry	Transportation	Energy production	Urbanization and coastal development
Water and sediment quality degeneration due to pollution from land-based sources	Common in all countries Affecting spawning areas for migratory marine organisms Potential for transboundary dispersion of persistent pollutants and litter	■	■		■	■				■	■	■	■	■	■	■
Physical alteration and destruction of habitats	Common in all countries Affecting spawning areas for migratory marine organisms	■	■	■	■	■	■	■	■	■	■			■	■	■
Alteration in freshwater flows and sediment loads from rivers	Common in many countries Affecting spawning areas for migratory marine organisms	■	■	■	■	■	■	■	■	■	■	■		■	■	■

1.6 Developing the Strategic Action Programme

1.6.1 General and specific objectives of the SAP

The overall objective of the SAP is to promote the sustainable development in the Western Indian Ocean (WIO) region by strengthening the management of coastal and marine resources in the various jurisdictions of the Region, on the basis of an ecosystem-based management approach. The specific objectives of the SAP are as follows:

- To constitute a frame of reference for regional harmonization and coordination of transboundary efforts undertaken in the WIO region in order to enable sustainable management of coastal and marine natural resources;
- To encourage the establishment of a comprehensive planning system and mechanisms for stakeholder consultations, coordination and participation in each country and for the WIO region as a whole;
- To promote the incorporation of transboundary environmental concerns in the development policies, plans and programmes of countries in the WIO region; and
- To promote the conceptualization and implementation of activities and projects for the sustainable management, protection and development of coastal and marine natural resources in the WIO region.

It is intended that the SAP will provide the basis for the Work Programme of the Nairobi Convention for 2010 and beyond, and be integrated into the Eastern Africa Action Plan of the Convention, which has a long-term planning horizon. Deliberate efforts have been made to formulate the SAP such that it is consistent with the objectives of other regional and international Conventions and policy frameworks, including the: UN Millennium Development Goals; regional and global priorities identified under Agenda 21 (Chapter 17); Convention on Biological Diversity; Programme of Action for the Sustainable Development of Small Island Developing States (Barbados, 1994); Pan-African Conference on Sustainable Integrated Coastal Management (Mozambique, 1998); Arusha Resolution on Integrated Coastal Zone Management (ICZM



*Celebrating World Ocean Day 2009 in Kenya
(Photo courtesy of Peter Scheren)*

in Eastern Africa including the Island States (April, 1993); and Seychelles Conference Statement on ICZM (October, 1996).

The SAP is also specifically intended to complement the commitments and priorities identified within the Environmental Component of the New Partnership for Africa's Development (NEPAD), and in particular its marine and coastal component (COSMAR), as well as of the African Union (AU), the Southern African Development Community (SADC), the East African Community (EAC) and the Indian Ocean Commission (COI).

Foremost, however, the SAP represents a framework for national action; it provides a consensus between Governments in the WIO region with regard to action to be taken to address priority environmental problems in the region. In this regard, the TDA and SAP are based primarily on a series of national analyses of specific thematic problem areas. In this respect, the reports derived from these analyses were subjected to broad-based consultation and

approval by Inter-Ministerial Committees. Moreover, the development of the SAP ran in parallel with the development of National Programmes of Action (NPAs) in some countries; the national priority actions identified in such NPAs were taken into consideration in the development of the SAP (see also section 3.2 for the role of NPAs in the implementation of the SAP).

The consolidated TDA and SAP underwent national- and regional-level review, in order to ensure that they represented a truly regional perspective of the issues and problems related to the management, development and protection of the coastal and marine ecosystems of the WIO region. A detailed description of the process of the development of the SAP is presented in the following section.

1.6.2 Process of developing the SAP

A Team of Experts established under the auspices of the Nairobi Convention led the process of the formulation of the Strategic Action Programme (SAP) for addressing land-based sources and activities responsible for the degradation of the coastal and marine environment in the WIO region. The SAP Drafting Team consisted of experts and stakeholders drawn from governments, the civil society and academic institutions in the WIO region. The formulation of the SAP relied on the key findings of the Transboundary Diagnostic Analysis (TDA). The SAP Drafting team first met in Mombasa, Kenya in August 2008, where drafts of the vision, long-term objectives, short-term management targets and actions for the SAP were drawn up.

The draft SAP emanating from Mombasa was later reviewed and refined by the Regional Task Forces on Municipal Wastewater Management and Physical Alteration and Destruction of Habitats, during its 4th regional meeting that was held in Nampula, Mozambique, from 22nd to 24th October 2008. The outcome of this review meeting was a more consolidated draft SAP with clearly articulated environmental quality objectives and specific management targets and actions.

From 20th and 21st November 2008, the draft SAP from Nampula was presented to stakeholders in the WIO region at a Regional SAP Stakeholder's

Workshop that was held in Cape Town, South Africa. During this workshop, stakeholders drawn from both governmental and non-governmental organizations further reviewed the vision, environmental quality objectives as well as the various management targets and actions in the SAP. The meeting also identified stakeholders to be involved in the implementation of the various management actions articulated in the document. Further deliberations and negotiations on the draft SAP were held during the WIO-LaB project Steering Committee meeting and the Nairobi Convention Focal Points Forum held in Seychelles on 11th and 12th March 2009.

Between January and December 2009, national consultative workshops on the SAP were held in all countries that are party to the Nairobi Convention. During these meetings, stakeholders in participating countries provided inputs in the identification of priority issues for implementation at the national level. The meetings also identified key stakeholders that would be involved in the implementation of the SAP at the national level, as well as in ongoing and planned projects and programmes that would contribute to its implementation.

Final technical negotiations on the SAP were held during the 2nd Regional Stakeholder Meeting held on 11th and 12th June 2009 in Mombasa, Kenya. These negotiation meetings were attended by officially nominated government delegates, as well as representatives of key partner institutions and organisations in the region. Following the Mombasa negotiation meeting on the SAP, the updated SAP was subsequently presented to the WIO-LaB Project Steering Committee on 7th December 2009 for approval.

Following the approval of the Steering Committee, the final version of the SAP was submitted to the 6th Conference of Parties of the Nairobi Convention for final approval by the governments of the participating countries. This paved the way for implementation and integration of the SAP into the Eastern Africa Action Plan and the Work Programme of the Nairobi Convention for the period 2010–2012, and beyond.



Photo courtesy of Farid Anasse

PART II: Strategic Action Programme

2.1 Structure of the SAP

The Strategic Action Programme (SAP) for the Protection of the WIO Coastal and Marine Environment from Land-based Sources and Activities has three sections: Section I provides an overview of the current environmental conditions in the WIO region and demonstrates the linkage between the Transboundary Diagnostic Analysis (TDA) and the SAP. Section II provides a definition of the vision, environmental quality objects and management targets that have been identified for each of the three thematic areas. Each strategic component has a long-term objective, and a set of short-term management targets and actions. A schematic overview of the SAP is presented in Figure 3.

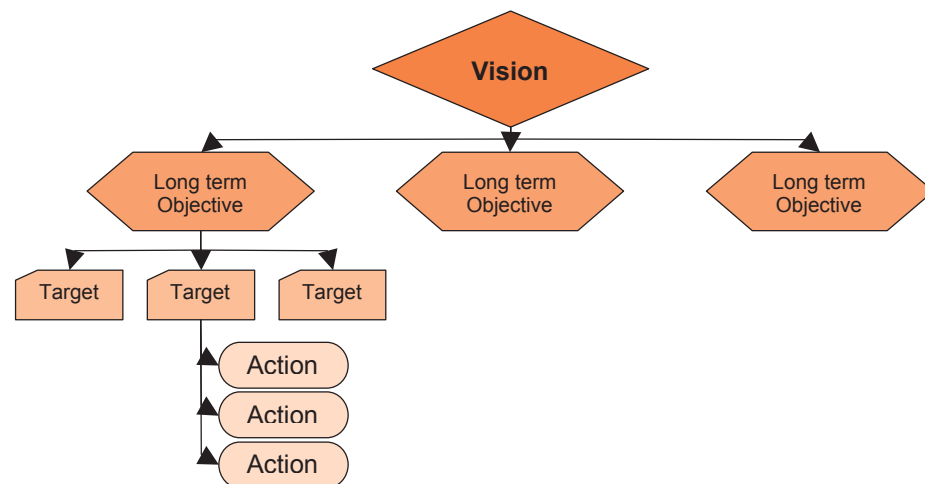


Figure 3 Structure of the SAP

Section III of the SAP presents the implementation plan that outlines the mechanisms that will be used in the implementation of the SAP, including monitoring and evaluation mechanisms.

2.2 Vision and objectives of the Strategic Action Programme

2.2.1 A new vision for the WIO region

The vision of the SAP for addressing land-based activities in the WIO region, as defined by the stakeholders in the WIO region is as follows:

“People of the region prospering from a healthy Western Indian Ocean”

This vision is underpinned by five key principles:

- Equity
- Sharing of responsibility and management
- Harmony between resource users and nature
- An informed society, and
- Lifestyles adjusted to foster sustainability.

2.2.2 Objectives of the Strategic Action Programme

The SAP has three long-term objectives relating to the desired environmental quality; these ‘Environmental Quality Objectives (EQOs) spell out the state or quality of the environment that the countries of the WIO region hope to achieve in 25 years, through the implementation of the SAP.

The EQOs are also intended to ensure that marine and coastal ecosystem functions, goods and services are assured as a basis for sustainable socio-economic development in the WIO region. The EQOs are as follows:

By 2035 in the WIO region,

- Critical coastal habitats will be protected, restored and managed for sustainable use;*
- Water quality will meet international standards; and*
- River flows will be wisely and sustainably managed.*

A shorter-term but equally important objective is that by 2015,

D. Stakeholders will collaborate effectively at the regional level in addressing transboundary challenges.

The four long-term objectives above provide the basis for the four main components of the SAP, which are presented in detail in the following sections. Each section outlines the issues at stake and provides a detailed description of the targets and specific actions that have been identified as priority measures towards the achievement of the objectives. A summary of the objectives and targets of the SAP is presented in Figure 4.

It should be noted that the prioritization of targets presented for each component is based upon extensive stakeholder consultations at both national and regional level. Details thereof are presented in Annex 7, including country-by-country priority rankings.

Box 8 What is an Environmental Quality Objective?

This Strategic Action Plan (SAP) contains a long-term vision and a set of three 25-year Environmental Quality Objectives (EQOs). These are objectives that spell out the state or quality of the environment that countries in the WIO region hope to achieve by 2035.

2.3 Strategic Component A: Protecting, Restoring and Managing Critical Coastal Habitats

2.3.1 Environmental Quality Objective: Critical Coastal Habitats

Critical coastal habitats in the WIO region protected, restored and managed for sustainable use

Recognising the enormous value of healthy critical coastal and marine habitats to the future well-being of people of the WIO region, this overall objective emphasises the urgent need to



Community-based mangrove forest conservation at Mida Creek in Kenya

- (a) halt any further degradation of critical habitats,
- (b) provide for restoration of degraded systems where this is required and
- (c) possibly have management activities implemented to ensure a full and sustained spectrum of ecosystem services.

It is envisaged that this triad of activities will be implemented concurrently so that the desired environmental state of the WIO's critical habitats can be achieved within a 25-year horizon. This objective provides an agreed-upon regional approach for all participating countries, and a basis from which to launch specific national actions to achieve defined targets.

The focus of activities under this objective will in the first instance be on priority areas for conservation in the region, such as those identified through the Eastern

Critical coastal habitats protected, restored and managed for sustainable use	Water quality meets international standards by the year 2035	River flows are wisely and sustainably managed	Stakeholders will collaborate effectively in addressing transboundary challenges
1 Incentives to encourage compliance with best practice in critical habitat management established	1 Effluent discharge standards developed and regionally harmonized	1 Awareness of Environmental Flow Assessment (EFA) as a tool for wise river basin management raised	1 Capacity for ecosystem-based management improved
2 Coastal zoning based on integrated economic, social and environmental considerations implemented	2 Marine water standards developed and regionally harmonized	2 Capacity for applying EFA increased amongst key stakeholders	2 Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level
3 Critical habitat management strategies in place and contributing to ecologically sustainable ecosystem services and regional protection.	3 Regional best practice framework models for municipal wastewater management developed and adopted	3 EFA conducted and operating rules (EQOs) integrated in river basin management plans for selected basins	3 Awareness of importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector
4 A regional monitoring and evaluation plan established and implemented for critical habitats, coasts and shorelines	4 Collection, treatment and disposal of effluents undertaken in accordance with regional standards	4 Methodologies agreed upon and tools developed for coherent application of EFA in both freshwater and coastal management	4 Regional legal frameworks for LBSA management updated and harmonized with multilateral environmental agreements
5 ICZM legislation in place in all countries	5 Environmental Management Systems and Cleaner Production Technologies encouraged	5 Policy discussion on coastal and marine issues catalysed through collaboration between SWCI and NC Secretariat	5 Regional coordination and inter-sectoral governance improved
6 National legislation to improve management of bilateral and regional issues strengthened	6 Stakeholders sensitized and political support harnessed in favour of pollution prevention	6 National freshwater management and coastal zone management frameworks fully integrated.	6 Appropriate financial mechanisms developed and implemented
7 Awareness of the importance of critical habitats raised significantly		7 Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	7 Knowledge management undertaken effectively
		8 Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed	
		9 Impacts of catchment management on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	

Figure 4 Overview of objectives and targets of the SAP

African Marine Ecoregion process⁹, which includes some of the hot spots of habitat degradation as identified in the TDA (see Annex 3a). Furthermore, most countries in the region have already identified priority areas for conservation along their coastline, which will be taken into consideration.

2.3.2 Management Targets: Critical Coastal Habitats

The seven management actions required to address the priority issues relating to the physical alteration and destruction of critical habitats are defined as follows:

1. *Incentives to encourage compliance with best practice in critical habitat management established (High)*

First on the agenda is the need to develop and implement “best practice” approaches in managing critical habitats. Currently, most environmental legislation is embedded in a regulatory approach with threats of punishment or forfeiture. This needs to be complemented with encouragement in the form of incentives and awards for adherence to best practice. Excellent examples and models already exist. The latter approach has been shown internationally to enlist a wider support than other approaches, as it gives recognition to the role of civil society in coastal zone management, and demonstrates the potential for benefit-sharing.

- Short-term target (within 5 years): Guidelines and standards developed and published, and incentive schemes developed, negotiated and adopted by stakeholders and countries.
- Medium-term target (10 to 15 years): Incentive schemes implemented, attitudes changed and greater co-management taking place in the WIO region.
- Long-term target (15 to 25 years): Resource-based livelihoods improved.

⁹ Global priority sites in the region include the Lamu Archipelago, the Mida Creek – Malindi complex, the Rufiji – Mafia complex, Mtwara – Quirimbas, Greater St Lucia Wetland Park, the Maputo Bay – Machangulo complex, the Bazaruto Archipelago, and the Zambezi Delta. Conservation priority sites for the rest of the WIO region (i.e. the island states) have not been identified as yet, but data is currently being collected in preparation for a priority-setting process through a similar process.

2. *Coastal zoning based on integrated economic, social and environmental considerations implemented (Very High)*

Coastal zoning allows for diverse activities to be located in coastal areas in a way that can significantly reduce damage to critical habitats and ecosystems, thereby reducing the damage to ecosystem services that underpin health, safety and development. The scientific basis for zoning decisions should be made more widely accessible and zoning guidelines customized for local conditions and piloted in participating countries.

- Short-term target (within 5 years): Governments and other institutions have initiated spatial planning of coastal and marine areas as part of national development plans; priority sites identified and described; comprehensive vulnerability assessment and spatial planning conducted for priority sites; and guidelines for zoning developed and implemented.
- Medium-term target (10 to 15 years): Percentage of Marine Protected Areas representativeness increased by at least 10%; existing MPAs management strengthened for effectiveness in reducing habitat transformation; and loss and vulnerability assessments undertaken for all critical habitats.
- Long-term target (15 to 25 years): Protected areas with focus on critical coastal and marine habitats established and contributing to mitigating habitat loss in the WIO region.

3. *Critical habitat management strategies in place in all countries and contributing to ecologically sustainable ecosystem services and regional protection (Very High)*

While all participating countries in the WIO region have implemented some level of protection for their critical habitats, regional collaboration and support is weak. Because of their transboundary importance, harmonizing the management of priority mangrove, seagrass, coral reef and coastal forest habitats is an important undertaking. All countries should have access to technical support, best practice guidelines and opportunities for lessons sharing at the regional level. In some cases, additional studies are required, e.g. in seagrass ecologies, and improved mapping of high-risk coral areas.

Eventually, all countries should be able to develop and implement management plans for their critical habitats, including identification of opportunities for alternative livelihoods for those communities that depend on their ecosystem services.

- Short-term target (within 5 years): Critical habitat management in all countries reviewed and contribution to regional protection documented; international best practice for critical habitat protection assessed and tailored for local application; “other” critical habitats, associated diversity and status inventoried; and scientific information on critical habitat dynamics (e.g. seagrasses) improved.
- Medium-term target (10 to 15 years): Ecosystem approach to fisheries and other resource extraction implemented, and opportunities for alternatives fully explored and mobilised.
- Long-term target (15 to 25 years): Critical habitats fully protected, trend in the net loss of critical habitats halted, reversed and/or offset, and ecosystem services restored and sustained.

4. A regional monitoring and evaluation plan established and implemented for critical habitats, coasts and shorelines (High)

In order to evaluate progress in the implementation of the SAP and further to guide management and decision-making, the baseline status of critical habitats, coasts and shorelines in the region needs to be documented according to an agreed set of key indicators. Remote sensing can be used as a tool for monitoring changes in land use and shorelines so as to meet national and regional targets designed to ensure that key ecosystem services are not degraded.

Baseline information on critical habitats and shorelines will form the basis of a monitoring strategy that will assist individual countries in their national reporting obligations, while collectively tracking the status of critical habitats and shoreline changes throughout the region. This presents an opportunity for the development of a regional advisory group (under the auspices of the Nairobi Convention) to support development decisions in the WIO region.

- Short-term target (within 5 years): Key indicators, e.g. Environmental State Indicator (ESI) and ecological indicators, and baseline status of critical habitats developed and agreed on; baseline (GIS) map of coastal zone resources, land use and critical ecosystems developed; long-term monitoring plan based on agreed targets of coastal zone land use developed and implemented.
- Medium-term target (10 to 15 years): Critical habitat monitoring included in national and regional State of the Environment (SOE) reporting; adaptive critical habitat management as part of implementation cycle implemented; changes to baseline maps documented periodically; and strategy developed for sustainable long-term monitoring of coastal zone land use and critical habitats.
- Long-term target (15 to 25 years): All critical habitats fully monitored and included in the management cycle at national and regional level.

5. ICZM legislation in place in all countries (High)

Integrated Coastal Zone Management (ICZM) is an essential tool for minimising destruction of habitats and supporting sustainable development of coastal zones. While progress in ICZM has been reported in several countries in the WIO region, the countries are clearly at different stages of ICZM development. Technical and financial support should thus be provided to assist countries with strengthening their ICZM legislation and planning.

- Short-term target (within 5 years): ICZM status in the region assessed, and technical support to develop and/or update ICZM legislation in selected countries provided; and an ICZM Protocol for the Nairobi Convention developed and adopted.
- Medium-term target (10 to 15 years): Government development and enactment of ICZM policy and legislation in at least 5 countries; ICZM Protocol for the Nairobi Convention ratified by all countries.
- Long-term target (15 to 25 years): All countries have full ICZM legislation in place.

6. National legislation to improve management of bilateral and regional issues strengthened (Medium)

While each country clearly needs to focus on its national objectives, collaboration between countries in resolving shared transboundary issues is also needed. Currently, collaboration takes place mostly on a rather *ad hoc* or voluntary basis. The authority of the respective national authorities needs to be strengthened so that they are fully authorised (and compelled) to deal with transboundary issues.

- Short-term target (within 5 years): Clear documentation of internal structures that reflect international liaison relating to transboundary critical habitat issues developed for each country; opportunities identified and recommendations made to strengthen national obligations towards improving regional management of critical habitats; and relevant legislation within and among WIO countries strengthened and harmonised.
- Medium-term target (10 to 15 years): Regionally agreed protocols for the management of critical transboundary habitats and resources developed.
- Long-term target (15 to 25 years): National and regional policy, legal and institutional frameworks for the management of critical habitats fully harmonized.

7. Awareness of the importance of critical habitats raised significantly (High)

The causes and consequences of destruction of critical habitats and coastal degradation revolve around people. Unless people are empowered with relevant information, it is not realistic to expect their support or to see changes in their resource-use behaviour. This calls for a communication strategy that identifies target audiences, key messages and awareness materials for each audience. Priorities for action include widely demonstrating the value and importance of ecosystem services provided by various habitats, developing awareness materials targeted at schools and the education curricula of WIO countries, and developing flagship demonstration sites near urban areas.

- Short-term target (within 5 years): Communication plan on critical habitats developed and implemented; coastal and marine environmental education introduced to school curricula; at least two flagship sites identified and developed per critical habitat in the region; and economic valuation of critical habitats and their services undertaken.
- Medium-term target (10 to 15 years): School and community involvement in critical habitat protection activities fostered; and coastal zone management as a topic for study and career development offered at selected institutions.
- Long-term target (15 to 25 years): Public awareness of critical habitat protection and value adequately entrenched; and adequately trained and retained experts in ICZM available for national and local implementation of ICZM.

2.3.3 Detailed Action Programme: Critical Coastal Habitats

An overview of the specific actions to be undertaken to achieve each of the Management targets is presented in Table 7. The table also shows the direct and root causes addressed by the target. Details on anticipated results and outcomes from SAP Component A are presented in Annex 5a.

Table 7 Detailed Action Programme: Critical Coastal Habitats

Target	Priority level	Strategic Actions	Direct Causes addressed*	Root Causes addressed*
1. Incentives to encourage compliance with best practice in critical habitat management established	High	Develop and implement sector-specific guidelines for best practice (similar to the FAO Code of Conduct)	e,f,i,j,k,l,m,o,q,t,u,v,w,x,y,z	C,D,E,G
		Develop and implement incentive and environmental award schemes to recognise good practice at different levels in governance and society.		
		Increase community involvement in critical habitat protection that promotes benefit-sharing and improves livelihoods. Undertake baseline surveys to assess attitudes & livelihood status.		
2. Coastal zoning based on integrated economic, social and environmental considerations implemented	Very High	Facilitate and support government-driven processes to undertake spatial planning	f,g,h,i,j,k,l,m,o,p,q,t,v,y	C,G
		Identify and support institutions to undertake spatial planning of coastal areas		
		Develop and implement guidelines for zoning and conduct vulnerability assessment for critical habitats		
		Establish protected areas with focus on critical coastal and marine habitats, evaluating their contribution to mitigating habitat loss		
		Support the implementation of zoning guidelines in participating countries		
3. Critical habitat management strategies in place in all countries contributing to ecologically sustainable ecosystem services and regional protection.	Very High	Review, develop and/or strengthen critical habitat management in all countries, contributing to regional protection	Cross-cutting	C,E,G
		Develop and implement guidelines (best practice) for critical habitat management and the activities that impact on them		
		Develop and introduce ecosystem approaches to fishing and other extractive-use activities associated with critical habitats		
		Develop and implement alternative sources for products derived from critical habitats, e.g. energy, building materials, etc.		
		Rehabilitate and mitigate degraded critical habitats		
		Identify and conduct strategic assessment of other critical habitats and such as canyons, coastal lakes, dunes, estuaries, aggregating and nesting sites, biodiversity hot spots, bird flyways, etc.		
		Update mapping, status and distribution of seagrass and coral habitats		
		Study seagrass ecology, function and dynamics		
		Establish implications of seaweed culture to seagrass ecologies		

*Direct causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

Table 7 Detailed Action Programme: Critical Coastal Habitats (continued)

Target	Priority level	Strategic Actions	Direct Causes addressed ¹	Root Causes addressed [*]
4. A regional monitoring and evaluation plan established and implemented for critical habitats, coasts and shorelines	High	Establish and agree on baseline status and key indicators for critical habitats	Cross-cutting	C,E
		Develop and support implementation of critical habitat monitoring strategy as input to national/ regional State of the Environment reporting		
		Produce adaptive critical habitat management recommendations as part of implementation cycle		
		Establish baseline map of coastal zone land use and critical ecosystems using remote sensing and GIS to map coast and shoreline changes		
		Integrate coastal mapping with ICZM and zoning programmes (Target 2 above)		
		Develop long-term monitoring of coast and shoreline changes, based on agreed targets of coastal zone land use		
5. ICZM legislation in place in all countries	High	Assess ICZM status in region	e,f,g,h,o,p,q,r,t,x,y	C,D
		Provide technical support to develop and/or update ICZM legislation in selected countries		
		Governments enact ICZM legislation		
6. National legislation to improve management of bilateral and regional issues strengthened	Medium	Review relevant national legislations within the context of priority transboundary critical habitat issues	Cross-cutting	C,G
		Harmonize relevant legislation within and among WIO countries		
		Develop regionally agreed protocols for the management of transboundary critical habitat resource issues		
7. Awareness of the importance of critical habitats raised significantly	High	Develop a communication plan on critical habitat protection, including mechanisms for delivery	Cross-cutting	E,G
		Conduct economic valuation of critical habitats		
		Promote and support school and community involvement in critical habitat protection activities		
		Establish flagship conservation sites and environmental education centres, especially near urban settings.		
		Introduce coastal and marine environmental education to school curricula		
		Promote coastal zone management as a topic for study and career development, to ensure future capacity		

¹Direct causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

2.4 Strategic Component B: Ensuring Water Quality

2.4.1 Environmental Quality Objective: Water Quality

Water quality in the WIO region meets international standards by the year 2035

Increasing levels of pollution resulting from discharge of untreated municipal (domestic and industrial) effluents into the inshore waters of the WIO region are threatening human health and ecosystem integrity. Human contact with contaminated waters leads to diseases which are not only costly to treat, but also increase poverty by lowering the productivity of local communities. Polluted waters also result in contamination of fish and other marine products, thus threatening public health. Pollution also reduces the productivity of coastal and marine waters. These threats can be contained by treating all industrial and domestic discharges to acceptable standards before they enter the coastal and marine environment.

Monitoring of the quality of marine waters to guarantee their safety for bathing and consumption of their products is also important for the protection of public health. Therefore, the SAP proposes the establishment of effluent and water quality standards, in order to protect public health and maintain ecosystem integrity. Pollutants can travel over large distances in the ocean and it is therefore imperative that all countries develop and enforce common standards in order to safeguard the integrity of the marine waters of the WIO region. Such standards would also aid in marketing the WIO region as a safe destination to local and international tourists, as well as for sustaining export markets for fish and other marine products. Some countries in the region (e.g. Mauritius and South Africa) already have marine water standards; others are in the process of developing similar standards (e.g. Kenya). Most of the existing international standards (such as the European Union Standards, World Health Organisation Guidelines) have been developed for conditions that may not be similar to those in the WIO region, and in this regard, there is a need to adapt the international standards to local (tropical) conditions.

The TDA found that high levels of microbial contamination and suspended solids is the key issue related to water quality in the region. One of the main



*Innovative wastewater treatment at Grahamstown, South Africa
(Photo courtesy of Peter Scheren)*

sources of these pollutants is the discharge of untreated or partially treated municipal wastewater into the marine environment. In the medium to long term, wastewater treatment systems should be constructed to ensure adequate treatment of all municipal effluents before they are discharged into estuaries and the ocean. Construction will require a substantial, but worthwhile outlay of funds. Improvement of water quality through the construction of such systems will assist countries in meeting the Millennium Development Goals 4 on Reducing Child Mortality; 5 on Improving Maternal Health; 6 on Combating HIV/AIDS, Malaria, and Other Diseases; and 7 on Ensuring Environmental Sustainability. The focus of such interventions will in the first instance be on the pollution hot spots, as identified in the TDA and summarised in Annex 3b.

Improving water quality and reducing the levels of suspended solids in water also requires better land use management, and in particular soil erosion control in river basins. This issue is addressed in component 3, which deals with managing river flows and sediment loads.

Box 9 Solid and hazardous waste management

While the general focus of Component B of the SAP is on addressing the issue of municipal wastewater management, it should also be recognized that individual hot spots may need a separate focus. From the list presented in Annex 4b, it may be concluded that issues related to solid waste management (marine litter) are considered important in a number of cases. In fact, marine litter is one of the foci of national action in all the small island states in the region (Comoros Mauritius, Seychelles).

Similarly, although the TDA shows little evidence of hazardous chemical waste seriously affecting the marine environment, it should be recognized that the effects of pollution from persistent hazardous substances may accumulate and be revealed only much later. Therefore, based on the precautionary principle, the SAP does recognize the application of appropriate hazardous waste management principles as an important area requiring attention.

The objectives, targets and activities to be carried out under the SAP to address and reverse the increasing pollution of WIO waters are further defined in more detail below.

2.4.2 Management Targets: Water Quality

In order to meet the Environmental Quality Objective of ensuring that water quality meets international standards by the year 2035, the following management targets have been set:

1. *Effluent discharge standards developed and regionally harmonised (High)*

Raw or semi-treated effluent discharges constitute the main sources of pollution to rivers, groundwater and inshore waters (receiving water bodies). To ensure that effluents do not unduly pollute the receiving waters, standards must be developed and harmonised within the WIO region to control the levels of pollutants that can be discharged into a given receiving water body without compromising its quality and ecosystem integrity.

- Short-term target (within 5 years): Regional effluent standards developed and regionally harmonized.
- Long-term target (15 to 25 years): Effluent discharges managed in line with regional effluent standards.

2. *Marine water quality standards developed and regionally harmonised (High)*

Marine waters host fish for human consumption, preserve important ecological systems as well as attract tourism and recreational activities (including swimming and diving). To prevent the contamination of food, and protect the ecosystem integrity, recreation and tourism functions, it is important that standards are set and enforced with regard to the levels of pollutants that are allowable in coastal and marine waters.

- Short-term target (within 5 years): Regional marine water quality standards developed and regionally harmonized.
- Long-term target (15 to 25 years): The quality of coastal and marine waters in the WIO region meets regionally agreed standards.

3. *Regional best practice framework models for municipal wastewater management developed and adopted (High)*

Municipal wastewaters are the greatest contributor to pollution of semi-enclosed creeks and bays in the WIO region, particularly those where urban activity/development is intense. The absence of frameworks for municipal wastewater management curtails the planning and budgeting for wastewater management activities. There is therefore a need to provide a framework within which coastal municipal authorities can plan and budget for proper wastewater management to protect human health and ecosystem integrity.

- Short-term target (within 5 years): Regional best practice framework models for municipal wastewater management developed and adopted.
- Long-term strategic target (15 to 25 years): Municipal wastewater management in the WIO region takes place in line with regional best practice.

4. Collection, treatment and disposal of effluents undertaken in accordance with regional standards (High)

In most of the WIO states, only a small percentage of the population is usually served by proper wastewater disposal systems. Even where such systems exist, most are presently overstretched by the demands of a rapidly increasing population. Effluent collection, treatment, and disposal systems are required to ensure that waters discharged from the treatment systems meet the standards agreed upon in targets 1 and 2 above. Pilot wastewater treatment facilities need to be constructed in each of the WIO states within the first five years of the SAP's implementation. The construction of more wastewater treatment facilities to cater for tertiary level treatment of all coastal municipalities may take longer, due to the high costs involved in their construction. However, the application of appropriate technology, such as constructed wetland treatment systems, that are less costly, provide more feasible alternatives in the shorter run.

- Short-term target (within 5 years): One pilot wastewater treatment plant in each WIO country.
- Medium-term target (10 to 15 years): Wastewater treatment plants in all major hot spots.
- Long-term target (15 to 25 years): All wastewater from municipalities treated to tertiary level before discharge.

5. Environmental Management Systems and Cleaner Production Technologies encouraged (High)

Pollution from industries located in coastal areas is a matter of concern in some countries in the WIO region. Cleaner production technologies have been successfully demonstrated around the world: not only do they reduce pollutants from manufacturing industries, but they also save industry money, cutting on wasted inputs of materials and energy. Measures to encourage more widespread use of cleaner production technologies will therefore protect the environment and human health, as well as make industries competitive in the long run. Promoting cleaner production approaches by industry will also help in ensuring the environmental sustainability of industrial growth.

In the short term (5-year time horizon), selected industries will be used to demonstrate the benefits of cleaner production technologies in pilot sites. In the longer term all industries in the WIO region will be encouraged to adopt cleaner production technologies.

- Short-term target (within 5 years): One pilot industry in each WIO states adopts Cleaner Production Technologies.
- Medium-term target (10 to 15 years): All major industries in WIO countries adopt Cleaner Production Technologies.
- Long-term target (15 to 25 years): All industries in WIO countries adopt Cleaner Production Technologies.

6. Stakeholders sensitised and political support harnessed in favour of pollution prevention (Very High)

The successful implementation of the strategies stated above will depend on the goodwill of many actors at the policy and implementation levels. As such, governments, NGOs, the private sector, local authorities and the various ministries that have mandates related to pollution reduction will all need to be involved. Relevant ministries (environment, water, local authorities, regional authorities, industry, lands, agriculture), National Bureaus of Standards, the private sector, NGOs, community-based organisations and the media need to be coordinated and brought together to adopt and implement the vision, objectives and benefits of a pollution-free coastal environment. The Nairobi Convention Secretariat and National Focal Point Institutions will need to be strengthened to facilitate this expanded coordination role.

- Short-term target (within 5 years): Tools for stakeholder sensitization developed and used, and the benefits of reducing coastal and marine pollution demonstrated.
- Long-term target (15 to 25 years): High level of awareness on pollution prevention achieved among various stakeholder groups.

Box 10 Two Success Stories

In Mauritius, implementation of the National Sewerage Master Plan resulted in prioritisation and construction of sewage treatment projects over a 20-year period, starting in 1994. The projects prioritised and implemented were: (i) Montagne Jacquo, (ii) Grand Baie (iii) Baie du Tombeau (iv) Plaines Wilhems Reticulation systems and House connection (v) West Coast sewerage project, which mainly includes the Flic-en-Flac, Bambous and Tamarin for the collection, treatment and disposal of sewage in the West Coast Region (vi) upgrading of sewerage infrastructure in low-cost housing estates, and (vii) St. Martin treatment plant.

In Mombasa, Kenya, the use of a constructed wetland to treat wastewater at the Shimo La Tewa prison is expected to reduce the pollution loading entering the Indian Ocean through Mtwapa Creek. Untreated wastewater from the prison's toilets, bathrooms and kitchens was previously being directly discharged into the creek, causing pollution of the Ocean. Similar systems can be adopted in hotels, educational institutions and settlements located along the coast.

2.4.3 Detailed Action Programme: Water Quality

An overview of the specific actions to be undertaken to achieve each of the Management targets is presented in Table 8. The table also shows the direct and root causes addressed by the target. Details on anticipated results and outcomes from SAP Component B are presented in Annex 5b.

2.5 Strategic Component C: Managing River Flows Wisely

The WIO region has a number of important river systems. In many of these, current and past management practices have resulted in changes to river flows, degeneration in water quality and changes in sediment loads (either increase or decrease depending on changes in basin land use). The changes in river flows and sediment loads impact negatively on the coastal and

marine environment, causing damage to critical habitats, reducing ecosystem productivity and the ecosystem services that they provide. Integrated Water Resources Management (IWRM) plans, which some of the countries in the WIO region have formulated, have attempted to devise a holistic approach to water management. However, to date the IWRM plans in the region have focussed on water management principles at the national level, with only few efforts being underway to roll out IWRM planning at the basin or (sub-) catchment level. Other factors being constant, the critical challenge in river basin management in the WIO region is the lack of an appropriate decision-making tool for sustaining river flows, including the natural variability thereof, and maintaining appropriate sediment budgets at the coast.

To promote the sustainability of ecosystem services in river basins, the SAP proposes that Environmental Flow Assessment (EFA) a decision support tool for managing river flows wisely and sustainably is adopted and implemented in the WIO region. The EFA has certain fundamental benefits, in that it allows for wise allocation of water resources while at the same time making sure there is adequate water in river systems to maintain ecological processes and ecosystems. The application of EFA as a tool for river basin management is still underdeveloped in most countries in the WIO region¹⁰. In this regard, awareness about the EFA needs to be created, capacity to implement EFA programmes built, and EFAs conducted in priority river basins in a participatory and transparent manner. Furthermore, to ensure that EFAs take coastal and marine management into account effectively, institutional linkages between national river basin management and coastal water management organizations need to be created. The ultimate objective is that freshwater and coastal zone management are integrated and managed sustainably at all levels.

¹⁰ It should be noted that EFA is already being applied in some of the countries, in particular South Africa, Tanzania and Kenya, which all have policy provisions for environmental flow assessments. South Africa is considered one of the world's pioneering countries in this regard. However, the practical application of this tool, in particular as it refers to river-coast interaction, is still largely underdeveloped.

*Sediment load from river basin draining into the Western Indian Ocean at Pondoland, South Africa
(Photo courtesy of Rudy van der Elst/ORI)*



Table 8 Detailed Action Programme: Water Quality

Target	Priority level	Strategic actions	Direct Causes addressed [*]	Root Causes addressed
1. Effluent discharge standards developed and regionally harmonized	High	Compile and review existing effluent standards in the WIO region	a,b,d,e,h,m	C
		Harmonize national effluent standards at the regional level		
		Hold national consultations on the draft harmonized standards		
		Publish, create awareness of, and adopt regional standards at the national level		
2. Marine water standards developed and regionally harmonized	High	Compile and review the existing marine water standards in the WIO region	a,b,d,e,f,g,h,i,j,m	C
		Harmonise the marine water standards		
		Hold national consultations on the draft harmonized standards		
		Publish, create awareness of, and adopt regional standards at national level		
3. Regional best practice framework models for municipal wastewater (MWW) management developed and adopted	High	Review existing MWW management frameworks and develop Best Practice models for MWW management in the WIO region	a,b,e	C,D,E
		Initiate/refine national frameworks for MWW management		
		Hold national consultations and agree on regional Best Practice models for MWW management		
		Develop and adopt national frameworks for MWW management and develop action plans for their implementation		
4. Collection, treatment and disposal of effluents undertaken in accordance with regional standards in pilot sites	High	Conduct an inventory of existing wastewater management systems in the WIO region	a,b,e	A,E
		Identify priority areas for intervention		
		Identify model MWW management systems		
		Construct one pilot treatment plant in each country		
		Rehabilitate existing wastewater management systems where necessary		
		Construct appropriate collection and treatment systems		
		Build capacity for wastewater management at appropriate levels (including laboratory staff)		
		Set up monitoring, evaluation and enforcement teams		

* Direct Causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

Table 8 Detailed Action Programme: Water Quality (continued)

Target	Priority level	Strategic actions	Direct Causes addressed*	Root Causes addressed
5. Environmental Management Systems and Cleaner Production Technologies encouraged	High	Cleaner production centres conduct scoping studies for industries	b,e,h,j,k	D,E
		Formulate cleaner production strategy/guidelines		
		Select industries on which to conduct pilot cleaner production practices		
		Sensitise and mobilise political support for wider application of cleaner production/ Environmental Management System (EMS)		
		Introduce financial/ economic incentives to promote the adoption of and compliance with Cleaner Production/EMS Technologies		
6. Awareness raised among stakeholders and political support harnessed in favour of pollution prevention in key sectors	Very High	Develop regional strategy for awareness raising and harnessing political support (identify champions).	Cross-cutting	C,E
		Prepare, publish and disseminate awareness-raising materials in multiple languages		

* Direct Causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

Box 11 What is Environmental Flow Assessment (EFA)?

A healthy river is one that is managed to provide a compromise between the needs of human water users, and the needs of the environment. But just how much of the original flow regime of a river should continue to flow down it, on to its floodplains and to the ocean, in order to maintain riverine, coastal and marine ecosystems?

Environmental Flow Assessment (EFA) is an internationally accepted tool for determining the water requirements of the environment. “Environmental flows” are the flows of water provided within streams and rivers, wetlands or coastal zone that are necessary to maintain aquatic ecosystems and their benefits. If these water flows can be maintained, the important natural functions that a river plays can be maintained.

An EFA aims to provide technical information to river, coastal and marine resource managers on how much water is necessary to maintain environmental goods and services. An EFA will include technical studies describing the social, economic and environmental implications of different options, which can help stakeholders select the desired balance among competing water uses.

EFA methods are available at a variety of costs; from ‘quick and dirty’ desk top studies to ‘comprehensive’ or ‘holistic’ methods that include detailed field assessments by multi-disciplinary teams over the annual cycle of a river and subsequent ‘scenario-modeling’. Some of the comprehensive and holistic methods are termed ‘Integrated Flow Management’ or similar, to better reflect the multi-disciplinary aspect. The appropriate method for a particular river basin will depend on the complexity of the problems and issues found there.

Additionally, the SAP proposes the immediate assessment of key aspects that are crucial to wise management of rivers: impoundments, dam operations and wetlands. The results of these assessment studies would be fed into EFA processes as well as into processes promoting integrated management of river basins.

The immediate causes of flow variability and increase/decrease of sediment discharge include inappropriate land use and land-use changes, especially agricultural land use, urbanisation, mining of sand and aggregates and deforestation. Catchment management planning and strategy can reduce these pressures and their negative impacts on coastal and marine habitats, shorelines and water quality. Although data and information for most river basins in the WIO region is incomplete, examination of catchment management as an integral part of Integrated River Basin Management (IRBM) as well as Integrated Coastal Zone Management (ICZM) is essential and adds value to current delineation of river basins up to the coastline.

The focus of these interventions would in the first instance be on the most affected river basins in the WIO region, as identified in the TDA and presented in Annex 3c. Consideration would furthermore be given to the specific situation in Small Island Developing States (Seychelles, Comoros and Mauritius), where water resources management has a different (in light of the smaller size of rivers) but equally crucial importance.

2.5.1 Environmental Quality Objective: River Flows and Sediment Loads

River flows in the WIO region are wisely and sustainably managed¹¹

Meeting this objective will mean healthy, functioning rivers, assuring the inhabitants of the WIO region of continued clean freshwater and a flourishing natural environment. This will ensure that the rivers, wetlands and coastal areas of the WIO region provide sustainable environmental goods and services for present and future generations.

¹¹ In technical terms, this can be expressed as: "Sustainable environmental flow regimes established and adhered to." This objective explicitly recognises environmental flow needs of rivers, through the establishment of water entitlements for the environment.

In addition to this 25-year Environmental Quality Objective, a 15-year Management Objective has been set:

Management systems of the Coastal Zone and River Basins are fully integrated with each other in the WIO region

This long-term management objective of integrated coastal zone and river basin management creates new opportunities for more effective management by providing for upstream and downstream flow assessment, reduced erosion and sediment transport and better catchment management, through enhanced interactions between coastal and river basin management institutions.

2.5.2 Management Targets: River Flows and Sediment Loads

In order to support the wise and sustainable management of rivers in the WIO region, the SAP proposes the use of Environmental Flow Assessment (EFA) as a tool for improved decision-making, and flow- and sediment-discharge management. Critical evaluation of impoundments and dam operations, wetlands and catchment management is also proposed, with results to be made available as inputs to EFA. A suite of priority management actions deriving from the development of EFA, defined as targets to be achieved within a five-year period, are suggested. Meeting these targets will improve prudent decision taking, support sustainable development and catalyse successful longer-term management of river-ocean interaction. These targets are set out below.

1. Awareness of EFA as a tool for wise river basin management raised (High)

Environmental Flow Assessment (EFA) is an internationally accepted tool for determining the water requirements needed to maintain river ecosystems and their benefits. An EFA helps river basin managers find the optimal balance among competing water uses, both environmental and human. As yet, the EFA tool is not well known in the WIO region. Its promotion needs to include information, guidelines and best practices, and an awareness-building strategy targeting key actors such as decision-makers, academic and research institutes, river basin managers and local stakeholders.

- Short-term target (within 5 years): Awareness of EFA as a tool for wise river basin management raised; and best-practice guidelines for EFA developed.
- Long-term target (15 to 25 years): EFA applied as a tool for river basin management in the main river basins of the WIO region.

2. Capacity for applying EFA increased amongst key stakeholders (High)

To implement EFA effectively, the capacity of key agencies in each of the Nairobi Convention countries needs to be strengthened; such agencies include academic and research institutions, river basin organisations, NGOs, the private sector, basins users' organisations, community based organisations and where such exist, land use commissions. Environmental Flow Assessment experts in the region can support on-the-job training programmes. Linkages with existing networks of practitioners and information centres will need to be established.

- Short-term target (within 5 years): Capacity for applying EFA amongst key stakeholders increased.
- Long-term target (15 to 25 years): EFA applied as a tool for river basin management in the main river basins of the WIO region.

3. EFA conducted and operating rules (EQOs) integrated into river basin management plans for selected basins (High)

The first step will be to develop criteria for identifying those river basins where EFAs should be conducted and implemented. Country-specific priorities will be determined and practical implementation options of EFA will be agreed upon by experts from relevant sectors, including ministries (such as ministries of water, fisheries, agriculture, mining and energy), research institutions, river basin management organisations, and basin users' and community-based organisations.

Once the EFA results are available, these need to be integrated into the management of the selected basins. This will involve strengthening (and where

needed establishing) legal, institutional and operational structures. Finally EFAs need to be incorporated into relevant water management plans, programmes and policies. During this process, practice and lessons on integration of EFA will need to be shared through exchange visits, secondments, and similar approaches. In anticipation of the next phase, member states will determine data requirements and carry out hydrological monitoring for other basins on the priority list. This target can be achieved within 5 years.

- Short-term target (within 5 years): Priority river basins identified and regionally and nationally agreed upon, and EFA conducted in selected basins.
- Medium-term target (10 to 15 years): Results of the EFA integrated into the management of the selected river basins.
- Long-term target (15 to 25 years): EFA applied as a tool for river basin management in the main river basins of the WIO region.

4. Methodologies agreed upon and tools developed for coherent application of EFA findings in both freshwater and coastal management (High)

At the outset, it is proposed that the WIO region develops an integrated tool as well as harmonised regulatory mechanisms for river basin and coastal zone management, to ensure that each member state meets the minimum management requirements for sustainable river and oceans ecosystems. Joint assessment and planning teams, working groups and a focal point for EFA and ICZM will be essential. Sharing of lessons and developing guidelines will also be important for expanding the application of EFA to other basins.

- Medium-term target (10 to 15 years): Regional EFA guidelines developed and agreed upon, and tools developed for coherent application of EFA findings in both freshwater and coastal management.
- Long-term target (15 to 25 years): EFA applied as a tool for river basin management in the main river basins of the WIO region.

5. Policy discussion on coastal and marine issues catalysed through collaboration between Shared Water Courses Institutions (SWCI) and the Nairobi Convention Secretariat (High)

To support the integration of ICZM and Integrated River Basin Management (IRBM), the Nairobi Convention Secretariat will initiate, sensitise and maintain formal communication with regional economic communities such as the Southern African Development Community (SADC), the East African Community (EAC), the African Ministerial Council on Water (AMCOW), the African Ministerial Conference on the Environment (AMCEN) relevant international protocols (secretariats or agencies) as well as other development partners. The aim will be to highlight the fact that most of the major rivers in the WIO region are transboundary, and require region-wide goodwill and political support. Formal regional collaboration between shared watercourse institutions such as river basin organisations, river commissions, technical committees and the Nairobi Convention Secretariat will be established to implement policy and political decisions.

- Medium-term target (10 to 15 years): Enhanced collaboration between Shared Water Course Institutions (SWCIs) and the Nairobi Convention Secretariat.
- Long-term target (15 to 25 years): Management systems of the coastal zone and river basins are integrated with each other in the WIO region.

6. National freshwater management and coastal zone management frameworks fully integrated (High)

The Nairobi Convention will support collaborative arrangements between relevant agencies at the national level. Local or national linkages between river basin management and coastal water management organizations are also needed. The purpose of such linkages will be to ensure that gaps/overlaps in current policies, legislations and institutions are identified and adjustments made as necessary. Forums for inter-sectoral discussion, cooperation and joint planning (at ministerial as well as stakeholder level) need to be established, to define common objectives and streamline management responsibilities between freshwater and coastal management organisations.

- Short-term target (within 5 years): Shortcomings in existing national policy, legal and institutional frameworks identified and updated; linkages between national river basin management and coastal water management organizations established, and forums for inter-sectoral discussion, cooperation and joint planning (at ministerial as well as stakeholder level) established.
- Medium-term target (10 to 15 years): Common objectives defined and management responsibilities between freshwater and coastal management organizations streamlined.
- Long-term target (15-25 years): Coherence exists between freshwater and coastal management policies, laws and institutions.

7. Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented (High)

Damming, water abstraction, inter-basin water transfer, land use changes and climate variability rank high among the main causes of alteration of river flows and sediment loads. Dams are envisaged as playing a role in adaptation to climate change and climate variability. Impoundments and dam operations alter river flows, increasing or decreasing sediment load discharge, thus causing rejuvenated erosion and/or deposition and water quality degeneration, both within the river and coastal-marine systems¹².

- Short-term target (within 5 years): Assessment of the impacts of impoundments and dam operations on river flow variability as well as related coastal-marine impacts conducted for priority river basins.
- Medium-term target (10 to 15 years): Results of the dam assessment are integrated into relevant legal, institutional and operational frameworks.
- Long-term target (15-25 years): Dam operating procedures used for regulating dam releases and therefore river flows, including climate-change-related effects, in river basin management plans.

¹² Water quality issues are dealt with in Strategic Component B (Section 2.4)

The SAP proposes an immediate assessment of the impacts of impoundments and dam operations on river flow variability as well as related coastal–marine impacts. The analysis will also include effects of climate change and climate variability on coastal and marine resources. Adaptation strategies will also be examined and recommendations put forward with regard to factoring these into national development and planning processes. The results would be implemented through EFA/IRBM processes.

8. Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed (High)

Both riverine and coastal wetlands play an important role in regulating river flow variability, including the discharge of sediments to the coast. They also have an impact on coastal and marine productivity through, for instance, nutrients outwelling. Wetlands are also valuable for provision of ecosystem services and maintaining the hydrological balance of rivers and in many cases they act as refugia to fauna and flora. With the growing human population, demand for food production has increased significantly in the recent past, resulting in increased pressure on wetlands. In some countries, important wetlands have already been lost and impacts on the hydrological dynamics of river systems (including socio-economic livelihood systems) are now evident. There is therefore a need for an assessment of key wetlands in the WIO region. As a part of EFAs, such assessment will consider anthropogenic effects as well as the impact of climate change and climate variability and effects of river flow and flow variability. Adaptation strategies will be examined and mechanisms of mainstreaming such strategies into national planning processes explored.

- Short-term target (within 5 years): Assessment of key wetlands and their functions conducted.
- Medium-term target (10 to 15 years): Results of the wetlands assessment are integrated into relevant EFA/IRBM processes.
- Long-term target (15-25 years): Wetlands sustainably managed and effective in regulating river flow variability and the discharge of sediments to the coast.

9. Catchment management impacts on coastal habitats, shorelines and water quality investigated and results applied in river and coastal management (Very High)

Cultivation of lands without appropriate application of river setback lines and soil conservation measures leads to soil erosion that contaminates water bodies, increasing sediment loads. The increased sediment loads subsequently have an impact on the coastal habitats such as mangroves, seagrass beds and coral reefs. The most effective tool for managing these pressures is catchment management, a participatory process that involves planning and implementing measures to sustain and enhance catchment functions (relating to water use and water allocation) that affect life within the catchment boundary. An important aspect of catchment management is providing for buffer zones restricting development to set distances from rivers, as well as the promotion of reforestation programmes and the application of appropriate soil conservation measures on farms.

- Short-term target (within 5 years): Riverine and coastal zone management plans adopted and implemented, and stakeholder involvement in river-basin management strengthened.
- Medium-term target (10 to 15 years): Zoning rules fully enforced; no new development takes place within agreed setbacks (riverine and coastal); and soil and water conservation and reforestation programmes promoted in key river basins.
- Long-term target (15-25 years): Soil, water and forest conservation plans for key river basins developed and implemented.

2.5.3 Detailed Action Programme: River Flows and Sediment Loads

An overview of the strategic actions to be undertaken to achieve each of the targets is presented in Table 9. Details on anticipated results and outcomes from SAP Component C are presented in Annex 5c.

Table 9 Detailed Action Programme: River Flows and Sediment Loads

River Basins Target	Priority level	Strategic Actions	Direct Causes addressed [*]	Root Causes addressed
1. Awareness raised and EFA tools promoted in the WIO region	High	Review completed and ongoing EFA studies assess best practices and prepare best practices/lessons learnt including existing sources of data for EFA	Cross-cutting	E
		Conduct desktop and/or rapid assessment of identified “hot spot” river basins		
		Establish a regional/basin-wide task force to develop and adapt EFA methodologies		
		Disseminate results and create buy-in among stakeholders, including political leaders and decision-makers		
2. Capacity for applying EFA increased amongst stakeholders	High	Carry out capacity needs assessment	Cross-cutting	C,E
		Identify experts for EFAs and launch training workshops including on-the-job training components, organized tours, visits, secondments, etc.		
		Review, strengthen/build capacity of identified institutions and review sector strategies		
		Create linkages/integration with existing networks of practitioners and information and data centres for exchange for information dissemination		
		Establish and implement demonstration projects focusing on meeting coastal water and sediment flows needs.		
3. EFA conducted and operating rules (EQOs) integrated in river basin management in selected basins in the WIO region**	High	Develop selection criteria for target basins	Cross-cutting	C,E
		Develop plans for conducting EFAs in identified river basins		
		Carry out hydrological monitoring in river basins for EFA		
		Establish/strengthen legal, institutional, operational structures for adoption and implementation of EFA in management of the selected basins		
		Carry out EFAs and validate results		
		Disseminate results and create buy-in at political and technical levels		
		Identify management activities corresponding to EFA findings, and revise existing water management plans (e.g. basin-level IWRM plans) to incorporate EQOs		

* Refer to Annex 4c for information on direct causes, and Table 5 (page 24) for root causes.

** Note: EQOs are environmental quality objectives for selected basins, and correspond to thresholds of potential concern.

Table 9 Detailed Action Programme: River Flows and Sediment Loads (continued)

River Basins Target	Priority level	Strategic Actions	Direct Causes addressed [*]	Root Causes addressed
4. Methodologies agreed upon and tools developed for coherent application of EFA findings in both freshwater and coastal management	High	Assess and harmonise, where necessary, different methodologies and management tools regarding EFA currently in application	Cross-cutting	C,E
		Develop an integrated tool for river basin and coastal zone management and establish regulatory mechanisms for application in river basin and coastal management		
		Establish joint assessment and planning teams/ working groups/ focal points for EFA, IRBM and ICZM		
		Develop guidelines for achievement of EQOs in river basin management and coastal and marine management (river, estuarine and marine management).		
5. Policy discussion on coastal and marine issues catalysed through collaboration between SWCI and Nairobi Convention Secretariat	High	Initiate, raise awareness and maintain formal communication with stakeholders	Cross-cutting	C,E
		Support collaborative arrangements between relevant agencies at national level		
6. National freshwater management and coastal zone management frameworks (policies, legal, and institutional) fully integrated.	High	Analyse current national/regional legal or institutional gaps/overlaps and identify options for review	Cross-cutting	C
		Assist parliament to harmonise national/regional laws governing freshwater and coastal management		
		Establish inter-sectoral discussion, cooperation arrangements and joint planning		
		Harmonise/streamline management responsibilities between freshwater and coastal management organizations		
7. Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	High	Develop selection criteria for target basins	a,c,d,i	C,E,F,G
		Carry out hydrological monitoring for key river systems		
		Establish/strengthen legal, institutional, operational structures		
		Carry out study and validate results		
		Disseminate results and create buy-in at political and technical level		
		Identify management activities corresponding to the findings, and revise existing dam operations/ incorporate findings into relevant water management policies and plans (e.g. IWRM plans)		

^{*} Refer to Annex 4c for information on direct causes, and Table 5 (page 24) for root causes.

^{**} Note: EQOs are environmental quality objectives for selected basins, and correspond to thresholds of potential concern.

Table 9 Detailed Action Programme: River Flows and Sediment Loads (continued)

River Basins Target	Priority level	Strategic Actions	Direct Causes addressed*	Root Causes addressed
8. Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed	High	Develop selection criteria for target wetlands	d,e,f,g,h,i,j,k,l,m,n,o	C,E,F
		Carry out hydrological, geological and biological assessment of selected wetland(s)		
		Establish/strengthen ecosystem-based management plan (legal, institutional, operational structures)		
		Carry out assessment and validate results		
		Disseminate results and create buy-in at political and technical level		
		Identify management activities corresponding to the findings and revise existing wetlands management/ incorporate findings into relevant wetland management policies and plans (e.g. IWRM plans)		
9. Catchment management impacts on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	Very High	Draft regional guidelines for harmonising riverine and coastal management plans, including setbacks	e,f,,l,k,l,m,o	A,C,E,G
		Promote and strengthen stakeholder institutions within the basin		
		Promote and strengthen sector collaboration, joint water resources planning, etc.		
		Review catchment management plans including information management, monitoring, etc.		
		Promote integrated land and water use planning		
		Identify partnerships and build resource- mobilisation opportunities for catchment co-management		

* Refer to Annex 4c for information on direct causes, and Table 5 (page 24) for root causes.

** Note: EQOs are environmental quality objectives for selected basins, and correspond to thresholds of potential concern.

2.6 Strategic Component D: Strengthening Governance and Awareness

Inadequacies in governance frameworks is regarded as one of the main root causes of much of the damage to the coastal and marine environment in the WIO region, in turn resulting in negative impacts on the people and the economies of countries in the Region. In addition, governance and management problems hamper successful responses to transboundary problems that impact on the coastal and marine environment. Key governance problems in the WIO region include poor co-ordination, inappropriate and

incoherent legislation and a lack of adequate institutional frameworks for managing development pressures. Equally important are poor information management and the lack of adequate financial resources and mechanisms. The widespread lack of understanding among policy makers of the importance of coastal and marine ecosystems for human health, well-being and prosperity is a compounding factor that limits initiation and adoption of appropriate and sustainable interventions at the national level.

*Community action and awareness raising in Lumbo, Mozambique
(Photo courtesy of Peter Scheren)*



This strategic component focuses on addressing four main root causes that emerged following the analysis of governance issues undertaken as part of the TDA process: inappropriate governance, inadequate financial resources, inadequate knowledge and awareness, and economic drivers.

The SAP proposes that over the next five years, a key priority will be improving capacity for Ecosystem-Based Management (EBM), and ensuring that, throughout the WIO region, appropriate legal and regulatory frameworks for LBSA management are put in place and implemented at the national and regional levels. An important priority is to create awareness on the importance of good marine and coastal management at the level of policy makers and legislators, civil society and the private sector. The regional legal framework for LBSA management (i.e. the LBSA Protocol of the Nairobi Convention) will need to be harmonized with other relevant multilateral environmental agreements, and regional co-ordination and inter-sectoral governance improved. Countries in the WIO region would also be expected to domesticate the LBSA Protocol, as part of their obligations to further the implementation of the GPA and also to deal with priority LBSA issues that are considered to be of great significance at both national and regional levels. Appropriate financial mechanisms need to be developed and implemented, and regional knowledge management needs to be undertaken effectively.

As it is a crosscutting issue, governance is addressed in all the Strategic Components of the SAP. However, the governance issues covered in Strategic Component D are more regional and generic in character, and complement the more specific governance issues addressed in the other Components.

2.6.1 Strategic Objective: Governance and Awareness

By 2015, stakeholders will collaborate effectively at the regional level in addressing transboundary challenges

This strategic objective is based on the assumption that with regional support, national governments in the region can overcome the most significant governance problems related to the coastal and marine environment within the first five years of SAP implementation. The key to achieving this is

collaborative action. However, sustained effort will be required to sustain the regional collaboration once it is achieved.

2.6.2 Management targets: Governance and Awareness

The SAP identifies a suite of priority management targets that should be achieved in order to provide a foundation for achieving the management targets set out in the previous sections. These targets address the governance-related root causes of many of the problems identified in the TDA. Meeting these short-term targets will help catalyze successful long-term governance in the WIO region. These targets are set out below.

1. Capacity for ecosystem-based management improved (Very High)

One of the most important priorities for the SAP is to support the development of human resources and technical capacity in institutions in the WIO region dealing with LBSA-related issues. To lay the foundation for this, the SAP proposes the development and implementation of a regional capacity building strategy, focusing on key priorities for LBSA management. Strengthening regional and national networking and lessons-sharing among practitioners, academics and policy makers will be a key component of this strategy.

A further crucial need is to facilitate integrated governance. Coastal zone users come from a range of economic sectors such as fishing and aquaculture, agriculture and forestry, tourism, mining, industry, transportation, energy production and urban development. Crosscutting governance instruments and initiatives essential to effective management include integrated coastal zone management (ICZM), integrated river basin management (IRBM), environmental impact assessment (EIA) and strategic environmental assessment (SEA). The SAP proposes that regional guidelines, standards and procedures for ICZM, IRBM, SEA and EIA be established, building upon the regional Guidelines for Environmental Assessment that were developed under the auspices of the WIO-LaB project. Furthermore, it recommends that relevant capacity building programmes are provided, to ensure that these instruments are implemented in coastal and marine management.

- Short-term target (within 5 years): Capacity building strategy developed and implemented; mechanisms for regional and national networking and lessons-learned sharing established; and regional guidelines for ICZM, IRBM, EIA and SEA developed.
- Strategic target (beyond 2014): Adequate capacity for effective ecosystem-based management exists.

2. *Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level (High)*

Various international and regional conventions, inter-governmental agreements and institutions that are central to good governance in the WIO region already exist. There is a need to encourage all countries to ratify relevant regional and international agreements and other instruments (where this has not been done), and to follow this up by enacting and implementing appropriate national legislation.

A key regional initiative will be to develop a framework for coastal area legislation as well as model national legislation and regulations. This framework would include ecosystem-based management approaches. Where appropriate, national governments would use this framework to domesticate and implement relevant regional and international instruments, including the new Protocol on LBSA, recently added to the Nairobi Convention. Improved enforcement of relevant policies and legislation will be supported by regular regional monitoring and reporting within the framework of the Nairobi Convention on the state of the environment, and publication and dissemination of findings.

- Short-term target (within 5 years): Regional framework for coastal area legislation developed; and national legislative frameworks updated.
- Strategic target (beyond 2014): Monitoring of state of the environment (including the effects of the new legislation) routinely taking place; greater awareness of priority issues and progress in addressing them; and national legal and regulatory systems effectively applied for LBSA management.

3. *Awareness of the importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector (High)*

Knowledge is a key pillar empowering people to play an active role in effective governance and management of natural resources, including coastal and marine resources. However, within the WIO region, many people do not have access to appropriate knowledge on the environmental impacts and socio-economic consequences of human activities. Also lacking is knowledge of policies and institutional structures that can prevent or mitigate adverse impacts on essential ecosystem services.

The SAP proposes the development and implementation, in consultation with key stakeholders, of a regional communication strategy targeting: a) policy makers and legislators, b) civil society and c) the private sector, with appropriate messages and materials for each sector, to support national governments to undertake similar activities, and to monitor the outcomes of the strategy.

- Short-term target (within 5 years): Regional communications strategy developed and implemented; and awareness of target groups raised.
- Strategic target (beyond 2014): Adequate awareness of the importance of good marine and coastal management existing at the level of policy makers and legislators, civil society and the private sector.

4. *Regional legal framework for LBSA updated and harmonized with multilateral environmental agreements (High)*

Addressing the underlying root causes of many transboundary problems requires cooperation between countries. Undertaken in isolation, national or local responses are often ineffective at addressing these challenges. In particular, efforts need to be focused on harmonising and adopting legislative frameworks at the regional level, and establishing and strengthening regional cooperation arrangements (including regional treaties, conventions and institutions) for their implementation.

The SAP proposes that regional action be taken to review, update and harmonize the regional legal framework relevant to LBSA in line with multilateral environmental agreements. This review will be undertaken in consultation with key stakeholders, including relevant inter-governmental organizations. A basis for this review would be provided by the new LBSA Protocol added to the Nairobi Convention.

- Short-term target (within 5 years): Regional legal framework harmonized, model national legislation for key issues/sectors developed, and national legislation consistent with regional framework.
- Strategic target (beyond 2014): National legal and regulatory systems effectively applied for implementation of relevant multilateral environmental agreements.

5. Regional co-ordination and inter-sectoral governance improved (High)

Establishing and strengthening regional cooperation arrangements including regional treaties, conventions and institutions is crucial to effective LBSA management in the region. The SAP proposes that the Nairobi Convention Secretariat takes the lead at the regional level to engage with relevant regional economic/trade organizations (e.g. SADC, IOC, EAC, etc.) on issues of common concern, and to facilitate collaboration on the implementation of LBSA instruments. A further priority is to support the building of collective capacity at the regional level to negotiate multilateral environmental agreements (MEAs) that reflect concerns for sustainability (both environmental and socio-economic).

- Short-term target (within 5 years): Enhanced collaboration between the Nairobi Convention and relevant regional economic/trade organizations (e.g. SADC, IOC, EAC, etc.) on issues of common concern; and enhanced capacity for negotiating multilateral environmental agreements (MEAs).
- Strategic target (beyond 2014): Enhanced regional coordination and inter-sectoral governance.

6. Appropriate financial mechanisms developed and implemented (Very High)

The TDA found that the scarcity of financial resources, which is linked to weak institutional capacity, remains the main limiting factor to optimal management of LBSA affecting the coastal and marine environment in the WIO region. A key priority of the SAP, therefore, is to mobilize financial resources. Mechanisms for sustainable financing include taxes, user charges, borrowing (bonds and loans) and grants. While grant financing from donor sources is an important mechanism to catalyze action, it cannot stand alone. Sustainable initiatives seek to assure both capital and operating costs, and integrate both short- and long-term financing.

The SAP proposes that a regional resource mobilization strategy be developed within the framework of the Nairobi Convention, including appropriate financial mechanisms, best practice and model legislation. Relevant aspects of this strategy should be taken up and implemented by national governments. Further, regional action is required to strengthen regional and national networking and lessons-sharing between practitioners, academics and policy makers.

- Short-term target (within 5 years): Regional resource mobilization strategy developed and domesticated, and mechanisms for regional and national networking and lessons-sharing between practitioners, academics and policy makers established.
- Strategic target (beyond 2014): Financial mechanisms effective in providing adequate financial resources for improved management of the coastal and marine environment.

7. Regional knowledge management undertaken effectively (High)

There already exists a wealth of relevant information that can be used more effectively to provide technical decision making-support to those responsible for development. An effective knowledge management system is an essential foundation for good governance. At present, the WIO region lacks access to adequate scientific data, information and analysis (in both natural and social

sciences), hampering effective policy making and sustainable management. Information is fragmented and difficult to access, and there is limited collaboration and co-ordination between various institutions responsible for knowledge management.

The SAP proposes that regional action be taken to develop and implement a regional knowledge management strategy, building on existing information, resources and systems, within the framework of the Nairobi Convention Clearing House Mechanism. Policy briefs based on existing and new information can make important information accessible to decision-makers. Regional collaboration in information management will help to make this happen.

- Short-term target (within 5 years): Existing information on critical habitats integrated into the existing Nairobi Convention Clearing House Mechanism; a comprehensive and integrated regional database in place and strengthened with information on Critical Habitats, Pollution and River Basins; and informative policy briefs developed based on existing information.
- Strategic target (beyond 2014): All metadata on Critical Habitats, Pollution and River Basins routinely captured and accessible for management support.

2.6.3 Detailed Action Programme: Governance and Awareness

An overview of the specific actions to be undertaken to achieve each of the targets is presented in Table 10. Details on anticipated results and outcomes from Component D of the SAP are presented in Annex 5d.

Table 10 Detailed Action Programme: Governance and Awareness

Governance and Awareness Target	Priority level	Strategic Actions	Direct Causes addressed ⁵	Root Causes addressed
1. Capacity for ecosystem-based management improved (including, e.g., ICZM, IRBM, SEA, EIA and EFA.)	Very High	Establish regional guidelines, standards and procedures for ICZM, SEA and EIA	a,d,e	C
		Develop and implement regional and national capacity building strategies, focused on key priorities for LBSA management		
		Strengthen regional and national networking and lessons sharing between practitioners, academics and policy makers		
2. Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level	High	Develop model legislation for key LBSA issues/sectors (local government, tourism, agriculture, etc.), incorporating ecosystem-based management approaches (e.g. ICZM, SEA, EIA and EFA)	a,f,g	C,E
		Domesticate and implement relevant regional and international instruments (among others through the development of national action plans)		
		Improve enforcement systems of relevant policies and legislation		
		Monitor impact of implementing new policies and legislation in addressing problems		
		Monitor state of environment in WIO region as a whole, in relation to priority problems, and publish findings		

Direct Causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

*Vulnerable small island states deserving special attention
(Photo courtesy of Peter Scheren)*



Table 10 Detailed Action Programme: Governance and Awareness (continued)

Governance and Awareness Target	Priority level	Strategic Actions	Direct Causes addressed ⁵	Root Causes addressed
3. Awareness of importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector	High	Develop a regional communication strategy targeted at: policy makers and legislators; civil society; the private sector; and including appropriate messages and materials for each sector	b	E
		Implement regional communication strategy at regional and national levels and monitor outcomes		
4. Regional legal framework for LBSA management updated and harmonized with MEAs	High	Review regional legal framework relevant to LBSA management	a,d,f	C
		Update and harmonize regional legal framework relevant to LBSA management		
		Enact necessary national legislation to domesticate and implement regional legal framework		
5. Regional co-ordination and inter-sectoral governance improved	High	Reach agreement with relevant regional economic/trade organizations on issues of common concern, and collaborate on the implementation of LBSA instruments (e.g. SADC Shared Water Resources Protocol)	d,e,f	C,E,F,G
		Build collective capacity to negotiate MEAs that reflect concerns for environmental and socio-economic sustainability		
6. Appropriate financial mechanisms developed and implemented	Very High	Develop a regional resource mobilization strategy, including appropriate financial mechanisms, best practice and model legislation	c	D
		Domesticate and implement relevant aspects of the regional resource mobilisation strategy; monitor outcomes		
		Strengthen regional and national networking and lessons sharing between practitioners, academics and policy makers		

Direct Causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

Table 10 Detailed Action Programme: Governance and Awareness (continued)

Governance and Awareness Target	Priority level	Strategic Actions	Direct Causes addressed ⁵	Root Causes addressed
7. Regional knowledge management undertaken effectively	High	Develop a regional knowledge management strategy, building on existing information, resources and systems	b,g	E
		Implement regional knowledge management strategy		
		Integrate existing information on critical habitats, river basins and pollution into clearing house mechanisms		
		Capture and make accessible metadata on critical habitats, river basins and pollution		
		Develop informative policy briefs based on existing information		
		Prepare treatise on each of the Critical Habitats in the region, thus contributing to baseline assessment of the current status of Critical Habitats		

Direct Causes of poor water quality are set out in Annex 4b. Root causes are set out in Table 5 (page 24).

2.7 Cross-cutting Themes

There are a number of cross-cutting themes in the SAP requiring separate attention. The first of these is climate change; the second is the specificities related to Small-island Developing States (SIDS). While the four Strategic Components address relevant issues related to these two themes, the following sections provide a consolidation of issues in this regard.

2.7.1 Cross-cutting Theme 1: Climate Change Adaptation and Mitigation

Throughout the four strategic components of the SAP, climate change is listed as one of the root causes of the problems to be addressed. There is building evidence that impacts associated with climate change in the WIO region are being manifested in the form of increased sea surface temperature, increased frequency of extreme hydro-climatic events (droughts and floods) and increased spatial-temporal variability of rainfall and storms. These effects have an impact on the already stressed marine ecosystems and people in the region, threatening agricultural productivity, animal husbandry, tourism and water availability, as well as causing coastal erosion and flooding of low-lying coastal plains.

Climate impacts affect the ecosystem goods and services that communities are largely dependent upon, threatening development and socio-economic stability. The impacts are projected to worsen in the future as the temperatures continue to rise and precipitation becomes more unpredictable. Countries in Africa are likely among the most vulnerable to the impacts of climate change (IPCC, 2007; Parry et al., 2007), their responses hampered by the limited human capacity and lack of resources for undertaking necessary mitigative actions. Overall, Africa has already warmed 0.7°C over the 20th century and general circulation models project further warming across the continent. According to the intermediate scenario of the IPCC, the mean surface air temperature in Africa is expected to increase between 3 and 4°C compared with the 1980-1999 period, although less warming is expected in equatorial and coastal areas (IPCC, 2007; Parry et al., 2007).

The TDA (UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d) recognized the effects of climate change as one of the main drivers of changes

in coastal and marine ecosystems. The principle impacts of climate change to the coastal and marine environment in the WIO region include the following:

- **Water availability:** Warm sea surface temperatures may lead to increased droughts in equatorial and subtropical Eastern Africa (Funk et al., 2005). As a result, annual river flow reductions are expected for the main river basins; for example, 6-9% of in the Pangani River and 10% in the Ruvu River (Tanzania) (VPO-URT, 2003).
- **Sea-level rise:** Thermal expansion of the ocean due to increased sea surface temperatures and melting of polar ice are expected to lead to a significant rise in sea-level. Accelerated erosion as well as inundation of low-lying coastal plains are predicted. Coastal habitats will be effected, in particular mangrove forests, which have been identified as one of the most vulnerable ecosystems to sea-level rise and inundation (IPCC, 2007; Parry et al., 2007).
- **Sea temperature rise:** Sea temperature rise may be extremely devastating to certain types of coastal and marine habitats, and may in particular lead to the destruction of coral reefs (IPCC, 2007; Parry et al., 2007). Already, such impacts are visible; In 1998, up to 95% of corals died in some areas in the region following an episode of rapid warming associated with the El Niño/Southern Ocean Oscillation phenomenon.
- **Extreme Weather Events:** Warming temperatures are projected to cause more frequent and more intense extreme weather events, such as heavy rain storms, flooding, fires, hurricanes, tropical storms and El Niño events (IPCC, 2007; Parry et al., 2007).
- **Biodiversity:** Climate change is expected to significantly alter biodiversity as species struggle to adapt to changing conditions (Lovett et al., 2005).

The scope of this SAP predetermines a focus, in the first instance, on reducing the risks and improving the resilience of ecosystems and communities to increased climate variability and long-term climatic changes. In this regard, the SAP provides the building blocks for adaptation to climate change through a number of cross-cutting objectives:

1. *Enhancing the resilience of coastal habitats to climate change and variability.*

- As part of the implementation of the SAP, countries in the WIO region will adopt measures to reduce vulnerabilities and build resilience to the impacts of climate change, including:
- Measures for enhancing the protection of critical habitats from anthropogenic alteration and sustainable exploitation;
- Measures for improving water quality by reducing waste loads to coastal habitats; and
- Measures for controlling freshwater flows and sediment loads from rivers into the coastal environment.

2. *Enhancing the knowledge-base and establishing monitoring and information-management mechanisms with regard to the coastal and marine environment.*

- The monitoring and assessment activities to be undertaken as part of the SAP, as well as the information management system to be applied, will allow more appropriate and timely action against climate change impacts to be undertaken.
- Strengthening of governance mechanisms. Many of the SAP activities are geared towards strengthening legal, policy and institutional frameworks for ecosystem-based management, which will allow more appropriate measures to be taken against climate change impacts, based on a cross-sectoral and regionally harmonized approach.
- Improving awareness: As part of the SAP, countries in the WIO region will work with partners to improve awareness, understanding of and promote action on different aspects of ecosystem management and climate change, targeting policy makers, civil society and the private sector.

Table 11 provides an overview analysis of the various SAP components that will be contributing to achieving the above objectives.

Table 11: Climate change adaptation in the SAP

		Enhancing resilience	Monitoring & assessment	Strengthening Governance	Raising awareness
A.	Protecting, Restoring and Managing Critical Coastal Habitats				
1.	Incentives to encourage compliance with best practice in Critical Habitat management established	√	√	√	
2.	Coastal zoning based on integrated economic, social and environmental considerations implemented	√	√	√	
3.	Critical Habitat management in place in all countries contributing to ecologically sustainable ecosystem services and regional protection	√	√	√	
4.	A regional monitoring and evaluation plan established and implemented for Critical Habitats, Coasts and Shorelines		√		
5.	ICZM legislation in place in all countries			√	
6.	National legislation to improve management of bilateral and regional issues strengthened			√	
7.	Awareness of the importance of critical habitats raised significantly				√
B.	Managing Water Quality				
1.	Effluent discharge standards developed and regionally harmonized			√	
2.	Marine water standards developed and regionally harmonized			√	
3.	Regional best practice framework models for municipal wastewater management developed and adopted	√		√	
4.	Collection, treatment and disposal of effluents undertaken in accordance with regional standards in pilot sites	√			
5.	Environmental Management Systems and Cleaner Production Technologies encouraged	√			
6.	Stakeholders sensitized and political support harnessed in favour of pollution prevention in key sectors				√
C.	Managing River Flows Wisely				
1.	Awareness raised and EFA tool promoted in the WIO region			√	√
2.	Capacity for applying EFA increased amongst stakeholders		√	√	
3.	EFA conducted and operating rules (EQOs) integrated in river basin management in selected basins in the WIO region	√		√	

Table 11: Climate change adaptation in the SAP (continued)

		Enhancing resilience	Monitoring & assessment	Strengthening Governance	Raising awareness
4.	Methodologies agreed upon and tools developed for coherent application of EQOs in both freshwater and coastal management	√		√	
5.	Collaboration between Shared Water Course Institutions (e.g. RBOs, Technical Committees, etc.) and the Nairobi Convention Secretariat catalyses policy discussion on coastal and marine issues.			√	
6.	National freshwater management and coastal zone management frameworks (policies, legal, and institutional) fully integrated			√	
7.	Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	√	√	√	√
8.	Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed	√	√	√	√
9.	Catchment management impacts on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	√	√	√	√
D.	Strengthening Governance and Awareness				
1.	Capacity for ecosystem-based management improved (e.g. ICZM, SEA, EIA, EFA)			√	
2.	Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level			√	
3.	Awareness of the importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector				√
4.	Regional legal framework for LBSA updated and harmonized with multilateral environmental agreements			√	
5.	Regional co-ordination and inter-sectoral governance improved			√	
6.	Appropriate financial mechanisms developed and implemented			√	
7.	Regional knowledge management undertaken effectively		√		

In addition to focusing on adaptation and risk reduction, the SAP also contributes to reducing emissions of greenhouse gases (mitigation), directly or indirectly, in a number of ways:

- The capacity of coastal habitats (e.g. mangroves and coastal forests, coral reefs, seagrass beds, etc.) to sequester carbon will be enhanced through improved management and protection, as well as through restoration;
- The focus on the introduction of Cleaner Production Technologies and Environmental Management System will lead to the elimination of obsolete technologies and a consequent reduction in greenhouse gas emissions; and
- The focus on alternative livelihood systems for coastal communities will involve the advancement of alternative and more efficient cooking and heating appliances, resulting in reduced emissions from such sources.

2.7.2 Cross-cutting Theme 2: Small-Island Developing States

Within the last two decades or so, the special needs of Small Island Developing States (SIDS) have been recognized through various international discussions and conferences. In this regard, reference should be made in particular to the Programme of Action for the Sustainable Development of Small Island Developing States (Barbados, 1994) and the related Mauritius Strategy (Mauritius, 2005).

Small Island Developing States have some specific issues in relation to sustainable development and environment that are not appropriate, or of as high-priority, to larger countries on the continental landmass. These include a limited resource base (human and natural); limited land area for development; a limited set of economic options; consequent intense competition between development priorities, the environment and associated biodiversity, and particular vulnerability to climate change and extreme events in the face of restricted movement and limited settlement options.

The shorelines of SIDS are, in many cases, their main asset. While the entirety of SIDS may often be designated as 'coastal', most development is taking place close to shore. The small coastal strip provides the basis for a

growing tourism industry, and in most cases, is the area where most major cities, ports and other infrastructure are located. This brings with it increased concerns with regard to the protection of habitats, pollution, and freshwater availability. Added to this, the impacts of climate change will be most heavily felt in SIDS, in terms of shoreline changes, flooding as well as impacts on coastal habitats.

While the key issues at hand are addressed through the four thematic components of the SAP, in the appropriate implementation of the SAP there is a need for a specific focus on the conditions of SIDS. An overview of the main specificities in this regard, quoted largely from the Barbados Programme of Action for the Sustainable Development of Small Island Developing States (Barbados, 1994), is presented in Table 12.

In implementing the SAP the above specificities of SIDS will be taken into consideration, and as appropriate, the focus will need to be shifted towards addressing their specific challenges. In doing so, the actions and recommendations proposed in the Programme of Action for the Sustainable Development of Small Island Developing States (Barbados, 1994) and the related Mauritius Strategy (Mauritius, 2005) will be taken into consideration. Furthermore, it should be noted that a specialized project "Piloting innovation in SIDS: Protection of surface and groundwater supply and wastewater management in African SIDS," is currently under developed. This project, to be financed by the GEF, will provide a specific focus on SIDS-specific water resources and wastewater management issues, and will therefore provide an important mechanism for implementation of, in particular, components B, C and (partly) D of the SAP.

Table 12 Overview of Specificities of Small Islands Developing States (SIDS) within the context of the SAP

Strategic Component	Highlighted SIDS specificities
A: Protecting, Restoring and Managing Critical Coastal Habitats	SIDS share with all nations a critical interest in the protection of coastal zones and oceans against the effects of land-based sources of pollution. However, much more than the mainland countries, sustainable development in the SIDS of the WIO region depends to a large extent on coastal and marine resources, because their small land area means that those States are effectively coastal entities. Finding the balance between ecological and economical utilization of coastal and marine resources is therefore a major challenges for SIDS.
B: Ensuring Water Quality	Limited freshwater resources, cumulatively increasing amounts of waste and hazardous substances, and limited facilities for waste disposal combine to make pollution prevention, waste management and the transboundary movement of hazardous materials critical issues for SIDS. SIDS, therefore, require more specific attention for solid and hazardous waste management than most of the mainland countries (see also Box 8 on page 23).
C: Managing River Flows Wisely	Because of their small size and particular geological, topographical and climatic conditions, many SIDS face severe constraints in terms of both quality and quantity of freshwater. While the focus for mainland states may be on the management of larger surface water courses, the SIDS' approach should be more that of integrated groundwater and surface water resources management.
D: Strengthening Governance and Awareness	SIDS are particularly vulnerable to natural as well as environmental problems and disasters and have a limited (human and financial) capacity to respond to and recover from such issues. Furthermore, SIDS have vulnerable economies and are dependent both upon narrow resource bases and on international trade, without the means of influencing the terms of that trade. For this reason, SIDS may particularly benefit from the regional integration efforts of the SAP, geared at enhancing cooperation, exchanging experiences and capacity, as well as in negotiating Multilateral Environmental Agreements (MEAs).
Cross-cutting theme 1: Climate Change Adaptation and Mitigation	While SIDS are among those that contribute the least to global climate change and sea-level rise, they are among those that would suffer most from the adverse effects of such phenomena and could in some cases become uninhabitable. In assessing vulnerabilities and designing and implementing approaches to address the impacts of climate change and variability, SIDS therefore require specific attention.

Photo courtesy of UNEP



Part III: Implementation Plan

3.1 Making it happen

Countries in the WIO region are in different stages of development. This implies that while some countries still require basic actions to be undertaken, others may skip certain levels, and proceed with advanced issues at a much higher level. In this regard, the process of achieving the long-term objectives of the SAP is likely to take place in a series of steps, each one building on the successes and lessons of the previous one, and taking into account any changes in the context that may have an impact on the programme. The anticipated steps in the process are:

- Phase 1: A **catalytic** phase, in which action is taken to address key priorities that are essential to the success of the programme, and that lay the foundation for the next phase.
- Phase 2: A **mainstreaming** phase, in which the major components of the strategy are incorporated into the programmes of responsible agencies and stakeholders.
- Phase 3: A **consolidation and long-term sustainability** phase, in which the programme's long-term objectives are achieved and their sustainability ensured.

These phases are general in character, and may not apply to all aspects of the programme/ some components of the SAP will always be more advanced than others, with some reaching a point where consolidation is the key focus while others will still be attempting to catalyse action.

Whatever the current level of implementation may be, however, the key interventions set out above will form the focus of implementation of the SAP Strategy. Successful implementation will also need strengthened partnerships and resources to match. The following lays out the principal mechanisms for implementation of the SAP.

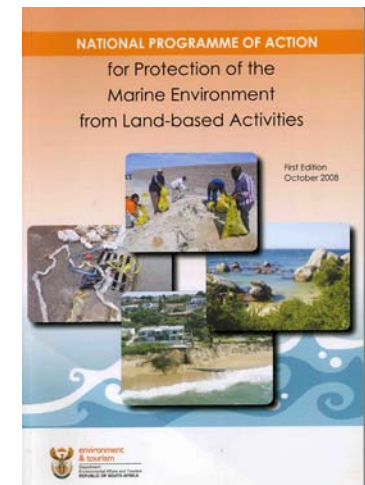
Further details on the implementation strategy are presented in Annex 6, which identifies, *inter alia*:

- Whether activities require primarily national or regional action, or a mixture of both;
- Potential funding mechanisms/sources for each activity
- Potential partnerships for implementation
- Stakeholders to be involved in the implementation

3.2 Mainstreaming action

At the national level, an important priority will be to mainstream the priorities of the SAP into national policy and legal frameworks, development plans and budgets. National implementation will also need to focus on the action on the ground, through the development of investment plans and projects in priority areas.

At the regional level, mainstreaming activities will include activities directed at strengthening of the regional legal framework and agreements, lessons-sharing, capacity building, and financial mechanisms. This could also include guidelines, protocols and possibly standards. Annex 6 provides an analysis of the level of action of the various interventions of the SAP, distinguishing between actions that are purely national, purely regional, or mixed in scope. Annex 7 presents an overview of the national priorities for implementation of the SAP, resulting from the national roll-out process undertaken as part of the SAP development (see section 1.6.2). Annex 8, furthermore, presents a basic framework for national implementation of the



SAP, including (i) an overview of national institutions and organisations with mandates relevant to the SAP, and (ii) an overview of current and planned national initiatives that may contribute to the implementation of the SAP.

Implementation will thus take place at both regional and national levels, with the SAP providing a framework for National Programmes of Action (NPAs) or similar national planning instruments such as ICZM Plans and Environmental Management Plans. Most countries are currently already in the process of developing and updating their NPAs, ICZM Plans or Environmental Management Plans, integrating such measures defined in the SAP as may be applicable to their national situations. The main national instruments development and/or under development in this regard are listed below:

Country	Mainstreaming Instrument
Comoros	National ICZM Plan
Kenya	National Programme of Action within the National ICZM Policy Framework
Madagascar	National ICZM Plan
Mauritius	National Programme of Action within the National ICZM Policy Framework
Mozambique	Strategic Environmental Assessment of the Coast
Réunion (France)	N/A (Managed within EU Framework)
Seychelles	National Environmental Management Plan
Somalia	N/A
South Africa	National Programme of Action for Addressing Land-based Sources and Activities
Tanzania	National Programme of Action within the National ICZM Policy Framework

3.3 Institutional arrangements

The Nairobi Convention Secretariat will serve as the main repository of the SAP, with the SAP being holistically incorporated in the Convention's Work Programme for the period 2010-2012 and beyond. It is intended that Regional Activity Centres focused on the various thematic topics of the SAP will be designated by the Contracting Parties of the Convention, in order to support the coordination of the implementation of the various components of the SAP¹³.

Box 12: Role and functioning of the Regional Advisory Groups

The purpose of the Advisory Groups/Task Forces is to provide the Nairobi Convention Secretariat with the best possible advice and information on topics key to implementation of the Strategic Action Programme. They will respond to requests for advice from the Secretariat and prepare proposals for the Secretariat's consideration at their own initiative. The groups will include experts from specialised institutions in the member states. The Advisory Groups will work closely with other experts, organisations, institutions and the private sector as may become necessary.

The Nairobi Convention Secretariat will provide general co-ordination for the Advisory Groups, assigning the management of specific tasks to appropriate officers according to their technical specialisation.

The Advisory Groups shall be supported by Regional Activity Centres, which shall co-ordinate the necessary programme support and the provision of practical technical support for their work. The Activity Centres shall be created through in-kind contributions by member state governments, supported where needed by funding from donors, especially during the first five years.

¹³ The approach of designated Regional Activity Centers as proposed in this SAP will take into consideration the lessons learnt from similar approaches applied in other regions (e.g. the Mediterranean and Guinea Current regions).

Furthermore, the existing Advisory Working Groups/Task Forces established under the Nairobi Convention will also be maintained, expanded and their work facilitated, in order to meet the new challenges presented by the SAP. An overview of the anticipated Regional Activity Centres and Task Forces is presented below.

Component	Regional Activity Centre(s)	Regional Task Force(s)
Strategic Component A: Protecting, Restoring and Managing Critical Coastal Habitats	<ul style="list-style-type: none"> Regional Activity Centre on Physical Alteration and Destruction of Habitats 	<ul style="list-style-type: none"> Regional Task Force on Physical Alteration and Destruction of Habitats Regional Task Force on Coral Reefs Regional Task Force on Marine Turtles
Strategic Component B: Ensuring Water Quality	<ul style="list-style-type: none"> Regional Activity Centre on Water, Sediment and Biota Quality Regional Activity Centre on Municipal Wastewater Management 	<ul style="list-style-type: none"> Regional Task Force on Water, Sediment and Biota Quality Regional Task Force on Municipal Wastewater Management
Strategic Component C: Managing River Flows Wisely	<ul style="list-style-type: none"> Regional Activity Centre on River-Coast Interaction 	<ul style="list-style-type: none"> Regional Task Force on River-Coast Interaction
Strategic Component D: Strengthening Governance and Awareness	<ul style="list-style-type: none"> Regional Activity Centre on Marine and Coastal Governance (including Integrated Coastal Zone Management) 	<ul style="list-style-type: none"> Regional Legal and Technical Review Task Force Regional Task Force on Integrated Coastal Zone Management

In order for the Nairobi Convention Secretariat to fulfil its expanded coordinative role of the implementation of the SAP, it will need to be strengthened, expanded, including through mobilization of political support from actors at the highest political levels in each of the participating countries. Furthermore, the capacity of the National Focal Point institutions will need to be enhanced so that they devote more time and resources to activities relating to the Nairobi Convention, and in particular the implementation of the SAP. Finally, there is a need to bring in other partners in order to provide the high level of specialized expertise and management capacity to implement the broad spectrum of SAP interventions (see also section 3.6).

3.4 Risks and sustainability

The implementation of the SAP for addressing land-based activities may face a number of risks. A detailed assessment of risks associated with the implementation of the various components of the SAP is included in Annex 5. The main risks may be divided into the following broad categories:

- **Inadequate cooperation and coordination:** Environmental considerations may not adequately be incorporated into projects, programmes, policies and activities, in the manner envisaged in the SAP in order to ensure consistency with a comprehensive vision of the WIO region.
- **Inadequate political will:** National governments may not accord enough importance to the participation by competent jurisdictional players in the implementation of the SAP or may not equip and mandate them adequately in order to allow them to comprehensively participate in region-wide programmes embracing the entire WIO region as envisaged in the SAP.
- **Inadequate capacity:** Mechanisms and regulations essential for integrated management of the WIO region's coastal and marine natural resources would not be developed, reformed, adopted or adequately implemented due to limited capacity in the participating countries.

- **Inadequate financial resources:** Due to current economic conditions, governments and national and regional institutions/organizations may not be able to allocate adequate human and financial resources to the implementation of the SAP.
- **Inadequate awareness:** For the strategies as defined in the SAP to be successful, it is crucial to develop and maintain a good level of stakeholder ownership; this concerns not only participating government agencies and institutions, but also NGOs, CBOs, the private sector as well as the communities themselves.

It should be noted that the SAP has built-in measures to mitigate the above-mentioned risks, including specific Targets and Actions aimed at mobilizing the required political support, building capacity, enhancing cooperation and coordination as well as establishing financial mechanisms. Specific Targets and Activities in this regard have been included as part of Component D of the SAP.

3.5 Financing the SAP

The implementation of the SAP will be financed through mobilization of financial resources at national, regional and international levels. It is expected that a substantial component of the funding will be generated by the governments of the participating countries themselves. The governments in the WIO region will in particular be expected to come up with innovative financing arrangements (e.g. through the use of economic instruments and incentives), as well as allocate core government budgets and attract donor support. As such, funding sources may involve:

- General public funding (allocated through national/local budgets);
- Private financing;
- Economic instruments; and
- Grants and loans.

Annex 6 provides an analysis of the potential categories of funding sources for each of the actions defined in the SAP. Specific funding arrangements for the national policies and measures agreed on in this Strategic Action Programme will be presented for consideration by national authorities, on the basis of the National Action Plans, or similar national planning instruments, being developed by each of the member states.

Furthermore, under the overall coordination of the Nairobi Convention Secretariat, targeted projects involving appropriate partners (see section 3.5) will be prepared for submission to bilateral or multilateral funding agencies. In particular, the global, regional and national non-governmental organisations (NGOs) will also be expected to be important players in the implementation of the SAP. It is also expected that NGOs will raise their own funds for implementation of specific activities listed in the SAP that they consider to be within their spheres of interest.

The Nairobi Convention Secretariat, in collaboration with partners, will also convene Donor Conferences, in order to create awareness and support among the bilateral and multilateral donor agencies for the financing needs of various activities stipulated in the SAP.

3.6 Partnership and cooperation

The SAP was prepared in close collaboration with many key partners in the region. As such, its implementation will be the collective responsibility of different partners of the Nairobi Convention. It is recognized that the development of partnerships between regionally active organisations is crucial to the successful implementation of the SAP. As such, partnerships will involve NGOs, international organizations (UN and non-UN), as well as regional and national institutions and organisations. A detailed analysis of potential partnerships for the implementation of the SAP is presented in Annex 6. Annex 9 presents an overview of ongoing and planned regional initiatives of partners that would contribute to the implementation of the SAP.

Two important mechanisms for coordination of the implementation of the SAP will be maintained and strengthened, in order to provide a mechanism for the involvement of key partners from the region.

These are:

1. The Forum of Academic and Research Institutions (FARI) in the Western Indian Ocean (WIO) region. This independent forum is made up of the heads of academic and research institutions in the WIO region and functions as a mechanism for coordination of research activities, as well as a mechanism for quality assurance and sounding board/clearinghouse for technical outputs from projects and other regional activities.
2. The Consortium for Conservation of Coastal and Marine Ecosystems in Western Indian Ocean (WIO-C). This consortium brings together a number of international and regional NGOs and inter-governmental organisations (IGOs) (see Box 3 on page 6) with the objective of enhancing partnerships that promote marine research, conservation and management in the WIO region.

The potential of these partnerships is enormous. An analysis of existing programmes and projects of regional and international NGOs contributing to the implementation of the SAP (see Annex 9), identified around 100 active projects and programmes at an annual value of over 11.3 million US dollars. In addition, various international and inter-governmental organisations are all in the process of implementing multi-million-dollar programmes that may all be linked to the objectives and targets of the SAP.

3.7 Monitoring and evaluation

The SAP is anchored within the frameworks of Nairobi Convention and as such, it will form part of the Work Programme of the Convention for 2010 and beyond. It will further be integrated into the Eastern Africa Action Plan (EAAP) of the Convention, a long-term plan that guides the Convention's future engagement and activities in the WIO region. As such, the Nairobi Convention Secretariat hosted by UNEP will be responsible for overall coordination, monitoring and evaluation of the implementation of the SAP.

Monitoring and evaluation of progress in the implementation of the SAP will be guided by the specific results-based indicators of the SAP as presented in Annex 5.

Monitoring and Evaluation of SAP implementation will take place on a bi-annual basis, as part of the overall implementation Work Programme of the Convention. In this regard, the Convention Secretariat will be expected to establish mechanisms for ensuring that the evaluation is carried out in the most transparent and objective manner. Official reporting will be in the form of a bi-annual progress reports prepared by the Secretariat and tabled to its Conference of Parties, the main decision-making organ of the Convention.

It is anticipated that the SAP will be updated on a regular basis in order to adapt it to emerging issues. This is particularly essential in view of new information that would be generated by the Agulhas and Somali Current LMEs SAP that will be delivered by 2012 (see section 1.4), which would complement the current level of assessment as presented in this LBSA-specific TDA and SAP. It is anticipated that specific updates of the SAP will take place every 4 years, in synergy with the Nairobi Convention's 4-year Work Programme cycle.



Photo courtesy of Peter Scheren

Annexes

Annex 1 References

Regional Status Reports

UNEP/GPA and WIOMSA, 2004a. Overview of Physical Alteration and Destruction of Habitats in the Eastern African Region using Geographical Information System (GIS), UNEP, Nairobi, Kenya, 82p.

UNEP/GPA and WIOMSA, 2004b. Regional Overview of the Physical Alteration and Habitat Destruction (PADH) in the Western Indian Ocean, UNEP, Nairobi, Kenya. 74p.

UNEP/GPA and WIOMSA, 2004c. Review of National Legislations and Institutions Relevant to Tourism, Ports, Land Reclamation and Damming of Rivers in selected countries along the Western Indian Ocean, UNEP, Nairobi, Kenya, 86p.

UNEP/GPA and WIOMSA, 2004d. An Assessment of the Socio-Economic Implications of PADH due to Coastal Tourism, Mangrove Destruction, Mining/Sediment Movement, Ports and Land Reclamation & Damming of Rivers, UNEP, Nairobi, Kenya, 82p.

UNEP/GPA and WIOMSA, 2004e. Shoreline Change in the Western Indian Ocean Region, UNEP, Nairobi, Kenya, 21 pp.

UNEP/Nairobi Convention Secretariat, CSIR and WIOMSA, 2009. Regional Assessment of the State of Pollution in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP and WIOMSA, 2008. Regional Overview and Assessment of Marine Litter Related Activities in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat and WIOMSA, 2009a. The Status of Municipal Wastewater (MWW) Management in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat, ACWR and WIOMSA, 2009. Regional Overview and Assessment of River-coast Interactions in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat and WIOMSA, 2009b. Regional Review of Policy, Legal and Institutional Frameworks for Addressing Land-based Sources and Activities in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat and WIOMSA, 2009c. Regional Review of the Status of Ratification of International Conventions related to Land-based Sources and Activities Management in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat and SAIEA, 2009. Environmental Assessment in the WIO region: An Overview of the Policy, Legal, Regulatory and Institutional Frameworks related to Environmental Impact Assessment in the Western Indian Ocean Region, UNEP, Nairobi, Kenya.

UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d. Transboundary Diagnostic Analysis of land-based Sources and Activities Degrading the Western Indian Ocean Ecosystems, UNEP, Nairobi, Kenya.

National Status Reports

State of the Coastal and Marine Environment

Association Nationale pour la Gestion des Aires Protégées, 2008. Rapport National de la Convention de Nairobi : Madagascar. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 45 pp.

- Bijoux, J.P., Decomarmond, A. & Aumeeruddy, R., 2008. Status of the Marine Environment Report: Seychelles. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 86 pp.
- Direction Nationale de l'Environnement et des Forêts, 2007. Rapport National sur l'Environnement Marin et Cotiêr : Comores. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 40 pp.
- Ministerio para a Coordenação da acção Ambiental, 2007. Relatório Nacional Sobre Ambiente Marinho e Costeiro: Mozambique. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 65 pp.
- Ministry of Environment and NDU, 2007. National Status Report on the Marine and Coastal Environment: Mauritius. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya 49 pp.
- National Environment Management Authority, 2007. National State of the Coast Report: Kenya. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 120 pp.

Physical Alteration and Destruction of Habitats

- Ali Abdallah, F., 2003. Physical Alteration and Destruction of Habitats in Comoros. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 23 pp.
- Andrianarivo, C., 2003. Physical Alteration and Destruction of Habitats in Madagascar. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 21 pp.
- Bhikajee, M. and Bhagwant, S., 2003: Physical Alteration and Destruction of Habitats in Mauritius. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya.
- Hoguane, A.M.; Dove, V. and Sete, C., 2004. Physical Alteration and Destruction of Habitats in Mozambique. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 27 pp.
- Kyewalyanga, M.S., 2003. Physical Alteration and Destruction of Habitats in Tanzania. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 46 pp.
- Mwaguni, S.M. and Munga, D., 2003: Physical Alteration and Destruction of Habitats in Kenya. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 44 pp.
- Payet, R., 2003. Physical Alteration and Destruction of Habitats in Seychelles. Unpublished Report submitted to UNEP/Nairobi Convention Secretariat, Nairobi, Kenya, 69 pp.

State of Pollution

- Abdallah, F.A., Bacari, A., Sinane, H.M., Ibrahim, Y. and Mouridi, A.A., 2006. Rapport national sommaire sur les activités terrestres, les sources de pollution et les niveaux des polluants dans l'eau et les sédiments : Comores. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 43 pp.
- Mong, Y., Rejo, R., Randriamanarivo, R., Ranaivoson, J., Rakotorinjahary, H., Ralaimaro, J., Manera, J.Y., 2009. Rapport national sur les activités terrestres, les sources de pollution et niveaux de pollution des eaux et des sédiments : Madagascar. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 115 pp.
- Anon, Mauritius, 2009. National summary report on land-based activities, sources of pollution and pollutant levels in water and sediment: Mauritius. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 103 pp.
- Anon, Mozambique, 2007. Draft national status report on land-based activities, sources of pollution and pollutant levels in water and sediment: Mozambique. Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 24 pp.
- Antoine, H., Carolus, I., Naya, N., Radegonde, V. and Sabury, E., 2008. The status of coastal and marine pollution in Seychelles. Unpublished

Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 149 pp.

Weerts, S., Taljaard, S. and Dubula, O., 2009. National status report on coastal and marine pollution from land-based activities in South Africa. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 79 pp.

Mohammed, S.M., Machiwa, J., Njau, K.N., and Mato, R.R.A.M., 2008. National status report on land-based activities, sources of pollution and pollutant levels in water and sediment: Tanzania. Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 121 pp.

Munga, D., S. Mwangi, J., Kamau, M.M., Nguli, P.O., Gwada, L.N., Daudi, H., Ong'anda, S.M., Mwanguni, H.S., Massa, M., Tole, J.M., Onyari, J., Makopa, A., Gachanja, G., Opello, A., Kheir and S. Machua, 2007. National status report on land-based activities, sources of pollution and pollutant levels in water and sediment: Kenya. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 56 pp.

State of Municipal Wastewater Management

Maarouf, M., 2008. Rapport national sur la gestion des eaux usées municipales aux Comores. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 20 pp.

Mong, Y., 2007. National Report on the Status of Municipal Wastewater Management in Madagascar. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 47 pp.

Montano, M., 2008. National Report on the Status of Municipal Wastewater Management in Seychelles. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 62 pp.

Mwanguni, S.M., 2008. National Report on the Status of Municipal Wastewater Management in Kenya. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 87 pp.

Pybus, Ph., 2008. National Report on the Status of Municipal Wastewater Management in South Africa. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 44 pp.

Radhay, A., 2007. National Report on the Status of Municipal Wastewater Management in Mauritius. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 161 pp.

Sangeu, M., 2008. National Report on the Status of Municipal Wastewater Management in Tanzania. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 136 pp.

Review of National Policy, Legal and Institutional Frameworks

Ahamada, H., 2008. Rapport National sur les Structures Législatives et Réglementaires pour le Gestion des Activités et des Sources Terrestres aux Comores. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 30 pp.

Andrianasolonjanahary, J.E., 2006. Rapport National sur les Structures Législatives et Réglementaires pour le Gestion des Activités et des Sources Terrestres au Madagascar. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 36 pp.

Carolus, I., 2007. National Report on Legal, Regulatory and Institutional Framework for Land-based Sources and Activities Management in Seychelles. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 89 pp.

Glazewski, J.I., 2006. National Report on Legal, Regulatory and Institutional Framework for Land-based Sources and Activities Management in South Africa. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 68 pp.

Jugessur-Manna, G., 2007. National Report on Legal, Regulatory and Institutional Framework for Land-based Sources and Activities Management in Mauritius. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 62 pp.

Mazivila, R., 2007. National Report on Legal, Regulatory and Institutional Framework for Land-based Sources and Activities Management in Mozambique. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 72 pp.

Mbulu, K., 2007. National Report on Legal, Regulatory and Institutional Framework for Land-based Sources and Activities Management in Seychelles. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 47 pp.

Review of the Status of Ratification of International Conventions

Ahamada, H., 2008. Rapport National de l'Etat de Ratification et de Mise en œuvre des Conventions Internationales Pertinents à la Gestion des Activités et des Sources Terrestres aux Comores. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 21 pp.

Andrianasolonjanahary, J.E., 2006. Rapport National de l'Etat de Ratification et de Mise en œuvre des Conventions Internationales Pertinents à la Gestion des Activités et des Sources Terrestres au Madagascar. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 30 pp.

Carolus, I., 2007. National Report on the Status of Ratification of International Conventions relevant to Land-based Sources and Activities Management in Mauritius. Unpublished Report submitted to UNEP/WIO-LaB Project/Nairobi Convention Secretariat, Nairobi, Kenya, 73 pp.

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Other reference documents

Clark, B.M., Lane, S., Turpie, J.K., van Niekerk, L. and Morant, P.D., 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: South Africa National Report Phase 1: Integrated Problem Analysis. March 2002. GEF MSP Sub-Saharan Africa Project (GF/6010-0016) Sponsored by GEF, UNEP, IOC-UNESCO, GPA and ACOPS, 116 pp.

Department of Environmental Affairs and Tourism (DEAT), 2000. White Paper for Sustainable Development in South Africa.

Dulymamode, R., Bhikajee, M. and Sanassee, V., 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: Mauritius National Report Phase 1: Integrated Problem Analysis. March 2002. GEF MSP Sub-Saharan Africa Project (GF/6010-0016) Sponsored by GEF, UNEP, IOC-UNESCO, GPA and ACOPS, 87 pp.

FAO, 1999. Land-based sources and activities affecting the marine, coastal and associated freshwater environment in Comores, Kenya,

- Mozambique, Seychelles and United Republic of Tanzania. EAF/5. Ed. D. Waruinge and D. Ouya. Nairobi. Kenya, 42 pp.
- FAO, 2007. Fisheries Statistics- capture production. FAO Fisheries series Vol 100/1. Rome. 539 pp.
- Francis, J., Wagner, G.M., Mvungi, A., Ngwale, J. and Salema, R., 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: Tanzania National Report Phase 1: Integrated Problem Analysis. Part of the GEF MSP Sub-Saharan Africa Project (GF/6010-0016): "Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa". UNEP, Nairobi, 69 pp.
- Funk, C., G. Senay, A. Asfaw, J. Verdin, J. Rowland, J. Michaelson, G. Eilerts, D. Korecha and R. Choularton. 2005. Recent drought tendencies in Ethiopia and equatorial-subtropical eastern Africa. Washington DC, FEWS-NET.
- GEF/MSP, 2001. Regional Consolidated Analysis of the first phase of the GEF MSP Sub-Saharan Project, GEF MSP Sub-Saharan Africa Project (GF/6010-0016).
- GEO Data Portal, 2003. Global Environment Outlook Data Portal. Retrieved Jan., 2003, from <http://geodata.grid.unep.ch/>.
- Hoguane, A.M., Motta, H., Lopes, S. and Menete, Z., 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: Mozambique National Report Phase 1: Integrated Problem Analysis. 113 pp. March 2002. GEF MSP Sub-Saharan Africa Project (GF/6010-0016) Sponsored by GEF, UNEP, IOC-UNESCO, GPA and ACOPS, 128 pp.
- Hulme, M., R. Doherty, T. Ngara, M. New, D. Lister. 2001. African climate change: 1900 – 2100. *Climate Research* 17: 145-168.
- IPCC, 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)], IPCC, Geneva, Switzerland, 104 pp.
- Jones, T., Payet, R., Beaver, K. and Nalletamby, M. 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: Seychelles National Report Phase 1: Integrated Problem Analysis. March 2002. GEF MSP Sub-Saharan Africa Project (GF/6010-0016) Sponsored by GEF, UNEP, IOC-UNESCO, GPA and ACOPS, 143 pp.
- Kazungu, J.M., Munga, D., Mwanguni, S.M. and Ochiwo, J. 2002. Development and protection of the coastal and marine environment in sub-Saharan Africa: Kenya National Report Phase 1: Integrated Problem Analysis. March 2002. GEF MSP Sub-Saharan Africa Project (GF/6010-0016) Sponsored by GEF, UNEP, IOC-UNESCO, GPA and ACOPS, 129 pp.
- LOICZ, 2002. African Basins: LOICZ Global Change Assessment and Synthesis of Rivers Catchment – Coastal Sea Interactions and Human Dimensions. LOICZ Reports and Studies No. 25, LOICZ, Texel, The Netherlands, 344 pp.
- Lovett, J.C., G.F. Midgely, P.B. Barnard. 2005. Climate change and ecology in Africa. *African Journal of Ecology* 43: 279-281.
- Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E., 2007. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- SEACAM, 2001. The Voyage from Seychelles to Maputo: Successes and Failures of Integrated Coastal Zone Management in Eastern Africa and Island States 1996-2001. Vols. 1 & II.
- UNEP/IMS-USM/FAO/SIDA, 1998. Overview of land-based sources and activities affecting marine, coastal and associated freshwater environment in the eastern Africa region. UNEP Regional; Seas Reports and Studies No. 167, Nairobi, Kenya, 31 pp.
- UNEP, 2006. Africa Environment Outlook 2-Our Environment, Our Wealth. ISBN: 92-807-26691-9, Nairobi, Kenya, 542 pp.

- UNEP, 2006a. Africa Environment Outlook 2, Our Environment, Our Wealth. United Nations Environment Programme, Nairobi, Kenya. 542 pp.
- UNEP, 2006b. Challenges to International Waters – Regional Assessments in a Global Perspective. United Nations Environment Programme, Nairobi, Kenya.
- UNEP, 2009. UNEP Climate Change Strategy for the Programme of Work -2010-2011, UNEP, Nairobi, Kenya, 31 pp.
- UNEP/GPA, 2006. The state of the marine environment. Report published by the United Nations Environmental Programme - Global Programme of Action for the Protection (UNEP/GPA) Coordination Office, The Hague, Netherlands.
- Van der Elst, R., Everett, B., Jiddawi, N., Mwatha, G., Afonso, P.S. and Boule, D., 2005. Fish, fishers and fisheries of the West Indian Ocean: their diversity and status. A preliminary assessment. Phil. Trans. A Math. Phys. Eng. Sci. Jan 15. 363 (1826): 263-84.
- Wells, S., Burgess, N. and Ngusaru, A., 2007. Towards the 2012 marine protected area targets in Eastern Africa. *Ocean & Coastal Management* 50:67-83.
- Vice President Office, The United Republic of Tanzania (VPO-URT), 2003. Initial National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC).
- World Bank, 2009. 2009 World Development Indicators, International bank for Reconstruction and Development/THE WORLD BANK, Washington, USA.
- WWF, 2004. The Eastern African Marine Ecoregion Biodiversity Conservation Strategy 2005 – 2025, Dar es Salaam, Tanzania, 54 pp.

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Non-Governmental Organisations

- Coastal Oceans Research and Development in the Indian Ocean (CORDIO)
- Conservation International (CI)
- Consortium for the Conservation of the Coastal and Marine Ecosystems of the Western Indian Ocean (WIO-C)
- East African Wildlife Society (EAWS)
- Forum of Academic and Research Institutions in the Western Indian Ocean (FARI)
- International Union for the Conservation of Nature (IUCN)
- Western Indian Ocean Marine Science Association (WIOMSA)
- Wetlands International (WI)
- World Conservation Society (WCS)
- World Wide Fund for Nature (WWF)

International Organisations

- East African Community (EAC)
- Food and Agricultural Organisation of the United Nations (FAO)
- Global Environment Facility (GEF)
- Indian Ocean Commission (IOC)
- Inter-Governmental Oceanographic Commission of UNESCO (IOC-UNESCO)
- International Maritime Organisation (IMO)
- New Partnership for Africa's Development (NEPAD)
- Southern African Development Community (SADC)
- Swedish International Water Institute (SIWI)
- United Nations Agency for Human Settlements (UN-HABITAT)
- United Nations Development Programme (UNDP)
- United Nations Educational, Scientific and Cultural Organisation (UNESCO)
- United Nations Environment Programme (UNEP)
- United Nations Industrial Development Organisation (UNIDO)
- World Bank

Annex 3 Hot Spots Of PADH, Pollution And River-Coast Interaction

The following sections provide an overview of the hot spots of physical alteration and destruction on habitats (PADH), pollution and river-coast interaction as identified in the TDA.

3a. Overview of PADH hot spots in the WIO region

COUNTRY	HOT SPOT	TRANSBOUNDARY PROBLEM				
		Degradation of mangrove forests	Degradation of seagrass beds	Degradation of coral reefs	Degradation of coastal forests	Shoreline changes
Comoros	Moheli			■	■	■
	Grand Comoros			■	■	
	Anjuan			■	■	
Kenya	Malindi Ungwana Bay*		■	■		■
	Vanga-Msambweni Complex*	■				■
	Tana Delta*	■			■	■
	Mida Creek*	■				
Madagascar	Toliare	■		■	■	
	Mahanjanga Bay					■
	Nosy Be					■
	Hahavavy	■				
Mauritius	Rodrigues			■	■	
	Grand Bay		■			■
	Flic en Flac		■			■
Mozambique	Maputo Bay*	■	■		■	■
	Nacala-Mossuril seascape*	■			■	■
	Zambezi delta*	■				■
Seychelles	La Digue					■
	East Coast, Mahé			■		■
	Anse Volbert, Praslin					■
South Africa	Richards Bay				■	■
Tanzania	Dar es Salaam	■				■
	Tanga Coastal Area*	■			■	■
	Zanzibar*			■		■
	Bagamoyo*					■

* These sites are also EAME conservation priority areas (WWF, 2004). However, it should be noted that this is not a complete list of EAME priorities, and that EAME does not cover the WIO island states, for which currently a separate prioritization exercise is underway as part of the WWF-led WIOMER programme. For a full list of EAME conservation priority areas, including action plans, please refer to <http://eame.wiomsa.org/consplan.html>.

3b. Overview of pollution hot spots in the WIO region

COUNTRY	HOT SPOT	CATEGORY ^a	TRANSBOUNDARY PROBLEM				
			Microbial contamination	Eutrophication (harmful algal blooms)	Marine litter (solid waste)	Suspended solids	Chemical Pollution
Comoros	Mitsamihouli beach	2	■	■	■		■
	Chindini Beach	4	■		■		
	Chomoni Beach	4			■		
	Moroni Port	1	■	■	■		■
	Anjouan Port	1	■	■	■		■
	Fomboni Port	4	■	■	■		■
Kenya	Mombassa	1	■	■	■	■	■
	Lamu inshore waters	1	■	■	■	■	■
	Malindi Bay and Sabaki Estuary	1	■	■	■	■	■
	Diani	2	■	■	■	■	■
Madagascar	Port de Mahajanga	1	■	■			■
	Port de Nosy-Be	1	■	■			■
	Toliara	1	■	■		■	
	Port de Tamatave	2					■
	Bay de Diego	1		■			■
	Baie de Fort-Dauphin	2	■				■
Mauritius	Pointe Aux Sables to Bay du Tombeau (through Port Louis)	1	■	■	■	■	
	Belle Mare/Palmar	1	■	■			
	Flic and Flac	4	■	■		■	■
	Grand Baie	3	■	■		■	
	Rodrigues ^b	?				■	
Mozambique	Maputo Bay	1	■	■	■	■	■
	Beira	4	■	■	■		
	Nacala Bay	4	■	■	■		
	Pemba Bay	4	■				
	Incomati Estuary	4		■			

^a Hot spots ranked in order of decreasing severity from 1 to 3; Category 4 refers to emerging hot spots.

^b Rodrigues did not form part of the WIO-LaB regional monitoring programme and is consequently not ranked.

3b. Overview of pollution hot spots in the WIO region (continued)

COUNTRY	HOT SPOT	CATEGORY ^a	TRANSBOUNDARY PROBLEM				
			Microbial contamination	Eutrophication (harmful algal blooms)	Marine litter (solid waste)	Suspended solids	Chemical Pollution
Seychelles	Port Victoria	2	■	■			■
	La Digue	3	■				
	Anse Volbert	4	■				
	Beau Vallon Bay	2	■	■			
	East coast Mahe	3	■	■			■
South Africa	Richards Bay	3				■	■
	Durban	1	■				
	East London	4	■	■			
	Port Elizabeth	4	■				■
	Eastern Cape and Kwazulu-Natal estuaries and adjacent coastal areas	4	■	■			
Tanzania	Dar es Salaam	1	■	■			■
	Tanga	1	■	■			
	Zanzibar	1	■	■			

^a Hot spots ranked in order of decreasing severity from 1 to 3; Category 4 refers to emerging hot spots.

^b Rodrigues did not form part of the WIO-LaB regional monitoring programme and is consequently not ranked.

3c. Overview of river-coast interaction hot spots in the WIO region

COUNTRY*	HOT SPOT	TRANSBOUNDARY PROBLEM			
		Alteration in river flow	Degradation of water quality	Increase in sediment load	Decrease in sediment load
Kenya	Tana	■	■		■
	Athi-Sabaki	■	■	■	
Madagascar	Betsiboka	■		■	
	Tsiribihina	■		■	
	Mangoky	■		■	
	Fiherenana	■		■	
Mozambique	Zambezi	■			■
	Pungue	■			■
	limpopo	■			
	Incomati	■			■
	Maputo		■		
South Africa	Thukela	■			■
Tanzania	Pangani	■	■	■	
	Rufiji		■		
	Ruvuma				

* Refers to country of river outflow

■ Issues of 'critical' concern

Annex 4 Prioritization of Transboundary Problems and their Causes

4a. Prioritization of problems and related causes of physical alteration and destruction of habitats

TRANSBOUNDARY PROBLEM					DIRECT CAUSES
Mangroves	Seagrasses	Coral reefs	Coastal forests	Shore-line change	
H				L	Coastal flooding as a result of sea level rise
H	H	M			Sedimentation associated with heavy river sediment discharge
M	L				Alteration of fresh water flow
			M		Salt water intrusion
				L	Destruction and/or degradation of wetlands
L			VH	M	Clearance of natural vegetation for human settlement
L	M	L	M		Pollution (discharge of municipal wastewater agricultural and industrial effluents, including accidental oil spillage)
	L	L		L	Land reclamation
	M				Increased sea urchin population associated with reduction in predators (due to inappropriate fishing practices or changes in environmental conditions)
	L				Seaweed harvesting for commercial purposes
		M			Increased reef activity
		M			Anchor damage
	M	M			Over-fishing and bad fishing practices
		VH			Coral bleaching
M			M	L	Conversion of habitats for aquaculture/mariculture
L			H		Conversion of habitats to industrial zones
				L	Mining of beach sand and removal of corals
				L	Dredging for port and harbours
M	L	L	M	M	Alteration in freshwater flows and sediment loads due to dam construction
H			M	L	Conversion of habitats for saltworks
H			VH		Deforestation to meet timber and fuelwood needs
	H				Seagrass beds removal for clam collection and bathers (tourists)
H			VH		Over-harvesting for supply of fuelwood and charcoal
			M		Overgrazing associated with high cattle population
			VH	L	Land clearance for agriculture
			H		Uncontrolled wild fires

Key: L: Limited M: Medium H: High VH: Very High

4b. Prioritization of problems and related causes of water quality degeneration due to pollution

TRANSBOUNDARY PROBLEM					DIRECT CAUSE
Microbial contamination	Eutrophication	Marine litter and debris	Suspended solids	Chemical Pollution	
H	L		H		Disposal of un- or under-treated municipal wastewater
L	L		H	L	Industries a discharging un- or under-treated industrial wastewater
			L	L	Dredging activities in ports and harbours
L	L		M	L	Waste from coastal mining and mineral (oil, gas, etc.) exploration activities
M	L	L	H	L	Contaminated surface and sub-surface runoff (e.g. from municipal, industrial and agricultural areas, as well as from accidental spills)
			M		Destruction of coastal forests contributing to high suspended solid loads
M	L	L	H	L	River discharges transporting high suspended sediment loads (as a result of soil erosion) and/or transporting municipal/ industrial waste and agrochemicals from catchment areas
	L			L	Leaking of agrochemical (fertilizer and pesticide residues) from inadequate storage facilities, dumping or return-flows
L	L				Runoff from livestock rearing areas
			L	L	Atmospheric emissions (e.g. incineration of waste, vehicle and industrial emissions and wood/ coal burning)
L		L		L	Inadequate collection, treatment and disposal of solid waste
		L			Public littering on beaches and in areas where litter can be transported into coastal areas
			L		Waste products from aquaculture farms that are high in nutrients and suspended solid loads

Key: L: Limited M: Medium H: High VH: Very High

4c. Prioritization of problems and related causes of alteration in river flow and sediment loads

TRANSBOUNDARY PROBLEM				IMMEDIATE CAUSES
Alteration of River Flow	Water Quality Degradation*	Increased Sediment Loads	Decreased Sediment Loads	
H	L		M	Damming of rivers
H	L			Direct water abstraction for urban water supply and irrigation agriculture
H			M	Inter-basin water transfer
L				Hydrological variability
	L	H		Poor land-use in river basins
	M			Agricultural runoff of nutrients and pesticide residues
	M			Wastewater discharges
	M			Stormwater runoff
		H	M	Changes in vegetation types and patterns
H		L	L	Alteration of climatic conditions
		H		Unsustainable agricultural practices/techniques (e.g. slash and burn)
		H		Deforestation of catchment areas
		H		Encroachment on river banks
		H		Mining of sand and aggregates within river courses
		M		Road development in rural and urban areas
			L	Canalization and impoundment of rivers for navigation purposes

Key: L: Limited M: Medium H: High VH: Very High

* Even where the overall ranking is 'low', water quality degeneration is a problem in some hot spots

4d. Prioritization of problems related to governance and awareness

Severity	Scope	Overall rating	Problem
VH	VH	VH	Inadequate updating, implementation, enforcement and monitoring of legislation
VH	H	H	Inadequate awareness, understanding and appreciation of economic value of coastal-marine ecosystem goods and services at the level of policy makers and legislators, civil society and the private sector
VH	H	H	Inadequate financial mechanisms and resources for dealing with LBSA-related issues
H	H	H	Lack of mechanisms for effective coordination and inter-sectoral governance
H	H	H	Inadequate human resources and technical capacity in institutions dealing with LBSA-related issues
H	H	H	Inadequate ratification and domestication of relevant international and regional instruments
M	M	M	Lack of adequate scientific and socio-economic data and information to support policy making, monitoring and enforcement

Key: L: Limited M: Medium H: High VH: Very High

Annex 5 Result-based Indicator Framework

5a. Strategic Component A: Protecting, Restoring and Managing Critical Coastal Habitats

Objective/Target	Verifiable Indicators
A. Critical coastal habitats protected, restored and managed for sustainable use	<ul style="list-style-type: none"> • Critical habitats identified, assessed, documented and mapped • Conservation plans and monitoring framework for critical habitats developed, adopted and implemented at regional and national levels • Trend in the net loss of critical habitats halted, reversed and/or offset • At least 10% of continental shelf in each country designated as protected areas (MPA or other) • ICZM policies, plans and/or legislation in place in all countries • Harmonized legal framework for transboundary ecosystem management in place at regional and national level

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
1. Incentives to encourage compliance with best practice in critical habitat management established	<ul style="list-style-type: none"> • Incentive schemes such as Sustainable Forest Management (e.g. FSC) and Blue Flag certification exist but poorly applied 	<ul style="list-style-type: none"> • Guidelines and standards developed and published • Incentive schemes developed, negotiated and adopted by stakeholders and countries 	<ul style="list-style-type: none"> • Incentive schemes implemented • Attitudes changed and greater co-management taking place in the WIO region 	<ul style="list-style-type: none"> • Resource-based coastal livelihoods improved 	<ul style="list-style-type: none"> • Adequate capacity for development of guidelines and incentive schemes • Adequate political will for implementation of incentive schemes • Adequate financial resources for incentive schemes
2. Coastal zoning based on integrated economic, social and environmental considerations implemented	<ul style="list-style-type: none"> • Coastal zoning applied on a limited scale (For example, 8.7% of shelf in Kenya, 8.1% in Tanzania and 4% in Mozambique designated as MPAs) • Many existing MPAs area currently not adequately organised and managed (Wells et al., 2007) 	<ul style="list-style-type: none"> • Governments and institutions have initiated spatial planning of coastal and marine areas as part of national development plans • Priority sites identified and described • Comprehensive vulnerability assessment and spatial planning conducted for priority sites • Guidelines for zoning developed and implemented 	<ul style="list-style-type: none"> • Percentage of Marine Protected Areas representativeness increased to at least 10% • Existing MPAs management strengthened for effectiveness in reducing habitat transformation • Loss and vulnerability assessments undertaken for all critical habitats 	<ul style="list-style-type: none"> • Protected areas with focus on critical coastal and marine habitats established and contributing to mitigating habitat loss in the WIO region • At least 10% of continental shelf for each country designated as protected areas (MPA or other) 	<ul style="list-style-type: none"> • Adequate political will for spatial planning approaches • Adequate institutional capacity for implementation spatial planning and MPA management

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
3. Critical habitat management strategies in place and contributing to ecologically sustainable ecosystem services and regional protection.	<ul style="list-style-type: none"> • Preliminary regional assessment of coastal habitats in Eastern Africa (Kenya, Tanzania, Mozambique and the northern part of South Africa) undertaken and conservation strategy developed under the WWF-EAME programme • Loss of coastal habitats continuing at varying rates 	<ul style="list-style-type: none"> • Critical habitat management in all countries reviewed and contributing to regional protection document • International best practice for critical habitats protection assessed and tailored for local application; "other" critical habitats, associated diversity and status inventoried • Scientific knowledge of critical habitat dynamics and their rate of loss (e.g. seagrass and forests) improved and documented 	<ul style="list-style-type: none"> • Ecosystem approach to fishery and other resource extraction implemented • Opportunities for alternatives fully explored and motivated 	<ul style="list-style-type: none"> • Critical habitats fully protected • Trend in the net loss of critical habitats halted, reversed and/or offset • Ecosystem services restored and sustained 	<ul style="list-style-type: none"> • Adequate capacity to undertake critical habitat studies and develop management plans • Political will to improve critical habitat management
4. A monitoring and evaluation plan established and implemented for critical habitats, coasts and shorelines	<ul style="list-style-type: none"> • Limited monitoring is taking place, but on an ad hoc basis and in absence of an agreed indicator and methodological base 	<ul style="list-style-type: none"> • Key indicators (ESI and ecological) and baseline status of critical habitats developed and agreed on • Baseline (GIS) map of coastal zone resources, land use and critical ecosystems developed • Long-term monitoring plan based on agreed targets of coastal zone land use developed and implemented 	<ul style="list-style-type: none"> • Critical habitat monitoring included in national and regional State of the Environment (SOE) reporting • Adaptive critical habitats management as part of implementation cycle implemented • Changes to baseline maps documented periodically • Strategy developed for sustainable long-term monitoring of coastal zone land use and critical habitats 	<ul style="list-style-type: none"> • All critical habitats fully monitored and included in management cycle at national and regional level 	<ul style="list-style-type: none"> • Capacity and financial resources for regular monitoring and evaluation of critical habitat status

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
5. ICZM legislation in place	<ul style="list-style-type: none"> • ICZM fully implemented in South Africa • ICZM policy development and strategic planning ongoing in Comoros, Kenya, Madagascar, Mauritius and Tanzania 	<ul style="list-style-type: none"> • ICZM status in region assessed • Technical support to develop and/or update ICZM legislation in selected countries provided • ICZM Protocol for the Nairobi Convention developed and adopted 	<ul style="list-style-type: none"> • Government development and enactment of ICZM policy and legislation in at least 5 countries • ICZM Protocol for the Nairobi Convention ratified by all countries 	<ul style="list-style-type: none"> • Coastal zones are sustainably managed in line with environmental and socio-economic objectives • All countries have ICZM legally in place 	<ul style="list-style-type: none"> • Capacity to implement ICZM • Political will to implement ICZM • Adequate cooperation between Government institutions and other national stakeholders
6. National legislation to improve management of bilateral and regional issues strengthened	<ul style="list-style-type: none"> • National legislative frameworks for transboundary issues largely absent or inadequate 	<ul style="list-style-type: none"> • Document setting out clear internal structures that reflect international liaison relating to transboundary critical habitat issues for each country • Opportunities identified and recommendations made to strengthen national obligations towards improving regional management of critical habitats • Relevant legislation within and among WIO countries strengthened and harmonized 	<ul style="list-style-type: none"> • Regionally agreed protocols for the management of transboundary critical habitats resource issues developed 	<ul style="list-style-type: none"> • National and regional policy, legal and institutional frameworks for the management of critical habitats fully harmonized 	<ul style="list-style-type: none"> • Political will to strengthen legislative frameworks for critical habitat management

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
7. Awareness of the importance of critical habitats raised significantly	<ul style="list-style-type: none"> Public awareness of coastal and marine issues weak Basic economic valuation of coastal habitats and their services undertaken Basic capacity in ICZM existing Poor grasp of ecosystem goods and services provided by coastal critical habitats 	<ul style="list-style-type: none"> Communication plan on critical habitats developed and implemented Coastal and marine environmental education introduced to school curricula At least two flagship sites identified and developed per critical habitat in the region Economic valuation of critical habitats and their services undertaken 	<ul style="list-style-type: none"> School and community involvement in critical habitat protection activities fostered Coastal zone management as a topic for study and career development offered at selected institutions 	<ul style="list-style-type: none"> Public awareness of critical habitats protection and value adequately entrenched Adequately trained and retained experts in ICZM available for national and local implementation of ICZM 	<ul style="list-style-type: none"> Capacity for undertaking economic valuation study Basic political will

5b. Strategic Component B: Ensuring Water Quality

Objective/Target	Verifiable Indicators
B. Water quality meets international standards by the year 2035	<ul style="list-style-type: none"> The quality of coastal and marine waters in the WIO region meet regionally agreed standards Wastewater discharges adhere to agreed national and regional effluent standards Increased Government budget allocations for pollution prevention

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
1. Effluent discharge standards developed and harmonized with regional guidelines	<ul style="list-style-type: none"> National effluent standards in place in most cases but not harmonized 	<ul style="list-style-type: none"> Regional effluent standards developed and regionally harmonized 	<ul style="list-style-type: none"> Effluent discharges managed in line with regional effluent standards 	<ul style="list-style-type: none"> Wastewater discharges adhere to agreed national and regional effluent standards 	<ul style="list-style-type: none"> Political will to adopt and comply with regional standards Availability of national capacity to develop and implement standards
2. Marine water standards developed and harmonized with regional guidelines	<ul style="list-style-type: none"> Regional marine water guidelines developed under WIO-LaB but not officially adopted and only partly domesticated 	<ul style="list-style-type: none"> Regional marine water quality standards developed and regionally harmonized 	<ul style="list-style-type: none"> The quality of coastal and marine waters in the WIO region meet regionally agreed standards 	<ul style="list-style-type: none"> The quality of coastal and marine waters in the WIO region meet regionally agreed standards 	<ul style="list-style-type: none"> Political will to adopt and comply with regional standards Availability of national capacity to develop and implement standards

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
3. Best practice framework models for municipal wastewater management implemented	<ul style="list-style-type: none"> Regional State of Municipal Wastewater Management Assessment undertaken Best practice reviewed but not translated into best practice models 	<ul style="list-style-type: none"> Regional best practice framework models for municipal wastewater management developed and adopted National wastewater management frameworks and action plans in place 	<ul style="list-style-type: none"> Municipal wastewater management in the WIO region takes place in line with regional best practice 	<ul style="list-style-type: none"> The quality of coastal and marine waters in the WIO region meet regionally agreed standards 	<ul style="list-style-type: none"> Political will to adopt and comply with regional best practice models Availability of national capacity for designing appropriate wastewater management frameworks
4. Collection, treatment and disposal of effluents undertaken in pilot sites	<ul style="list-style-type: none"> Only around 10% of population in main urban settlements is sewered and connected to treatment systems or deep sea outfalls (South Africa) Where treatment plants are existing they are often inadequate and not functioning properly 	<ul style="list-style-type: none"> One pilot wastewater treatment plant in each WIO country 	<ul style="list-style-type: none"> Wastewater treatment plants in all major hot spots 	<ul style="list-style-type: none"> All wastewater from municipalities treated to tertiary level before discharge 	<ul style="list-style-type: none"> Political will for making investments in wastewater management infrastructure Capacity for the implementation of wastewater management infrastructure development and operation Financial resources for investment in wastewater infrastructure
5. Environmental Management Systems and Cleaner Production Technologies encouraged	<ul style="list-style-type: none"> Implementation of Environmental Management Systems and Cleaner Production Technologies very limited National Cleaner Production Centres established in Kenya, Tanzania and South Africa 	<ul style="list-style-type: none"> One pilot industry in each WIO states adopts Cleaner Production Technologies 	<ul style="list-style-type: none"> All major industries in WIO countries adopt Cleaner Production Technologies 	<ul style="list-style-type: none"> Wastewater discharges adhere to agreed national and regional effluent standards 	<ul style="list-style-type: none"> Goodwill and financial capacity of targeted industries Technical capacity to design and implement Cleaner production technology and Environmental management Systems
6. Stakeholders sensitized and political support harnessed in favour of pollution prevention in key sectors	<ul style="list-style-type: none"> Political support for pollution prevention on the rise but so far hardly translated into action 	<ul style="list-style-type: none"> Tools for stakeholder sensitization developed and used Benefit of improving on coastal and marine pollution is demonstrated 	<ul style="list-style-type: none"> High level of awareness among various stakeholder groups on pollution prevention achieved Increased Government budget allocations for pollution prevention 	<ul style="list-style-type: none"> High level of awareness among various stakeholder groups on pollution prevention achieved Increased Government budget allocations for pollution prevention 	<ul style="list-style-type: none"> Political stability in participating countries

5c. Strategic Component C: Managing River Flows Wisely

Objective/Target	Verifiable Indicators
C. River flows are wisely and sustainably managed	<ul style="list-style-type: none"> • Environmental Flow Assessment (EFA) widely applied as a tool for river basin management in the main river basins of the WIO region • Coherence between freshwater and coastal management policies, laws and institutions • Dam operation and wetland and catchment management effectively applied to sustain ecosystem functioning at the river-coast interface

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
1. Awareness raised and Environmental Flow Assessment (EFA) tool promoted	<ul style="list-style-type: none"> • Good awareness and understanding of EFA existing in South Africa and to a certain extent in Tanzania, Kenya and Mozambique 	<ul style="list-style-type: none"> • Awareness of EFA as a tool for wise river basin management raised • Best-practice guidelines for EFA developed 	<ul style="list-style-type: none"> • EFA applied as a tool for river basin management in the main river basins of the WIO region 	<ul style="list-style-type: none"> • EFA accepted as a decision support tool by governments and stakeholders 	<ul style="list-style-type: none"> • Capacity for the application of EFA: Governments able to identify/equip Focal Points/Ministries for coordination of EFA
2. Capacity for applying EFA increased amongst stakeholder	<ul style="list-style-type: none"> • Good capacity for EFA existing in South Africa 	<ul style="list-style-type: none"> • Capacity for applying EFA amongst key stakeholders increased • Critical mass of managers trained in EFA 	<ul style="list-style-type: none"> • EFA applied as a tool for river basin management in the main river basins of the WIO region 	<ul style="list-style-type: none"> • Adequate capacity for EFA existing in the region 	<ul style="list-style-type: none"> • Capacity for the application of EFA: Governments able to identify/equip Focal Points/Ministries for coordination of EFA
3. EFA conducted and operating rules (EQOs) integrated in river basin management in selected basins	<ul style="list-style-type: none"> • River-coast impact hot spots identified as part of the WIO-LaB project, but priority basins not formally agreed upon 	<ul style="list-style-type: none"> • Priority river basins identified and regionally and nationally agreed upon • EFA conducted in river basin management in selected basins 	<ul style="list-style-type: none"> • Results of the EFA integrated into the management of the selected river basins 	<ul style="list-style-type: none"> • River basin management takes into account EQOs regarding ecosystem functioning at the river-coast interface 	<ul style="list-style-type: none"> • Willingness at level of Government Agencies as well as development partners, private sector, etc., to support the EFA programme
4. Methodologies and tools developed for coherent application of EQOs in both freshwater and coastal management	<ul style="list-style-type: none"> • Tools existing at international level but not regionalised and domesticated 	<ul style="list-style-type: none"> • Report on tools and methodologies for EFA for freshwater and coastal management • Assessment of management responsibilities between freshwater and coastal management organisation 	<ul style="list-style-type: none"> • Regional EFA guidelines developed and agreed upon • Tools developed for coherent application of EFA findings in both freshwater and coastal management 	<ul style="list-style-type: none"> • EFA effectively applied as a tool for river basin management in the main river basins of the WIO region 	<ul style="list-style-type: none"> • Capacity for the application of EFA: Governments able to identify/equip Focal Points/Ministries for coordination of EFA and integration of ICZM and IRBM

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
5. Policy discussion on coastal and marine issues catalysed through collaboration between SWCI and NC Secretariat	<ul style="list-style-type: none"> Policy discussion between SWCI and NC not taking place 		<ul style="list-style-type: none"> Enhanced collaboration between SWCIs and the NC Secretariat 	<ul style="list-style-type: none"> Management of Coastal Zone and River Basins are integrated with each other in the WIO region 	<ul style="list-style-type: none"> Willingness for cooperation at political/governance level
6. National freshwater management and coastal zone management frameworks (policies, legal, and institutional) fully integrated.	<ul style="list-style-type: none"> Freshwater and coastal zone management disconnected 	<ul style="list-style-type: none"> Shortcomings in existing national policy, legal and institutional frameworks identified and updated Linkages between national river basin management and coastal water management organizations established Forums for inter-sectoral discussion, cooperation and joint planning (at ministerial as well as stakeholder level) established 	<ul style="list-style-type: none"> Common objectives defined and management responsibilities between freshwater and coastal management organizations streamlined 	<ul style="list-style-type: none"> Coherence between freshwater and coastal management policies, laws and institutions 	<ul style="list-style-type: none"> National freshwater and coastal zone management authorities willing to cooperate. National parliaments ready to debate and approve laws and regulations on integrated river basin and ocean and coastal water resources management
7. Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	<ul style="list-style-type: none"> Studies conducted for some river basins, but mostly not adequately taking into consideration river-coast interaction 	<ul style="list-style-type: none"> Assessment of the impacts of impoundments and dam operations on river flow variability as well as related coastal-marine impacts conducted for priority river basins 	<ul style="list-style-type: none"> Results of the dam assessment are integrated into relevant legal, institutional and operational frameworks 	<ul style="list-style-type: none"> Dam operation effective in regulating river flow variability, including climate change related effects in (EFA/IBRM-based) river basin management plans 	<ul style="list-style-type: none"> Capacity to undertake assessment existing Adequate buy-in at political level
8. Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed	<ul style="list-style-type: none"> Studies conducted for some river basins, but mostly not adequately taking into consideration river-coast interaction 	<ul style="list-style-type: none"> Assessment of key wetlands and their functions conducted 	<ul style="list-style-type: none"> Results of the wetlands assessment are integrated into relevant EFA/IBRM processes 	<ul style="list-style-type: none"> Wetlands sustainably managed and effective in regulating river flow variability and the discharge of sediments to the coast 	<ul style="list-style-type: none"> Capacity to undertake assessment existing Adequate buy-in at political level

5c. Strategic Component C: Managing River Flows Wisely (continued)

Target	Baseline	Short-term results (2015)	Medium-term results (2025)	Long-term outcomes (2035)	Risks and assumptions
9. Catchment management impacts on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	<ul style="list-style-type: none"> Studies conducted for some river basins, but mostly not adequately taking into consideration river-coast interaction 	<ul style="list-style-type: none"> Riverine and coastal zone management plans adopted and implemented Stakeholder involvement in river-basin management strengthened 	<ul style="list-style-type: none"> Zoning rules fully enforced: no new development takes place within agreed setbacks (riverine and coastal) 	<ul style="list-style-type: none"> River catchment zoning and soil conservation plans for key river basins result in allowable sediment loads at river outflow Soil/ water conservation and reforestation programmes promoted in key river basins 	<ul style="list-style-type: none"> Capacity to undertake development of catchment management plans Adequate buy-in at political level

5d. Strategic Component D: Strengthening Governance and Awareness

Objective/Target	Verifiable Indicators
D. Effective governance and stakeholder collaboration	<ul style="list-style-type: none"> Adequate capacity for effective ecosystem-based management existing Effective national and regional policy, legal and institutional frameworks for addressing LBSA Management in place, including supporting financial mechanisms and knowledge management systems Adequate awareness of the importance of good marine and coastal management

Target	Baseline	Short-term results (2015)	Medium-term outcomes (2025)	Risks and assumptions
1. Capacity for ecosystem based management improved	<ul style="list-style-type: none"> Basic capacity for ecosystem-based management existing but limited Regional Guidelines for EIA and SEA developed under the WIO-LaB project 	<ul style="list-style-type: none"> Capacity building strategy developed and implemented Mechanisms for regional and national networking and lessons-learnt sharing established Regional guidelines for ICZM, IRBM, EIA and SEA developed 	<ul style="list-style-type: none"> Adequate capacity for effective ecosystem-based management existing 	<ul style="list-style-type: none"> Political will for adoption regional guidelines
2. Appropriate legal and regulatory frameworks for LBSA management in place and implemented	<ul style="list-style-type: none"> National legal frameworks in many cases not adequately adapted for LBSA Management (UNEP/Nairobi Convention Secretariat and WIOMSA, 2009d) 	<ul style="list-style-type: none"> Regional framework for coastal area legislation developed National legislative frameworks updated Relevant international Conventions ratified 	<ul style="list-style-type: none"> Monitoring of state of the environment (including the effects of the new legislation) routinely taking place Greater awareness of priority issues and progress in addressing them 	<ul style="list-style-type: none"> Political will to strengthen national policy, legal and institutional frameworks for LBSA Management Financial resources for regular monitoring of the state of the coastal environment

5d. Strategic Component D: Strengthening Governance and Awareness (continued)

Target	Baseline	Short-term results (2015)	Medium-term outcomes (2025)	Risks and assumptions
3. Awareness of importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector	<ul style="list-style-type: none"> Basic awareness of coastal and marine management existing 	<ul style="list-style-type: none"> Regional communications strategy developed and implemented Awareness of target groups raised 	<ul style="list-style-type: none"> Adequate awareness of the importance of good marine and coastal management existing at the level of policy makers and legislators, civil society and the private sector National legal and regulatory systems effectively applied for LBSA management 	<ul style="list-style-type: none"> Basic political will to improve coastal and marine management
4. Regional legal framework for LBSA updated and harmonized with multilateral environmental agreements	<ul style="list-style-type: none"> National legal frameworks in many cases not consistent with regional and international environmental agreements (UNEP/Nairobi Convention Secretariat and WIOMSA, 2009e) 	<ul style="list-style-type: none"> Regional legal framework harmonized Model national legislation for key issues/sectors developed National legislation consistent with regional framework 	<ul style="list-style-type: none"> National legal and regulatory systems effectively applied for implementation of relevant multilateral environmental agreements 	<ul style="list-style-type: none"> Political will to adopt new legal framework
5. Regional co-ordination and inter-sectoral governance improved	<ul style="list-style-type: none"> Basic collaboration between regional organisations ongoing on ad hoc basis 	<ul style="list-style-type: none"> Enhanced collaboration between the Nairobi Convention and relevant regional economic/trade organizations (e.g. SADC, IOC, EAC, etc.) on issues of common concern Capacity for negotiating multilateral environmental agreements enhanced 	<ul style="list-style-type: none"> Enhanced regional co-ordination and inter-sectoral governance 	<ul style="list-style-type: none"> Basic capacity and political will to undertake negotiations
6. Appropriate financial mechanisms developed and implemented	<ul style="list-style-type: none"> Basic financial mechanisms existing at the level of inter-governmental organisations (NC, SADC, IOC, etc.) 	<ul style="list-style-type: none"> Regional resource mobilization strategy developed and domesticated Mechanisms for regional and national networking and lessons-sharing between practitioners, academics and policy makers established 	<ul style="list-style-type: none"> Financial mechanisms effective in providing adequate financial resources for improved management of the coastal and marine environment 	<ul style="list-style-type: none"> Political will to establish financial mechanisms Financial resources available

5d. Strategic Component D: Strengthening Governance and Awareness (continued)

Target	Baseline	Short-term results (2015)	Medium-term outcomes (2025)	Risks and assumptions
7. Knowledge management undertaken effectively	<ul style="list-style-type: none"> Clearinghouse Mechanism established and operational but data not routinely collected and updated 	<ul style="list-style-type: none"> Existing information on critical habitats integrated into the existing Nairobi Convention Clearing House Mechanism Comprehensive and integrated regional database in place and strengthened with information on Critical Habitats, Pollution and River Basins Informative policy briefs based on existing information developed 	<ul style="list-style-type: none"> All metadata routinely on Critical Habitats, Pollution and River Basins captured and accessible for management support 	<ul style="list-style-type: none"> Capacity to undertake adequate knowledge management Financial resources to maintain Clearinghouse Mechanisms available

Annex 6: Detailed implementation Plan

6a. Strategic Component 1: Protecting, Restoring and Managing Critical Coastal Habitats

Target	Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
1. Incentives to encourage compliance with best practice in Critical Habitat management established	Develop and implement sector specific guidelines for best practice (similar to FAO Code of Conduct)	●	(●)	1, 4	MEAs, IGOs, NGOs	MEAs; IGOs; National Sectoral Ministries and Institutions; National Environmental Protection Agencies; NGOs; Academic Institutions; Local authorities; Private corporations; Media; Politicians; Education units; NGOs; Local beach committees; CBOs
	Develop and implement incentive and environmental awards schemes to recognise good practice at different levels in governance and society.	●	(●)	1, 2, 3, 4		
	Increase community involvement in Critical Habitats protection that promotes benefit sharing and improves livelihoods. Undertake baseline surveys to assess attitudes & livelihood status.	●		1, 3, 4		

6a. Strategic Component 1: Protecting, Restoring and Managing Critical Coastal Habitats (continued)

Target	Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
2. Coastal zoning based on integrated economic, social and environmental considerations implemented	Facilitate and support government-driven process to undertake spatial planning	●	(●)	1, 2, 4	NGOs, IOC-ReCoMaP	Academic and Research Institutions; National Conservation and Environmental Protection Agencies; Land-use Authorities; GIS/Remote Sensing Institutions; NGOs; Private sector; CBOs; Local authorities
	Identify and support institutions to undertake spatial planning of coastal areas	●		1, 2, 4		
	Develop and implement guidelines for zoning & conduct vulnerability assessment for Critical Habitats in WIO	●	(●)	2, 4		
	Establish protected areas with focus on critical coastal and marine habitats, evaluating their contribution to mitigating habitat loss.	●	(●)	1, 2, 3, 4		
	Support the implementing of zoning guidelines in participating countries.	●	(●)	1, 2, 3, 4		
3. Critical Habitat management in place in all countries contributing to ecologically sustainable ecosystem services and regional protection.	Review, develop and/or strengthen Critical Habitat management in all countries contributing to regional protection	●	(●)	1, 2, 3, 4	MEAs, IGOs, NGOs, FAO, ASCIME, SWIOFP	Government Agencies responsible for Fisheries, Forests and Natural Resources; Academic and Research Institutions; GIS/Remote Sensing Institutions; NGOs; CBOs
	Develop and implement guidelines (best practice) in Critical Habitat management and the activities that impact on them.	(●)	●	4		
	Develop and introduce ecosystem approaches to fishing and other extractive-use activities associated with Critical Habitats.	(●)	●	1, 4		
	Develop and implement alternative sources for products derived from Critical Habitats, e.g. sources of energy and building materials	●		1, 2, 4		
	Rehabilitate and mitigate degraded Critical Habitats	●		1, 2, 4		
	Identify and do strategic assessment of other critical habitats and such as canyons, coastal lakes, dunes, estuaries, aggregating and nesting sites, biodiversity hot spots, bird flyways, etc.	●		1, 4		
	Update mapping, status and distribution of seagrass and coral habitats	●	(●)	1, 4		
	Study seagrass ecology, function and dynamics	●	(●)	1, 4		
Establish implications of seaweed culture to seagrasses.	●	(●)	1, 4			

6a. Strategic Component 1: Protecting, Restoring and Managing Critical Coastal Habitats (continued)

Target	Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
4. A regional monitoring and evaluation plan established and implemented for Critical Habitats, Coasts and Shorelines	Establish and agree on baseline status and key indicators for Critical Habitats	(●)	●	1, 4	NGOs, UNEP/WCMC, FARI, IOC-ReCoMaP	Government Agencies responsible for Fisheries, Forests and Natural Resources; Academic and Research Institutions; GIS/Remote Sensing Institutions; NGOs
	Develop & support implementation of Critical Habitat monitoring strategy as input to national/ regional SOE reporting	●	●	1, 4		
	Produce adaptive Critical Habitats management recommendation as part of implementation cycle	●		1, 2, 3, 4		
	Establish baseline map of coastal zone land use and critical ecosystems using remote sensing and GIS to map coast and shoreline changes.	●	(●)	1, 4		
	Integrate coastal mapping with ICZM and zoning programmes (Target 2 above)	●		1, 2, 4		
	Develop long term monitoring of coast and shoreline changes based on agreed targets of coastal zone land use	●	(●)	1, 4		
5. ICZM legislation in place in all countries	Assess ICZM status in region		●	1, 4	IOC-ReCoMaP	Ministries and agencies responsible for coastal zone management; National ICZM Committees
	Provide technical support to develop and/or update ICZM legislation in selected countries.	●	(●)	1, 4		
	Governments enact ICZM legislation	●		1, 4		
6. National legislation to improve management of bilateral and regional issues strengthened	Review relevant national legislations within the context of priority transboundary Critical Habitats issues.	●		1, 4	FARI, IOC-ReCoMaP	Ministries and agencies responsible for coastal zone management, environment, fisheries, forestry and natural resources; National Legal Departments; Nairobi Convention Secretariat; MEAs; RECs
	Harmonize relevant legislation within and among WIO countries.	●	●	1, 4		
	Develop regionally agreed protocols for the management of transboundary Critical Habitats resource issues		●	1, 4		

6a. Strategic Component 1: Protecting, Restoring and Managing Critical Coastal Habitats (continued)

Target	Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
7. Awareness of the importance of critical habitats raised significantly	Develop dissemination (communication) plan on Critical Habitats protection, including mechanisms for delivery.	●	●	1, 2, 4	NGOs, FARI	Government Educational Departments; Educational Institutes; Academic and Research Institutions; Environmental Protection Agencies; Wildlife Conservation Authorities; NGOs, private sector, CBOs; Media; Religious groups
	Conduct economic valuation of critical habitats.	●	●	1, 4		
	Promote & support school & community involvement in Critical Habitat protection activities	●		1, 2, 4		
	Establish flagship conservation sites and environmental education centres especially near urban setting.	●		1, 2, 4		
	Introduce coastal & marine environmental education to school curricula.	●		1, 4		
	Promote coastal zone management as a topic for study and career development to ensure future capacity	●		1, 4		

Key: National/Regional action is highlighted as: ● Primary action; (●) Secondary action. Funding mechanisms distinguished are (1) General public funding (allocated through national/local budgets); (2) Private financing; (3) Economic instruments; and (4) Grants and loans.

6b. Strategic Component 2: Ensuring Water Quality

Target	Strategic actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
1. Effluent discharge standards developed and regionally harmonized	Compile and review the existing effluent standards in the WIO region		●	4	EU	National Standards Organisations; Environment Protection Agencies; relevant sectoral Ministries, Academic and Research Institutions; Local Authorities; Private Sector
	Harmonize the regional effluent standards		●	4		
	Hold national consultations on the draft harmonized standards	●	●	1,4		
	Publish, create awareness of, and adopt regional standards at national level	●		1,4		
2. Marine water standards developed and regionally harmonized	Compile and review the existing marine water standards in the WIO region		●	4	EU	National Standards Organisations; Environment Protection Agencies; relevant sectoral Ministries, Academic and Research Institutions; Local Authorities; Private Sector
	Harmonise the marine water standards		●	4		
	Hold national consultations on the draft harmonized standards	●	●	4		
	Publish, create awareness of, and adopt regional standards at national level	●		1,4		

6b. Strategic Component 2: Ensuring Water Quality (continued)

Target	Strategic actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
3. Regional best practice framework models for municipal wastewater management developed and adopted	Review existing MWW management frameworks and develop Best Practice models for MWW management in the WIO region		●	4	AfDB, WB	UNEP; UN-Habitat; water and sanitation companies and agencies; Environment Protection Agencies; Local Authorities; Academic Institutions
	Initiate/refine national frameworks for wastewater management	●		1, 4		
	Hold national consultations and agree on regional Best Practice models for MWW management	●	●	1, 4		
	Adopt National frameworks for wastewater management and develop action plans for their implementation	●		1, 4		
4. Collection, treatment and disposal of effluents undertaken in accordance with regional standards in pilot sites	Conduct an inventory of existing wastewater management systems in the WIO region		●	4	AfDB, WB	Regional and International Development Banks; UNEP; UN-Habitat; water and sanitation companies and agencies; Environment Protection Agencies; Local Authorities; Academic Institutions
	Identify priority areas for intervention		●	4		
	Identify model MWW management systems		●	4		
	Construct one pilot treatment plant in each country	●		1, 2, 4		
	Rehabilitate existing wastewater management systems where necessary	●		1, 2, 4		
	Construct appropriate collection and treatment systems	●		1, 2, 4		
	Build capacity for wastewater management at appropriate levels required (including laboratory staff)	●	●	1, 4		
	Set up monitoring, evaluation and enforcement teams	●		1, 3		
5. Environmental Management Systems and Cleaner Production Technologies encouraged	Cleaner production centres conduct scoping studies for industries	●		1, 2, 3, 4	UNEP, UNIDO	UNIDO; UNEP; industries; Local Authorities; Environment Protection Agencies; Academic Institutions
	Formulate cleaner production strategy/guidelines	●		1, 3, 4		
	Select industries on which to conduct pilot cleaner production practices	●		1, 3, 4		
	Sensitise and mobilise political support for wider application of cleaner production/EMS	●		1, 2, 3, 4		
	Introduce financial/economic incentives to promote the adoption and compliance of cleaner production/EMS technologies	●		1, 3, 4		

6b. Strategic Component 2: Ensuring Water Quality (continued)

Target	Strategic actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
6. awareness raised among stakeholders and political support harnessed in favour of pollution prevention in key sectors	Develop regional strategy for awareness raising and harnessing political support (identify champions).		●	4	UNEP, UNIDO	Media; Environmental Protection Agencies; NGOs; CBOs
	Prepare, publish, disseminate awareness raising materials in multiple languages	●	●	4		

Key: National/Regional action is highlighted as: ● Primary action; (●) Secondary action. Funding mechanisms distinguished are (1) General public funding (allocated through national/local budgets); (2) Private financing; (3) Economic instruments; and (4) Grants and loans.

6c. Strategic Component 3: Managing River Flows Wisely

Target: River basins	Strategic Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
1. Awareness raised and EFA tool promoted in the WIO region	Review completed and ongoing EFA studies, assess best practices and prepare guidelines/best practices/ lessons learnt including existing sources of data for EFA		●	4	SADC, SIWI, LOICZ, IUCN-WANI	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; SWCI's, Water Users' Associations; Academic and research institutions; NGOs
	Desk-top and/or rapid assessment of identified "hot spot" basins	(●)	●	1, 4		
	Establish a regional/basin-wide task force to develop and adapt EFA methodologies		●	4		
	Disseminate results and create buy-in by stakeholders including political leaders and decision-makers	(●)	●	1, 4		
2. Capacity for applying EFA increased amongst stakeholders	Carry out capacity needs assessment		●	4	SADC, SIWI, LOICZ, IUCN-WANI	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; SWCI's, Water Users' Associations; Academic and research institutions; NGOs; Private Sector, Basins Users, Water Use Associations, CBOs; Land Use Commissions.
	Identify experts for EFAs and launch training workshops including "training on the job" components, organized tours, visits, secondments, etc.		●	4		
	Review, strengthen/build capacity of identified institutions and review sector strategies	●	(●)	4		
	Create linkages/integration with existing networks of practitioners and information and data centres for exchange (e.g. www.indaba.iucn.org , www.eflownet.org) for information dissemination.		●	4		
	Establish and implement demonstration projects focusing on meeting coastal water and sediment flows needs.	●	(●)	4		

6c. Strategic Component 3: Managing River Flows Wisely (continued)

Target: River basins	Strategic Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
3. EFA conducted and operating rules (EQOs) integrated in river basin management in selected basins in the WIO region*	Develop selection criteria for target basins		●	4	SADC, SIWI, LOICZ, IUCN-WANI	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; SWCI's, Water Users' Associations; Academic and research institutions; NGOs; Private Sector, Basins Users, , Water Use Associations, CBOs; Land Use Commissions.
	Develop plans for conducting EFAs in identified river basins	(●)	●	4		
	Carry out hydrological monitoring for river basins for EFA	●	(●)	1, 4		
	Establish/strengthen legal, institutional, operational structures for adoption and implementation of EFA in management of the selected basins	●	(●)	1, 4		
	Carry out EFAs and validate results	●	(●)	1, 4		
	Disseminate results and create buy-in at political and technical level	●	(●)	1, 4		
	Identify management activities corresponding to EFA findings and revise existing/ incorporate EQOs into relevant water management plans (e.g. IWRM plans)	●	(●)	1, 4		
4. Methodologies agreed upon and tools developed for coherent application of EQOs in both freshwater and coastal management	Assess and harmonise, where necessary, different methodologies and management tools regarding ICZM currently in application.		●	4	IOC-ReCoMaP, LOICZ, UNEP/GPA	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; Authorities responsible for Coastal Zone Management, Academic and research institutions; NGOs
	Develop an integrated tool for river basin and coastal zone management and establish regulatory mechanism for application in river basin and coastal management.	●	(●)	4		
	Establish joint assessment and planning teams/ working groups/ focal point for EFA and IRBM, ICZM	●	(●)	4		
	Develop guidelines for achievement of EQOs in river basin management and Coastal and marine management (River Estuarine and marine management).	●	(●)	4		
5. Collaboration between SWCI (RBOs, Technical Committees, etc.) and Nairobi Convention Secretariat catalyse policy discussion on coastal and marine issues.	Initiate, raise awareness and maintain formal communication with stakeholders		●	4	SADC, EAC	ANBO; Nairobi Convention Secretariat; RECs; AMCOW; AMCEN; SWCIs; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; Authorities responsible for Coastal Zone Management
	Support collaborative arrangements between relevant agencies at national level	●	(●)	1, 4		

* Note: EQOs are environmental quality objectives for selected basins, and correspond to thresholds of potential concern

6c. Strategic Component 3: Managing River Flows Wisely (continued)

Target: River basins	Strategic Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
6. National freshwater management and coastal zone management frameworks (policies, legal, and institutional) fully integrated.	Analyse current national/regional legal/ institutional gaps/ overlaps and identify options for review	●	●	1, 4	SADC, UNEP/GPA IUCN-WANI	Relevant Sectoral Ministries; National Water Research Institutes; RBOs; Authorities responsible for Coastal Zone Management
	Assist parliament to harmonise national/regional laws governing freshwater and coastal management	●	●	1, 4		
	Establish intersectoral discussion, cooperation arrangements and joint planning	●	●	1, 4		
	Harmonise/streamline management responsibilities between freshwater and coastal management organizations	●	●	1, 4		
7. Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	Develop selection criteria for target basins		●	4	SADC, SIWI, ANBO, RBOs, LOICZ, IUCN-WANI	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; SWCI's, Water Users' Associations; Academic and research institutions; NGOs; Private Sector, Basins Users; Water Use Associations, CBOs; Dam Operators.
	Carry out hydrological monitoring for river basins	●	(●)	1, 4		
	Establish/strengthen legal, institutional, operational structures	●	(●)	1, 4		
	Carry out study and validate results	●	(●)	1, 4		
	Disseminate results and create buy-in at political and technical level	●	(●)	1, 4		
	Identify management activities corresponding to the findings and revise existing dam operation/ incorporate findings into relevant water management policies and plans (e.g. IWRM plans)	●	(●)	1,4		
8. Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed.	Develop selection criteria for target wetlands		●	4	SIWI, IUCN-WANI	ANBO; RAMSAR Secretariat; Relevant Sectoral Ministries; RBOs; SWCI's, Academic and research institutions; NGOs.
	Carry out hydrological, geological and biological study of selected wetland(s)	●	(●)	1, 4		
	Establish/strengthen ecosystem-based management plan (legal, institutional, operational structures)	●	(●)	1, 4		
	Carry out study and validate results	●	(●)	1, 4		
	Disseminate results and create buy-in at political and technical level	●	(●)	1, 4		
	Identify management activities corresponding to the findings and revise existing wetlands operation/ incorporate findings into relevant wetland management policies and plans (e.g. IWRM plans)	●	(●)	1, 4		

6c. Strategic Component 3: Managing River Flows Wisely (continued)

Target: River basins	Strategic Actions	National action	Regional action	Funding mechanisms	Potential partnerships	Stakeholders to be involved
9. Catchment management impacts on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	Draft regional guidelines for harmonising riverine and coastal management plans including setbacks		●	4	SADC, SIWI, LOICZ, IUCN-WANI	ANBO; Relevant Sectoral Ministries; National Water Research Institutes; RBOs; SWCI's, Academic and research institutions; NGOs; Private Sector, Basins Users; Water Use Associations, CBOs.
	Promote and strengthen stakeholder institutions within the basin	●	(●)	1, 4		
	Promote and strengthen sector collaboration, joint water resources planning, etc.	●	(●)	1, 4		
	Review catchment management plans including information management, monitoring, etc.	●	(●)	1, 4		
	Promote integrated land and water use planning	●	(●)	1, 4		
	Identify partnerships and build resources mobilisation opportunities for catchment co-management	●	(●)	1, 4		

Key: National/Regional action is highlighted as: ● Primary action; (●) Secondary action. Funding mechanisms distinguished are (1) General public funding (allocated through national/local budgets); (2) Private financing; (3) Economic instruments; and (4) Grants and loans.

6d. Strategic Component 4: Strengthening Governance and Awareness

Target	Strategic Actions	National action	Regional action	Funding mechanisms	Partnerships	Stakeholders to be involved
1. Capacity for ecosystem based management improved (including e.g. ICZM, SEA, EIA and EFA)	Establish regional guidelines, standards and procedures for ICZM, SEA and EIA.		●	4	NGOs, IOC-ReCoMaP, FARI	Relevant Government Ministries; Environmental Protection Agencies; Academic and Research Institutions; Nairobi Convention Secretariat; NGOs
	Develop and implement regional and national capacity building strategies, focused on key priorities for LBSA management.	●	●	1, 4		
	Strengthen regional and national networking and lessons sharing between practitioners, academics and policy makers.	●	●	1, 4		

6d. Strategic Component 4: Strengthening Governance and Awareness (continued)

Target	Strategic Actions	National action	Regional action	Funding mechanisms	Partnerships	Stakeholders to be involved
2. Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level	Develop regional framework (including guidelines and model legislation) for national legislation. Include ecosystem based management approaches into national legislative and regulatory frameworks (e.g. ICZM, SEA, EIA and EFA).		●	4	FARI, NGOs, IOC-ReCoMaP	Relevant Government Ministries; Environmental Protection Agencies; Academic and Research Institutions; Nairobi Convention Secretariat; UNEP; NGOs
	Domesticate and implement relevant regional and international instruments.	●		1, 4		
	Improve enforcement of relevant policies and legislation.	●		1, 4		
	Monitor impact of implementing new legislation in addressing problems.	●		1, 4		
	Monitor state of environment in WIO region as a whole, in relation to priority problems, and publish findings.	●	●	1, 4		
3. Awareness of importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector	Develop a regional communication strategy targeted at: <ul style="list-style-type: none"> ● policy makers and legislators; ● civil society; ● the private sector; ● including appropriate messages and materials for each sector. 		●	1, 4	NGOs, IOC-ReCoMaP	Relevant Government Institutions; Environmental Protection Agencies; NGOs, private sector, CBOs; Media
	Implement regional communication strategy at regional and national levels, monitor outcomes	●	●	1, 4		
4. Regional legal framework for LBSA updated and harmonized with multilateral environmental agreements	Review, update and harmonize regional legal framework relevant to LBSA		●	4	UNEP, IOC-ReCoMaP	Ministries of Foreign Affairs; Relevant Sectoral Ministries; MEAs; Nairobi Convention Secretariat; UNEP
	Develop model legislation for key LBSA Issues/sectors (local government tourism, agriculture, etc.).		●	4		
	Enact necessary national legislation to domesticate and implement regional legal framework	●		1, 4		

6d. Strategic Component 4: Strengthening Governance and Awareness (continued)

Target	Strategic Actions	National action	Regional action	Funding mechanisms	Partnerships	Stakeholders to be involved
5. Regional co-ordination and inter-sectoral governance improved	Reach agreement with relevant regional economic/trade organizations on issues of common concern, and collaborate on the implementation of LBSA instruments (e.g. SADC Shared Water Resources Protocol).		●	4	SADC, EAC, IOC-ReCoMaP	Ministries of Foreign Affairs; Relevant Sectoral Ministries; RECs; MEAs; Nairobi Convention Secretariat
	Build collective capacity to negotiate MEAs that reflect concerns for environmental and socio-economic sustainability.		●	1, 4		
6. Appropriate financial mechanisms developed and implemented	Develop a regional resource mobilization strategy, including appropriate financial mechanisms, best practice and model legislation.		●	1, 2, 3, 4	WB, AfDB, NGOs, WIOMSA, FARI	Ministries of Finance; Regional and international development banks; Donors
	Domesticating and implementing relevant aspects of the regional resource mobilisation strategy; monitor outcomes.	●		1, 2, 3, 4		
	Strengthen regional and national networking and lessons sharing between practitioners, academics and policy makers.	●	●	1, 4		
7. Regional knowledge management undertaken effectively	Develop a regional knowledge management strategy, building on existing information, resources and systems.		●	1, 4	FARI, NGOs, IOC-ReCoMaP, ASCIMEs, IOC-UNESCO	Academic and Research Institutions; WIOMSA; NC-Clearing House nodes; Odin-Africa; WCMC
	Implement regional knowledge management strategy.		●	1, 4		
	Integrate existing information on critical habitats, river basins and pollution into clearing house mechanisms		●	1, 4		
	Capture metadata on critical habitats, river basins and pollution and made accessible.		●	1, 4		
	Develop informative policy briefs based on existing information.		●	1, 4		
	Prepare treatise on each of the Critical Habitats in the region– contributing to baseline assessment & current status of Critical Habitats		●	1, 4		

Key: National/Regional action is highlighted as: ● Primary action; (●) Secondary action. Funding mechanisms distinguished are (1) General public funding (allocated through national/local budgets); (2) Private financing; (3) Economic instruments; and (4) Grants and loans.

Annex 7: Prioritization of SAP Targets

The SAP development process included various stages of prioritization of targets. National stakeholder workshops were held in each of the countries to review the proposed objectives, targets and actions, and rank them according to the specific priorities of each country. Furthermore, two regional workshops were held (Cape Town, November 2008, and Mombasa, June 2009) to align views at the regional level, involving some of the main partner organisations (NGOs, International and Inter-Governmental Organisations).

The summary tables of priorities presented on the following pages provide details of country-level priority setting as well as the regional perspective. The overall prioritization of targets is based on the average for the region.

		Comoros	Kenya	Madagascar	Mauritius	Mozambique	Seychelles	South Africa	Tanzania	Regional	Average
A.	Critical coastal habitats protected, restored and managed for sustainable use										
1.	Incentives to encourage compliance with best practice in Critical Habitat management established	H	VH	H	H	H	H	M	VH	M	H
2.	Coastal zoning based on integrated economic, social and environmental considerations implemented	VH	VH	VH	VH	VH	VH	M	H	H	VH
3.	Critical Habitat management in place in all countries contributing to ecologically sustainable ecosystem services and regional protection.	VH	VH	VH	H	H	H	VH	H	VH	VH
4.	A regional monitoring and evaluation plan established and implemented for Critical Habitats, Coasts and Shorelines	H	H	M	H	VH	M	H	H	H	H
5.	ICZM legislation in place in all countries	H	VH	H	H	M	VH	M	VH	H	H
6.	National legislation to improve management of bilateral and regional issues strengthened	H	M	M	M	M	L	M	H	M	M
7.	Awareness of the importance of critical habitats raised significantly	VH	H	VH	VH	M	H	H	VH	H	H
B.	Water quality meets international standards by the year 2035										
1.	Effluent discharge standards developed and regionally harmonized	VH	H	VH	H	M	VH	H	H	M	H
2.	Marine water standards developed and regionally harmonized	VH	VH	VH	H	M	M	H	VH	M	H
3.	Regional best practice framework models for municipal wastewater management developed and adopted	M	VH	H	H	VH	VH	H	VH	M	H
4.	Collection, treatment and disposal of effluents undertaken in accordance with regional standards in pilot sites	H	VH	VH	H	H	H	VH	VH	H	H
5.	Environmental Management Systems and Cleaner Production Technologies encouraged	H	H	H	H	H	H	H	H	H	H
6.	Stakeholders sensitized and political support harnessed in favour of pollution prevention in key sectors	VH	VH	VH	H	H	VH	VH	VH	H	VH
C.	River flows are wisely and sustainably managed										
1.	Awareness raised and EFA tool promoted in the WIO region	H	VH	H/ VH	M	H	VH	H	H	H	H
2.	Capacity for applying EFA increased amongst stakeholders	VH	H	VH	H	H	VH	H	H	H	H

		Comoros	Kenya	Madagascar	Mauritius	Mozambique	Seychelles	South Africa	Tanzania	Regional	Average
3.	EFA conducted and operating rules (EQOs) integrated in river basin management in selected basins in the WIO region	VH	H	VH	M	M	VH	H	H	H	H
4.	Methodologies agreed upon and tools developed for coherent application of EQOs in both freshwater and coastal management	H	H	VH	H	M	H	M	H	H	H
5.	Collaboration between SWCI (RBOs, Technical Committees etc.) and Nairobi Convention Secretariat catalyse policy discussion on coastal and marine issues.	VH	VH	H/ VH	M	M	H	H	VH	M	H
6.	National freshwater management and coastal zone management frameworks (policies, legal, and institutional) fully integrated	H	VH	VH	H	H	H	VH	VH	H	H
7.	Effects of impoundments and dam operations on river flow variability and sediment discharge analysed and results implemented	H	H	VH	M	VH	L	M	H	H	H
8.	Significance of identified wetlands on flow variability, sediment discharge and coastal and marine productivity investigated and wisely managed.	VH	VH	VH	H	H	L	H	VH	H	H
9.	Catchment management impacts on coastal habitats, shorelines and water quality investigated and results adopted in river basin and coastal and marine management	VH	VH	VH	H	VH	VH	H	VH	H	VH
D.	Effective governance and stakeholders collaboration										
1.	Capacity for ecosystem based management improved (including e.g. ICZM, SEA, EIA and EFA.)	VH	VH	H	VH	VH	H	H	H	VH	VH
2.	Appropriate legal and regulatory frameworks for LBSA management in place and implemented at national level	H	VH	H	H	VH	H	M	VH	H	H
3.	Awareness of importance of good marine and coastal management raised at the level of policy makers and legislators, civil society and the private sector	VH	H	H	VH	VH	H	VH	H	H	H
4.	Regional legal framework for LBSA updated and harmonized with multilateral environmental agreements	H	VH	M	VH	H	M	H	M	H	H
5.	Regional co-ordination and inter-sectoral governance improved	M	VH	H	L	H	VH	VH	H	H	H
6.	Appropriate financial mechanisms developed and implemented	H	VH	VH	M	VH	VH	VH	VH	H	VH
7.	Regional knowledge management undertaken effectively	M	VH	VH	H	H	M	H	H	H	H

Annex 8: A Framework for National SAP Implementation

Comoros

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
University of Comoros / Université de Comores (UDC)	Research and academic education	√	√		√
Centre for Documentation and Scientific Research / Centre National de Documentation et de Recherche Scientifique (CNDRS)	Scientific research, documentation, archiving, training and awareness raising	√	√		√
National Institute for Agricultural, Environmental and Fishery Research / Institut National de Recherche pour l'Agriculture, la Pêche et l'Environnement (INRAPE)	Applied research, reporting and information management, training	√	√	√	√
National Directorate for Environment and Forestry / Direction Nationale de l'Environnement et des Forêts (DNEF)	Coordination, conceptualisation and monitoring and evaluation of environmental programmes and projects, management of international conventions	√	√	√	√
National Directorate for Fishery Resources / Direction Nationale des Ressources Halieutiques (DNRH)	Coordination, conceptualisation and monitoring and evaluation of environmental programmes and projects, training	√			√
National Directorate for Agriculture and Livestock Keeping / Direction Nationale des Stratégies Agricoles et Elevage (DNSAE)	Coordination, conceptualisation and monitoring and evaluation of environmental programmes and projects, training			√	√
National Planning Commissariat / Commissariat Général aux Plans (CGP)	Coordination, monitoring and evaluation and resource mobilization for programmes and projects				√
National Assembly / Assemblée Nationale	Adoption of legal texts				√
Ministry of Health / Ministère de la Santé	Public health and environmental sanitation	√	√		√
Department of land management / Aménagement du territoire	Implementation of the National ICZM Plan	√	√	√	√
National Sustainable Development Committee / Comité National de Développement Durable (CNDD)	Development of the National ICZM Plan	√	√	√	√
GIS Department / Département SIG	Decision support				√
Civil society	Awareness raising, environmental projects and activities, contribution to the development of environmental projects and programmes	√	√	√	√

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Development of a National ICZM Plan and separate ICZM Plans for the Islands	INRAPE	√	√	√	√	Ongoing	EU through IOC-ReCoMaP
Capacity building for Land-use Management (Gestion des Terres - GDT)	DNEF	√			√	Ongoing	Government, GEF
Management of Protected Areas	DNEF	√			√	Ongoing	Indian Ocean Commission, Convention on Biodiveristy
National sustainable human development programme (Programme National pour le Développement Humain et Durable - PNDHD)	DNSAE	√	√	√	√	Ongoing	Government
Strengthening and diversification of food crops i Comoros (Projet de Renforcement et Diversification des Cultures Vivrières aux Comores -PREDIVAC)	DNSAE	√	√	√	√	Ongoing	France
Strengthening of community-based organisations	DNEF	√	√		√	Ongoing	GEF
Small Grants Programme (SGP)	UNDP, NGOs	√	√	√	√	Ongoing	GEF
National Capacity Self Assessment (Projet Autoévaluation Nationale des Capacités À Renforcer - ANCAR)	DNEF	√	√		√	Ongoing	GEF
Management and development of the Marine Park of Moheli	DNEF	√	√	√	√	Ongoing	Various
Community based ICZM projects - control of coastal soil erosion; solid and liquid waste management, etc.	ICZM Committee and NGOs	√	√	√	√	Ongoing	EU through IOC-ReCoMaP

Kenya

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Ministry of Environment and Mineral Resources	Developing and implementing ICZM legislation; Developing and implementing appropriate legal and regulatory frameworks for LBSA management	√			√
National Environment Management Authority (NEMA)	Developing & implementing incentives and environmental award schemes to encourage good practice in environmental conservation and governance; Developing and implementing critical areas conservation strategies and management plans; Developing and implementing ICZM legislation; Developing and implementing appropriate legal and regulatory frameworks for LBSA management; Awareness creation on LBSA; Develop and implement SEA, EIA, EA guidelines, waste mgt standards; Developing and implementing monitoring and evaluation plan for critical habitats; Promotion of EMS and cleaner production technologies Develop and implement environmental information management system	√	√	√	√
Kenya Wildlife Service	Conservation of critical habitats including MPAs; Developing and implementing critical areas (MPA) conservation strategies and management plan; Developing and implementing monitoring and evaluation plan for critical habitats (MPAs); Awareness on critical habitats conservation	√			
Coast Development Authority (CDA)	Coastal zoning based on economic, social and environmental considerations; Developing and implementing critical areas conservation strategies and management plans; Promotion of EMS and cleaner production technologies; Awareness creation	√	√	√	√
Kenya Marine and Fisheries Research Institute (KMFRI)	Research on critical habitats, river flows, water and sediment quality; Assessment of effects of impoundments and dam operations on river flow variability and sediment discharge analysed; Investigating importance of wetlands on river flow variability, sediment discharge and coastal and marine productivity; Investigating catchment management impacts on coastal habitats, shorelines and water quality	√	√	√	
Kenya Forest Service (KFS)	River catchment conservation; Awareness on forest conservation	√		√	
Ministry of Tourism	Promotion of EMS and cleaner production technologies in hotel sector		√		
Tana and Athi Rivers Development Authority (TARDA)	Awareness creation on river basin conservation; Enhancing capacity for applying EFA amongst stakeholders; Developing methodologies and tools for coherent application of EQOs in both freshwater and coastal management; Implementing survey recommendation on effects of impoundments and dam operations on river flow variability; Implementing survey findings on catchment management impacts on coastal habitats, shorelines and water quality in river basin management	√		√	√

Kenya (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Local Authorities	Coastal zoning based on economic, social and environmental considerations; Developing and enforcing effluent discharge standards; Developing and implementing best practice framework models for municipal wastewater management; Collection, treatment and disposal of effluents; Solid waste collection and disposal; Promotion of EMS and cleaner production technologies; Awareness creation on pollution prevention and control	√	√		√
Academia (Universities, colleges, schools)	Training programmes on coastal and marine conservation; Research on critical habitats, river flow, water and sediment quality, pollution; Awareness creation on coastal zone conservation	√	√	√	
Private sector, NGOs, CBOs	Education and awareness raising; research on critical habitats, river flows, water and sediment quality; critical habitats conservation; solid waste management; Promotion of EMS and cleaner production technologies	√	√	√	√

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Developing ICZM Framework including Policy and National ICZM Programme of Action for Kenya	NEMA, ICZM Committee	√	√	√	√	ICZM Policy at advanced stage Development of ICZM NPA at inception stage	Government, DANIDA EU through IOC-ReCoMaP WIO-LaB
Development of Shoreline Management Strategy for Kenya	NEMA, ICZM Committee	√	√			Development of Strategy at inception stage	Government, DANIDA
Enforcement of effluent discharge standards	NEMA, Coast Water Services Board		√			Ongoing	Government
ICZM Information management System	NEMA, ICZM Committee				√	Ongoing	Government, DANIDA
Land capability mapping and zoning of the coastal area	Physical Planning Department, Ministry of Lands	√				Planned	World Bank
Development of SEA guidelines	Ministry of Environment and NEMA				√	Ongoing	Government, DANIDA
Community based ICZM projects	ICZM Committee and NGOs	√	√	√	√	Ongoing	EU through IOC-ReCoMaP
Small Grant Programme (SGP)	UNDP, NGOs	√	√	√	√	Ongoing	GEF

Madagascar

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
National ICZM Committee / Comité National GIZC	Developing and implementing ICZM policy, strategy, action plan and legislation; Developing and implementing an appropriate legal and regulatory frameworks for LBSA management	√	√	√	√
Ministry of Environment and Forestry / Ministère de l'Environnement et des forêts	Developing & implementing incentives and environmental award schemes to encourage good practice in environmental conservation and governance; Developing and implementing critical areas conservation strategies and management plans; Developing and implementing ICZM legislation; Developing and implementing appropriate legal and regulatory frameworks for LBSA management; Awareness creation on LBSA Promotion of EMS and cleaner production technologies; Develop and implement environmental information management system	√	√	√	√
Ministry of Fisheries and related institutions / Ministère de la Pêche et des ressources Halieutiques et les institutions sous sa tutelle	Conservation of critical habitats including MPAs; Assessing marine biomass including fish stock; Developing and implementing monitoring and evaluation plan for fish reserves	√			√
National Environment Authority / Office National pour l'Environnement (ONE)	Coastal zoning based on economic, social and environmental considerations; Developing strategies and management plans for coastal habitats; Clearing house on biodiversity; Develop and implement SEA, EIA, EA guidelines,	√			√
National Centre for Environmental Research and National Institute for Fisheries Resources – Ministry of Higher Education and Research / Centre National de Recherche sur l'Environnement (CNRE) and Institut Halieutique et des Ressources Marines (IHSM) - Ministère de l'Enseignement Supérieur et de la Recherche	Research on critical habitats, river flows, water and sediment quality; Implementing survey findings on catchment management impacts on coastal habitats, shorelines and water quality in river basin management; Assessment of effects of impoundments and dam operations on river flow variability and sediment discharge analysed; Investigating importance of wetlands on river flow variability, sediment discharge and coastal and marine productivity; Investigating catchment management impacts on coastal habitats, shorelines and water quality; Implementing survey recommendation on effects of impoundments and dam operations on river flow variability; Developing methodologies and tools for coherent application of EQOs in both freshwater and coastal management	√	√	√	√
Parcs Nationaux Madagascar National Parks	Creating and Managing Protected Areas; Conservation of critical habitats including MPAs Developing and implementing critical areas (MPA) conservation strategies and management plans; Developing and implementing monitoring and evaluation plan for critical habitats (MPAs); Awareness on conservation	√			
Ministère de Tourisme	Promotion of EMS and cleaner production technologies in hotel sector; Ensure that hotels are following specifications		√		
Service d'Appui à la Gestion de l'Environnement	Local community Awareness creation	√			√

Madagascar (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Local Authorities	Implementing ICZM action plan and Policy; Developing and enforcing effluent discharge standards; Developing and implementing best practice for municipal resources management; Solid waste collection and disposal; Promotion of EMS and cleaner production technologies; Awareness creation on pollution prevention and control	√	√		√
Academia (Universities, colleges, schools)	Training programmes on coastal and marine conservation; Research on critical habitats, river flow, water and sediment quality, pollution; Awareness creation on coastal zone conservation	√	√	√	√
Private sector, NGOs, CBOs	Education and awareness raising; research on critical habitats, river flows, water and sediment quality; critical habitats conservation; solid waste management; Promotion of EMS and cleaner production technologies	√	√	√	√

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Developing National ICZM Policy, strategy and Action Plan ICZM in Madagascar	ICZM Committee and technical Secretariat	√	√	√	√	ICZM Policy at advanced stage; Development of ICZM NPA at inception stage	Government, EU through IOC-ReCoMaP
Creating MPAs	Ministry of Environment and Madagascar National Parks	√				Ongoing	Government, GEF
Monitoring hot spots of pollution	CNRE		√			Ongoing	Government
Community based ICZM projects	ICZM Committee and NGOs	√	√	√	√	Ongoing	EU through IOC-ReCoMaP
SGP Small Grant Programme	UNDP / NGOs	√	√	√	√	Ongoing	GEF

Mauritius

National Institutions to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Ministry of Environment & National Development Unit (MENDU)	Overall protection and enhancement of the environment through the administration of environment protection legislation, design and environmental guidelines and standards	√	√		√
Ministry of Agro Industry, Food Production & Security	Sustainable management and economic use of agricultural, fishers and marine resources	√	√		√
Fisheries Division (Albion Fisheries Research Centre)	Management of fisheries and marine resources, control of two marine parks and marine protected areas	√	√		√
Fisheries Protection Services	Enforcement of laws related to fisheries and marine resources	√			√
National Parks & Conservation Service	Management and restoration of the terrestrial biodiversity and the promotion of public awareness	√			√
Forestry Service	Protection of forest environment and coastal vegetation	√		√	√
Ministry of Housing & Lands	Regulation of Land Use	√			√
Ministry of Tourism, Leisure & external Communication	Planning, management and control of tourism development	√			√
Ministry of Local Government	Local Government administrative coordination with municipalities and district councils	√	√		√
Beach Authority	Conservation and protection of the environment of public beaches	√			√
Local authorities	Issue of building and land use permits	√	√		√
Solid Waste Management Unit)	Solid waste management	√			√
Ministry of Renewable Energy & Public Utilities	Formulation of policies in the energy, water and waste water sectors and the establishment of a responsive legal framework to govern the development of these sectors	√	√	√	√
Wastewater Management Authority	Implementation of sewerage network, operation and maintenance of public wastewater treatment plants and monitoring of industrial and domestic effluents	√	√		√
Central Water Authority	Control, development and conservation of water resources; treatment and distribution of water for domestic, industrial and commercial use.		√	√	√
Water Resources Unit	Assessment, development, management and conservation of water resources	√	√	√	√
Prime Minister's Office	All matters pertaining to national security and internal affairs of the country				√
Mauritius Oceanography Institute	Development and strengthening of oceanographic research and rational development of marine resources within the maritime zone of the Republic of Mauritius	√			√
Mauritius Police Force - National Coast Guard	Enforcement of law relating to the protection of the maritime zones	√			√
Mauritius Police Force - Police de L'Environnement	Co-ordination and enforcement of environmental laws	√	√		√
Attorney's General Office	Drafting and updating of laws	√	√		√
Mauritius Ports Authority	Management of wastes within the Ports area	√	√		√

Mauritius (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Non Government Organisations :					
Mauritius Marine Conservation society	National Steering Committee on Blue Bay Marine Park Sensitization of public, children and stakeholders on marine environment and marine protected areas	√	√		√
Reef Conservation Mauritius	Setting up of permanent mooring buoys to prevent reef degradation	√			√
Mauritian Wildlife Foundation	Conservation of Wildlife	√			√
Association des Hoteliers et Restaurateurs de l'Île Maurice	Planning and establishment of hotels and restaurants	√			√

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Lagoonal water quality index framework	MENDU, Wastewater Management Authority, Fisheries Division, University of Mauritius	√	√		√	Completed	EU
Development of National ICZM Framework	MENDU	√			√	Ongoing	Government
ESA	MENDU	√	√				
GEF/Small Grant Programme Project	UNDP, NGOs	√			√	Ongoing	GEF
National Sewage Programme	Wastewater Management Authority	√	√		√	Ongoing	Government, WB
St Martin Sewerage Project	Wastewater Management Authority	√	√		√	Ongoing	Government, Donors
Mt Jacquot Sewerage Project	Wastewater Management Authority	√	√		√	Ongoing	Government, Donors
Baie du Tombeau Sewerage	Wastewater Management Authority	√	√		√	Ongoing	Government, Donors
Grand Baie Sewerage Project	Wastewater Management Authority	√	√		√	Ongoing	Government, Donors
Grand Baie Sewerage Project – Phase 2	Wastewater Management Authority	√	√		√	Planned	Government, Donors
West Coast Sewerage Project	Wastewater Management Authority	√	√		√	Planned	Government, Donors
Pailles-Guibies Sewerage Project	Wastewater Management Authority	√	√		√	Planned	Government, Donors
Monitoring of WWTPs, industries and hotels	Wastewater Management Authority	√	√		√	Ongoing	Government
Plantation of endemic species on public beaches	Beach Authority	√				Ongoing	Beach Authority
Cleaning and sensitization campaigns (solid waste)	Beach Authority				√	Ongoing	Beach Authority In kind
Zoning of Lagoons	Ministry of Tourism	√				Ongoing	Government
Mooring buoys	Ministry of Tourism	√				Ongoing	Government
Updating and drafting of legislations	Attorney General Office	√	√		√	Ongoing	Government
Dredging of rivers	Ministry of Local Government			√		Ongoing	Government

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Coastal Ecosystem Monitoring	Fisheries Division, AFRC	√	√		√	Ongoing	Government
Lagoonal monitoring in the region of Port Louis	MENDU, Fisheries Division, Wastewater Management Authority	√	√		√	Ongoing	Government
Independent Environment Audit on Wastewater Projects	MENDU, Fisheries Division, Wastewater Management Authority, Central Water Authority, Water Resources Unit, Min. of Health & Quality of Life	√	√		√	Ongoing	Government
Piloting ICZM in Flic en Flac and La Gaulette/Le Morne	MENDU, Fisheries Division, Wastewater Management Authority, Mauritius Ports Authority Water Resources Unit, Min. of Tourism, Local Government, MPA	√	√		√	Ongoing	Government, EU through IOC-ReCoMaP
Monitoring of Water, Sediment & Biota	MENDU, Fisheries Division, Wastewater Management Authority	√	√		√	Ongoing	Government, GEF
Use of native species to control soil erosion in the Black River gorges national parks	MENDU, Fisheries Division, NPCS	√	√		√	Ongoing	Government, Norway
Genetic connectivity	MOI, WIOMSA	√			√	Ongoing	Government, WIOMSA
Coral farming	MOI, AFRC	√			√	Ongoing	Government
Coastal Vulnerability mapping	MOI	√			√	Finished	Government, IOC
Ballast water	MOI, Min. of Public infrastructure, land, transport and shipping	√			√	Ongoing	Government
AMESD	MOI	√			√	ongoing	EU
Integrated water resource management	WRU	√	√	√	√	planned	UNEP/GEF
Solid waste management in the Port Area	MPA	√	√	√	√	Ongoing	Government, Norway

Mozambique

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Centre for Research of Marine Environment (CEPAM-MICOA)	Research, training, technical assistance on the marine and coastal ecosystems and aquaculture	√			
National Directorate of Geology (MIREM-DNG)	Environmental geological mapping of the Mozambican coastal zone	√	√		√
National Directorate of Mines (MIREM-DNG&DNM)	Prevention of river contamination /pollution due to artisanal gold mining		√	√	√
Ministry of Public Works and Housing (MOPH) –National Directorate for Water (DNA), Regional Administration of Water Resources	Freshwater Management, river basin management, boreholes		√	√	√
National Directorate of Industry (DNI), Ministry of Industry and Commerce (MIC)	Water Quality (AIA)		√		√
Ministry for the Coordination of Environmental Affairs (MICOA)	Policy development and governance of environmental affairs	√	√	√	√
Institute for the Sea and Borders (IMAF)	Governance	√	√		√
Centre for Sustainable Development of Coastal Zones (CDS-ZC)	Technical assistance and extension on marine and coastal habitats; research and training	√			√
Institute for the Development of Small-scale Fisheries (IDPPE)	Promote the development of small-scale fisheries	√		√	√
(UNDP) United Nations Development Programme	Small Grant Programme				√
National Institute for Navigation and Hydrology (INAHINA)	Hydrology and oceanography	√	√	√	
Ministry of Health (MISAU)	Water quality		√		
Grupo de Trabalho Ambiental (GTA)	Conservation and promotion of natural resources; Promote alternative livelihoods; Training, research and environmental awareness	√	√		√
University of Eduardo Mondlane(UEM)	University with relevant topics on training in marine & coastal research; Relevant consultancies.	√	√	√	√
National Institute for the Sea (INAMAR)	Responsible for marine safety	√		√	
(IIP) National Fisheries Research Institute	Responsible for Research Programmes on Fisheries	√		√	√
Medium and Small Enterprise Institute (IMPE), Ministry of Industry & Commerce Medium and Small Enterprise Institute, (MIC) Ministry of Industry & Commerce	Promotion and governance of small and medium enterprises		√		√

Mozambique (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Ministry for Planning & Development	Government institution responsible for the globalization of all development programmes in Mozambique				√
(MINAG) Ministry of Agriculture	Governance of agricultural activities and development	√			√
(DNTEF) National Directorate for Land & Forests	Governance of land and forests				
WWF Mozambique	Conservation and promotion of natural resources; Promote alternative livelihoods; Training, research and environmental awareness	√	√		√
FNP	Endangered Wildlife Trust	√			√
IUCN	Intl Union for the conservation of Nature	√		√	√
School of Marine and Coastal Sciences in Quelimane city (Escola Sup. C.M C-Quelimane)	University with relevant topics on training in marine & coastal research	√		√	
(ESCOLA DE TURISMO) School of Tourism	Tourism associated with biodiversity conservation	√			
Institute for Agricultural Research (IIAM)	Agronomic research; Resource management	√			√

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Geological mapping of the Mozambican coastal zone	National Directorate of Geology	√	√			Ongoing	Government
Governance of small scale and artisanal mining	National Directorate of Mining		√			Ongoing	Government
Collection of baseline information on the coastal and marine resources	CEPAM-MICOA	√				Ongoing	Government
Drinking water supply in rural areas	MOPH – DNA		√			Ongoing	Government, donor
Demarcation of the maritime borders	IMAF, INAHINA, INAMAR				√	Ongoing	Government
Integrated Coastal Zone Management	CDS – Coastal zones	√			√	Ongoing	Government
Eastern African Marine Ecoregion Programme	WWF, CDS – Coastal Zones	√			√	Ongoing	Donor
Small Grant Programme (SGP)	UNDP, NGOs	√	√	√	√	Ongoing	GEF

Seychelles

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Seychelles Tourism Board (STB)	Sustainability label for tourism sector	√	√		√
Fishing Boat Owners Association (FBOA)	Promotion of sustainable fisheries	√			√
Ministry of Education	Eco School competition; other educational activities	√	√	√	√
Ministry of Environment, Natural Resources and Transport	Environmental policy development and implementation; Environmental educational activities	√	√	√	√
Planning Authority	Authority that regulates overall development.	√	√	√	√
Dept of Environment	Various conservation/environmental monitoring programmes; Atlas of sensitive zones; monitoring of sensitive marine species	√	√	√	√
National Development	Development of Land Use Plan started but not finished.	√			√
Eco-tourism society of Seychelles	Promote eco-tourism in Seychelles	√			√
Environmental NGOs (various)	Advocacy; implementation and management of environmental projects	√	√	√	√
Seychelles Fishery Authority (SFA)	Development and implementation of fisheries policies and legislation	√		√	√
Environment Police	Enforcement of EIA procedures and environmental legislation	√	√		√
Coastguard	Enforcement of marine regulations; oil spill response	√	√		
Ministry of Health	Development of health-related legislation		√		√
Attorney General	Enforcement of legislation	√	√	√	√
Foreign Affairs	Regional conventions				√
President's Office	Overall policy directions				√
Public Utility Corporation (PUC)	Wastewater service; construction and management of potable water infrastructure		√	√	
Seychelles Bureau of Standards (SBS)	Testing and monitoring		√		
Landscape & Waste Management Agency	Management of waste disposal in Seychelles		√		
STAR (Societe Transport Assainissement Regional)	Contractor for waste disposal on Mahe and La Digue		√		
PDF (Praslin Development Fund)	Contractor for waste disposal site on Praslin		√		
Marine Parks Authority (SCMRT – MPA)	Monitoring of biophysical and oceanographic parameters; development of policies regarding marine parks; management of marine parks	√	√		√
MND (Ministry of National Development)	River Board			√	

Seychelles (continued)

Directory of relevant ongoing and planned development programmes and projects

Programme/project	Executing organisation	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Mainstreaming Biodiversity Project	UNDP	√	√	√	√	2008-2014 Under Implementation	Government, GEF, NGO, Private Sector
Mainstreaming Prevention and Control Measures for Invasive Alien Species into Trade, Transport and Travel across the Production Landscape (Biosecurity Project)	UNDP	√			√	2008-2013	Government, GEF, NGO, Private Sector
Water & Wastewater Support Programme	PUC		√	√		2009 Not yet started	Loan from AfDB EU Water Facility
Sustainable Land Management Project	UNDP	√	√	√	√	2009 - 2013	GEF
9 th EDF Solid Waste Management Programme	Department of Environment		√			2007-2012 Under Implementation	EU, Government
10 th EDF Water & Wastewater Management Programme	PUC / GOS		√	√		2008-2013	EU, Government
Capacity Development for Improved National and International Environmental Management in Seychelles	UNDP				√	2007-2010 Delay in starting. Start Date 2009	GEF, Government
Enabling Seychelles to prepare its Second national communication as a response to its commitments under the UNFCCC	UNDP	√			√	2006-2009	GEF, Government
The Regional Tuna Tagging Project-Indian Ocean (RTTP-IO)	IRCC IOC & IOTC				√	2003-2008	EU
Improving Management of NGO and Privately Owned Nature Reserves and High Biodiversity Islands in Seychelles	NGOs & Government Institutions [ICS MCSS Nature Seychelles GIF]	√				2009-2014 PPG approved	GEF, NGOs, Government

South Africa

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Local Government	Wastewater treatment; solid waste management; water quality monitoring and pollution control; stormwater management; housing; service delivery; service supply agreements (for example for major coastal developments); expansion and development of urban areas; land use zoning; biodiversity management; permitting of local industry and business; litter prevention and control; emergency response and disaster management; environmental health management; education and awareness; Blue Flag	√	√	√	√
National Treasury	Departmental budgets; financial controls; technical assistance to all spheres of government				√
Department of Agriculture, Fisheries and Forests	Aquaculture; flow run-off; water resources; agricultural practice regulation; registration of fertilizers; remedies/poisons etc.; Management of industrial forests and plantations; monitoring status of natural agricultural resources	√			√
Department of Minerals	Sand winning and mining licences; monitoring and enforcement; EIA's and management plans for mining; rehabilitation	√	√	√	√
Transnet (National Ports Authority)	Environmental management of areas and activities within ports (water, land, air), including port reception facilities and waste management (transport, handling and storage); ballast water management; safety in ports; dredging and disposal of spoil; port expansion developments (habitat alteration and destruction)	√	√		√
South African Maritime Safety Authority (SAMSA)	Coastal monitoring and surveillance; disaster management (search and rescue for whole SADC); communications; licencing of shipping.		√		√
Department of Trade & Industry	Setting standards for industries; Industrial Development Zones (IDZ's); Cleaner Production; taxes and incentives; education and awareness to industries		√		√
Provincial Government	EIA's; waste licences; policy development; delegated functions from national; cleaner production; enforcement; disaster management; advise in emergencies; education and awareness; health; spatial planning	√	√	√	√
Tourism Associations (municipal and provincial level)	Sustainable and responsible tourism; planning; licensing; accreditation; Blue Flag; inspection and regulation; grading system; accreditation of agencies	√	√		√
Department of Science & Technology	Innovation; solutions at strategic level; research and development; training; centralising intellectual property (patents, inventions, etc.) for commercialisation; development/implementation of research programmes; outsourcing research through science councils	√	√	√	√

South Africa (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Department of Arts & Culture	Conservation of indigenous knowledge and systems				√
Department of Co-operative Governance & Traditional Affairs	Support good governance at different tiers of government; heritage issues; resolve issues around land belonging to traditional leaders and government				√
Department of Education (higher & lower)	Awareness; training; skills development; school curriculum				√
South African Police Services, South African National Defence Force	CITES and poaching compliance and enforcement; conservation; disaster management and emergency response	√			√
Science Councils: Water Research Commission (WRC); National Research Foundation (NRF); Agricultural Research Council (ARC), Council for Scientific and Industrial Research (CSIR), South African National Biodiversity Institute (SANBI), Geoscience; MINTEK; Eskom; NERSA; SANERI.	Support; research and funding; awareness; training; skills development; create material for knowledge dissemination; policy development influencing; support long-term strategic research programmes	√	√	√	√
NGOs & CBOs	Watch dog; community interface; awareness and education; local knowledge; research and policy; public pressure; lobbying; advocacy; support; implement projects; monitoring; reporting; Blue Flag programme.	√	√	√	√
Academic Institutions	Education; research; skills development and transfer; capacity building; training; expert base; (meta-)datasets	√	√	√	√
South African Environmental Observation Network (SAEON)	Monitoring; data collation and management; archiving; support long-term strategic monitoring programmes	√	√	√	√
Development Bank of South Africa	Funding and operational support		√		√
Office of Presidency (National Planning Commission)	Strategic planning and scenario development within public service				√
Department of Transport	Marine pollution control related to shipping		√		√
Government Agencies and parastatal organisations for conservation (KZN Wildlife, SAN Parks, Cape Nature, EC Nature Conservation, etc.)	Implement national policy and custodians of environment; manage protected areas & species	√	√	√	√
Public/private Utilities (Umgeni Water, Rand Water, Mhlathuze Water, etc.)	Monitoring and catchment management; operate treatment works in their catchments; reporting; bulk water supply		√	√	√
Provincial Planning Tribunals / Commissions (DFA Tribunal and KZN Provincial Planning & Development Commission)	Decision-making in terms of planning developments; change of land use; approve/disapprove service supply agreements (e.g. water supply to major coastal developments). This is being devolved to local municipalities; but the replacement of the Planning Commission will still have some oversight function	√		√	√
Petroleum Agency of South Africa (PASA)	Ensure compliance with the law; technical standards; control of environmental impacts in terms of refining and distribution issues.	√	√		√
Water Institute of Southern Africa (WISA)	Supports water sector; drives various initiatives through different WISA divisions to strengthen water sector professionals; sends regular updates on events/activities to registered members (e.g. scientists and engineers).		√	√	

South Africa (continued)

Directory of relevant ongoing and planned development programmes and projects

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Responsible tourism grading: Environment and social accreditation scheme for the tourism sector	Department of Tourism	√	√	√	√	Ongoing (continuous)	Government
Resource directed management: establishment of management classes and objectives for water resources	Department of Water Affairs	√	√	√	√	Ongoing (continuous)	Government
Blue Flag programme for beaches	Wildlife and Environment Society of South Africa (WESSA)	√	√		√	Ongoing (continuous)	Government and private sector (beach registration) and NGO (WESSA)
Mussel Watch programme	Oceanographic Research Institute / Council for Scientific and Industrial Research	√	√		√	Ongoing	Government
Blue and Green Drop Programme: reporting on wastewater treatment practices	Department of Water Affairs		√		√	Ongoing	Government
Coastcare: coastal development projects	Department of Environmental Affairs	√	√		√	Ongoing	Government and private sector
Water Research Commission Guidelines and best practice on wastewater management and water services	Water Research Commission		√	√	√	Completed	Government
Department of Water Affairs guidelines and best practice for stormwater management	Water Research Commission		√			Ongoing (to be completed by 2012)	Government
Department of Water Affairs guidelines and best practice for small wastewater treatment works	Water Research Commission		√			Completed	Government
Set back zones for ICM Act	Department of Environmental Affairs and provincial Departments supporting local authorities	√	√	√	√	Ongoing	Government
Nairobi Convention: National Programme of Action (NPA) for land-based sources and activities management	Department of Environmental Affairs through provincial departments, with local authorities.	√	√	√	√	NPA completed. Implementation ongoing	Government with potential donors
Climate change long term scenario and adaptation strategy	All spheres of government and private sector.	√	√	√	√	Ongoing	Various

South Africa (continued)

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
Department of Science and Technology Grand Challenge for climate change innovations	Department of Science and Technology	✓	✓	✓	✓	Ongoing (2008-2018)	Government and bilateral partners
Landcare programme : sustainable community-based land-use	Department of of Agriculture	✓			✓	Ongoing	Government
Water Research Commission (WRC) climate change programme	Water Research Commission	✓	✓	✓	✓	Ongoing	Government
Catchment to Coast programme	Wildlife and Environment Society of South Africa with district municipalities	✓	✓	✓	✓	Started in 2009 with proposals submitted for funding	WESSA
Stop the Spread of invasive alien species	Wildlife and Environment Society of South Africa with communities, other NGOs and local, provincial and national depts	✓	✓	✓	✓	Ongoing	Various (self-generating)
Eco Schools programme	Wildlife and Environment Society of South Africa with Foundation for Environmental Education (FEE)	✓	✓	✓	✓	Ongoing since 2003	Foundation for Environmental Education (FEE) and WESSA
Coastwatch programme	Wildlife and Environment Society of South Africa with volunteer members with experience, expertise and local knowledge	✓	✓	✓	✓	Ongoing since 1998	No financial input. Every member of Coastwatch acts on a purely voluntary basis.
Coastwatch Marine Impacts Initiative	Wildlife and Environment Society of South Africa's Coastwatch	✓	✓	✓	✓	From 1998 to May 2009	Initially done by volunteers, then funded by Marine outfall operators, eThekweni Municipality, DEA, DWAF and DAEA for the marine outfall work. Operational funding from DAEA from July 2005 to the end of March 2009.

South Africa (continued)

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
Mondi Wetlands Programme	Wildlife and Environment Society of South Africa with Mondi and WWF	√	√	√	√	Ongoing	Private sector (Mondi – Private company involved in plantations for paper and pulp)
Documentary on Water Situation in South Africa	Wildlife and Environment Society of South Africa				√	Planned	Donor to be identified
Source to Sea	Wildlife and Environment Society of South Africa	√	√	√	√	Planned	Donor to be identified
Water harvesting, utilization and sustainability projects	Wildlife and Environment Society of South Africa with Department of Water Affairs			√		Planned	Donor to be identified
Barcode of Life	Frontier Science Programme	√	√	√	√	Planned	Sponsor to be identified
EIA Capacity Building Programme	Wildlife and Environment Society of South Africa supported by WWF , Mazda Wildlife Fund	√	√	√	√	Ongoing since 2008	Private sector (Mazda Wildlife Fund)
CAPE Estuaries Programme	Cape Nature	√	√	√	√	Ongoing	Government
Licence Advisory Fora for Marine Outfalls	Department of Water Affairs and pipeline operators	√	√		√	Ongoing and improving with time and inclusion in all licences	Government and private sector (Polluter pays – pipeline operators and effluent dischargers)
Training materials development for Working for Wetlands	Wildlife and Environment Society of South Africa		√	√		Ongoing: currently in 2 nd of 3 phases	Government (South Africa National Biodiversity Institute)
eThekwini Estuarine Delineation	eThekwini Municipality	√	√	√	√	Completed, but needs to be validated	Government (eThekwini Municipality)
Chlorination Policy	eThekwini Municipality	√	√		√	Completed	Government (eThekwini Municipality)
Durban Bay Authorities' Forum on environmental management	Kwzulu-Natal Department of Agriculture, Environmental Affairs & Rural Development (DAEARD), eThekwini Depts., Transnet Ports Authority, Transnet Projects, eKZN Wildlife	√	√	√	√	On hold	Local Government, Transnet Project, eKZN Wildlife

South Africa (continued)

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
Simunye Environmental Forum	Sappi Mandeni Mill & Mandeni Municipality	✓	✓	✓	✓	Ongoing	Private sector (Sappi – Private company involved in plantations for paper and pulp)
Kwazulu-Natal Estuaries Sub-Committee	Kwazulu-Natal Department of Agriculture, Environmental Affairs & Rural Development, eKZN Wildlife, Wildlife and Environment Society of South Africa, estuarine specialists, Tourism, coastal municipalities and community reps	✓	✓	✓	✓	Ongoing	Government (DAEAR)
Kwazulu-Natal Water Strategy	Department of Water Affairs and other stakeholders			✓	✓	Investigation completed; Implementation pending.	DWAF
Southern African Sustainable Seafood Initiative (SASSI)	WWF	✓			✓	Ongoing since 2004	WWF and network partners: SANBI, DEA MCM, Two Oceans Aquarium, eKZN Wildlife, Seaworld at uShaka, TRAFFIC, EWT, SAIAB, Sharklife, Bayworld
Update of Admiralty Reserve in Kwazulu-Natal	Kwazulu-Natal Provincial Planning & Development Commission	✓			✓	Initially in 1998, then updated in 2008	Kwazulu-Natal Provincial Planning & Development Commission
Bergwatch: programme for the conservation of highland areas	Wildlife and Environment Society of South Africa with volunteer members	✓	✓	✓	✓	Ongoing	None – volunteers manage the programme
National river Health Programme	Department of Water Affairs			✓	✓	Ongoing	Government
Accelerated Water and Sustainable Sanitation Development) programme (AWSSD)	Department of Science and Technology		✓	✓	✓	Ongoing	Government
Working For Wetlands	South African National Biodiversity Institute			✓	✓	Ongoing	Government (South Africa National Biodiversity Institute)

Tanzania

National Institutions and Organisations to be involved in the implementation of the SAP

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Vice President's Office (Division of Environment)	Environmental policy formulation and implementation; formulation and implementation of relevant environmental legislation and regulations; Monitoring and evaluation of environmental projects; development and coordination of implementation guidelines; Coordination of the implementation of the national strategy for conservation of oceans, lakes, rivers and dams; Awareness creation on coastal tourism.	√	√	√	√
Ministry of Water & Irrigation	Monitoring and evaluation of water sector projects; Water policy formulation and implementation; Development and enforcement of water related legislation and regulations; Issuance of effluent discharge permits; Determination and enforcement of water rights; Management of river basins; Development of water quality standards.		√	√	√
Ministry of Industries, Trade & Marketing	Industrial policy formulation and implementation; Development and coordination of the implementation of relevant legislation and regulations; Issuance of licenses to industries and businesses.		√		√
Ministry responsible for Local Government Authorities	Formulation and coordination of implementation of policies on waste management at local level; Formulation of by-laws; monitoring and enforcement at local level	√	√	√	√
Ministry of Lands and Human Settlement Development	Formulation and coordination of implementation of policies, legislation and regulations; monitoring and evaluation of projects focussed on land and human settlements; Formulation of land use guidelines; Coordination of the implementation of land policy; Control and/or management of land development and surveys.	√		√	√
Ministry of Livestock Development & Fisheries	Formulation and coordination of the implementation of policies, legislation and regulations; monitoring and evaluation; Formulation of guidelines; Management and development of fisheries; Coordination of relevant protocols and treaties.	√	√		√
Ministry of Infrastructure Development	Formulation and implementation of construction and transportation policies, legislation and regulations; Monitoring and evaluation; Formulation of guidelines; Coordination of relevant protocols and treaties; Development and coordination of the implementation of contingency plans for oil spills and chemicals.	√			√
Ministry of Energy & Minerals	Formulation and implementation of energy and mineral sector policies, legislation and regulations; Monitoring and evaluation; Formulation of guidelines; Issuance of licenses and permits; Development and implementation of national standards for oil and gas exploration.	√	√	√	√
Ministry of Natural Resources and Tourism	Formulation and implementation of natural resources and tourism development policies, legislation and regulations; Monitoring and evaluation; Formulation of guidelines; Conservation of natural resources	√		√	√

Tanzania (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
National Environment Management Council (NEMC)	Enforcement, compliance, review and monitoring of environmental impact assessment and facilitate public participation in environmental decision making; exercise general supervision and coordination over all matters relating to the environment; Research and surveys for the proper management and conservation of environment; Environmental education and public awareness; and operation of national environmental information system for sound environmental management	√	√	√	√
Ministry of Agriculture, Food Security and Cooperatives	Formulation, monitoring and evaluation of the implementation of relevant policy in the agricultural sector and monitoring of regulating institutions; Provide relevant technical services, research and extension services on irrigation, plant protection, crop selection and promotion, land use, mechanisation, agricultural inputs, information services and cooperative development; Undertake crop monitoring early warning; maintaining strategy food results and protecting appropriate post harvest technologies; Coordinate research and development projects and training				
Tanzania Bureau of Standards	Formulation of National Standards in the fields of agriculture and food, chemicals, textiles, leather, environment, engineering and service industry; Promotion of standardization and quality assurance services in industry and commerce through training of personnel		√		
Government Chemist	Carry out scientific analysis and provide expert opinion/advice on water, cosmetics and chemicals management		√		
Energy and Water Utilities Regulatory Authority	Setting guidelines and licensing, tariff review, monitoring performance and standards with regards to quality, safety, health and environment		√		√
Urban Water and Sewerage Authorities (UWSAs)	Plan, develop and maintain the sewerage system on any public land in order to ensure hygienic sewerage collection and safe disposal; Set water and sewerage disposal tariffs and collect revenue from customers for water consumed and sewerage disposed; Educate and provide information to the public on public health aspects of water supply and wastewater disposal; Implement medium and long term investment programmes, financial plans and annual capital and recurrent budgets.		√		√
Tanzania Petroleum Development Corporation	Ensure right technologies for exploration; spearhead, facilitate and undertake oil exploration and development and ensure compliance with relevant environmental provisions.		√		
Tanzania Ports Authority (TPA)	Establish and coordinate system of Harbours in Tanzania; Provide facilities relating to harbours and provision of harbour services including waste management services.		√		√
Zanzibar Ports Corporation (ZPC)	Establish and coordinate system of Harbours in Zanzibar; Provide facilities relating to harbours and provision of harbour services including waste management services.		√		√
Surface and Marine Transport Regulatory Authority (SUMATRA)	Ensure proper disposal of solid and liquid waste management, coordinate cleaner operations particularly oils and gas spills, taking into account the need to protect and preserve the environment as well as the need to regulate safety and security in the transport sector.		√		

Tanzania (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Research and Development Institutions University of Dar es Salaam (UDSM) Dar es Salaam Maritime Institute (DMI) Mbegani Fisheries Development Centre (MFDC) Tanzania Fisheries Research Institute (TAFIRI)	Provision of technical expertise of constructed wetlands and other wastewater treatment systems (Waste stabilization ponds and constructed wetlands research programme); Water resources research and training; Fisheries research and training; Marine/oceanographic research and training; Education and awareness creation; Safety and environmental education	√	√	√	√
Commission for Science and Technology (CST)	Advise the Government on all matters relating to Science and Technology (S&T) including but not limited to the formulation of S&T policy, priority setting for Research and Development (R&D), allocation and utilization of resources; Promotion, coordination, monitoring and evaluation of scientific research and technology development and technology transfer activities; Facilitate national, regional and international cooperation in scientific research and technology development and transfer; Acquire, store, and disseminate scientific and technological information and popularize S&T.				√
Tanzania Electricity Supply Company (TANESCO)	Management of the operations of hydro-Electric Power (HEP) generating Dams and implementation of Environmental Flows Assessment guidelines.			√	
Marine Parks and Reserves Unit	Monitoring, control and surveillance in Marine Protected Areas (MPAs); Undertake basic research for conservation of marine biodiversity; Management of marine and coastal areas in order to promote sustainability of the use, and the recovery of areas and resources that have been over exploited and/or damaged; Ensure that communities and local resident resource users in the vicinity of the Marine Protected Areas that depend on the resources for their livelihood are involved in all phases of the planning, development and management; Ensure communities share in the benefits of operations of the Marine Protected Areas; Promote community oriented education and dissemination of information concerning conservation and sustainable use of the marine protected areas; Protect, conserve and restore the species and genetic diversity of living and non-living marine resources and ecosystem processes in marine and coastal areas; Facilitate research and to monitor resource conditions and uses within the marine protected areas.	√			√
NGOs & CBOs (local & international)	Awareness, advocacy and sensitization; lobbying for state agencies to implement policies and regulations; environmental conservation watchdog; monitoring and research; capacity building and facilitation; ecosystem conservation and restoration	√	√	√	√
Media	Awareness creation; advocacy and community sensitization; information dissemination; watchdog; monitoring and research				√

Tanzania (continued)

Agency/Institution	Description of areas of intervention	SAP components			
		A	B	C	D
Private sector	Utilization of cleaner production technologies and best practices; implementation of appropriate waste management strategies; compliance with relevant state policies, legislation and regulations focussed on the environmental protection; provision of investments and capital for implementation of environmental protection projects.		√		
Ministry of Agriculture, Livestock and Environment (Zanzibar)	Formulation and coordination of the implementation of environmental, agricultural and livestock policies, legislation and regulations; Monitoring and evaluation of the agricultural, livestock and fisheries sectors development; Formulation of appropriate guidelines.	√	√		√
Tanzania National Bureau of Statistics (TNBS)	Undertake Agriculture Surveys; Construction, Mining and Quarrying Surveys; Demographic and Health Survey; Economic Survey; Development of Geographical Information System; Industrial Production Survey; Population and Housing Census Results Dissemination; Tourism Sector Survey; Provision and analysis of data and information on various sectors of the economy.				√
Cleaner Production Centre of Tanzania (CPCT)	Coordination of cleaner production initiatives; Training on cleaner production practices; Dissemination of information on cleaner production.		√		√
Tanzania Atomic Energy Commission (TAEC)	Provision of a system for the determination of radioactivity in the environment (water, sediments, flora and fauna) including other areas such as foodstuffs/products; Advise the Government on the administration Of the International Atomic Energy Agency Safeguards and other related International Nuclear Agreements, Protocols, Conventions and Treaties		√		√

Directory of relevant ongoing and planned development programmes and projects

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Implementation Support Programme for the Tanzania Environmental Management Act - (EMAISP)	DoE, NEMC	√	√	√	√	Ongoing (2007 – 2012)	DANIDA Government, other donors.
Marine and Coastal Environment Management Project (MACEMP)	Ministry of Livestock Development & Fisheries	√			√	Ongoing (2005 – 2011)	World Bank, GEF
Road sector environmental management programmes	Ministry of Infrastructure Development	√			√	2003 - ongoing	DANIDA
Tanzania Coastal Management Partnership – TCMP	NEMC	√	√	√	√	Ongoing	USAID, Coastal Resources Centre (CRC)
Eastern African Marine Ecoregion Programme (EAME)	WWF, NEMC	√	√			Ongoing (2004 – 2024)	WWF

Tanzania (continued)

Name of Programme/project	Executing organization	Link to thematic area(s) of the SAP				Status and duration	Financial source
		A	B	C	D		
Eastern Arc Mountain Conservation Endowment Fund (EAMCEF)	WWF			√		Ongoing (continuous)	WWF, WB, Government, GEF, UNDP
Dar es Salaam Water Supply And Sanitation Project	Dar es Salaam Water and Sanitation Authority (DAWASA)		√	√		Ongoing (2003 -2010)	WB/IDA
Water Sector Development Programme	Ministry of Water & Irrigation			√	√	Ongoing (2007 – 2012)	WB
The Waste Stabilization Pond (WSP) & Constructed Wetland Research Programme	University of Dar es Salaam		√			Ongoing (continuous)	DANIDA, ENRECA, SIDA-SAREC, UDSM, UNEP
Tanzania Forest Conservation and Management Project (TFCMP)	Ministry of Natural Resources and Tourism	√				2002 – 2009 (to be renewed)	WB, GEF, Government

Annex 9: Overview of Partner Programmes and Projects Relevant to the SAP

DISCLAIMER:

The lists of ongoing projects and programmes of partner organisations presented below have been established based on voluntary contributions by partners. While these lists may not be exhaustive, they do reflect the very substantial amount of effort that is taking place in the WIO region to address some of the challenges related to the management of coastal and marine ecosystems of the region.

Non-Governmental Organisations

Organisation	Name of project/programme	Status	SAP Thematic Areas			
Birdlife	Livelihoods and Sustainable use	Ongoing	√			
	Marine IBA identification – seabird programme	Ongoing	√			
	Wetlands management	On Hold	√			
	Development of collaborative forest management	Closing '09	√			
	Awareness and advocacy	Completed	√			√
	IBA Monitoring	Ongoing/continuous	√			
	WildLife Clubs of Africa	Ongoing/continuous	√			
CORDIO	Coral reef surveys and assessments (long term monitoring)	Ongoing/continuous	√			
	Implementing resilience principles in the management of coral reefs impacted by climate change	Closing '09	√			√
	Assessment of bleaching resistance and resilience in coral reefs	Closing '09	√			√
	Genetic connectivity and its implications for the design and management of marine protected areas in the East African Ecoregion	Closing '09	√			√
	Is there a core region (coral triangle) in the WIO?	Ongoing-'11	√			√
	Incorporating reef fish spawning aggregations into optimal designs for no-take fishery reserves: Improving fisheries management and coral reef resilience in the WIO	Ongoing-'11	√			
	Migrant fishers and fishing in the Western Indian Ocean: Socio-economic dynamics and implications for management	Ongoing	√			√
	Sustainable fisheries: testing methods for improving livelihoods in coastal communities in northern Kenya	Ongoing	√			√
	SocioEconomic Monitoring programme of the Western Indian Ocean	Ongoing/continuous	√			√
	Capacity building for co-management in Kenya - Beach Management Units - training and critical issues studies	Closing '09	√			√
	Empowering Self Help Groups in Kenya and India through ICT for better education and alternative livelihood opportunities	Closing '09				√
	Environmental Education - Schools to the Sea programme	Ongoing/continuous				√
	Environmental Education - Teacher Training programme in using EE in the classroom	Ongoing/continuous				√

Non-Governmental Organisations (continued)

Organisation	Name of project/programme	Status	SAP Thematic Areas			
EAWLS	Contributing towards sustainable and Coastal Wetlands management – Vanga/Jimbo – Kenya	Closing '09	√			
	Creating an enabling environment for wise use and management of wetland biodiversity through wetland policy advocacy	Ongoing-'10	√	√	√	√
	Sustainable conservation and management of Kenya's Marine and coastal resources (Shimoni, Majoreni and Vanga)	Ongoing-'12	√			
	Protecting the rights of minority groups conserving the wetlands of Tana Delta, Coast Province, Kenya	Closing '09	√			
	Community managed marine conservation area, Kuruwitu-Kilifi- Kenya	Ongoing/continuous	√			
	East African Marine Ecoregion National Steering Committee - Kenya	Ongoing/continuous	√			√
	Water governance and sanitation	Ongoing/continuous	√	√	√	√
IUCN	Building capacity and strengthening policies for coastal communities to manage their marine resources in East Africa	Closing '09	√			√
	Entrenching livelihoods enhancement and diversification in the development and implementation of a new MPA in Tanga Region, Tanzania, and supporting associated policy	Ongoing-'10	√			√
	Mangroves for the Future Western Indian Ocean Component	Ongoing-'12	√			√
	Participatory planning for the establishment of an MPA in Tanga	Ongoing-'10	√			√
	Enabling management of Somaliland's first MPA	Ongoing-'12	√			√
	Conservation of Aquatic Eco-Systems in Tanzania's Northern Seascape: The COAST/PWANI Project	Ongoing-'13	√			√
	Situational analyses for the Wami and Ruvu river basins	Ongoing	√	√	√	√
	Pangani River Basin Management Project – EU component	Closing '09			√	√
	The Pangani River Basin Management Project (PRBMP): Second Phase	Ongoing-'10			√	√
	Pangani River Basin Management Project – UNDP – GEF component	Ongoing-'10			√	√
Global Water Initiative/Running Dry	Ongoing-'11				√	
WCS	Coral Reef Monitoring (biophysical and socio-economic)	Ongoing/continuous	√			√
	Alternative livelihoods	Ongoing/continuous	√			√
	Anthropogenic impacts on coral reefs	Ongoing/continuous	√			√
	Climate change and coral reefs	Ongoing/continuous	√			√
	MPAs, their impacts, and effectiveness	Ongoing/continuous	√			√
	Reefs and people	Ongoing/continuous	√			√
	Ocean giants	Ongoing/continuous	√			
	Valuation of coastal habitats	Ongoing/continuous	√			√
	CBOs and coastal governance	Ongoing/continuous	√			√
Wetlands International	African Waterbird Census	Ongoing/continuous	√			√
	Wings Over Wetlands	Ongoing/continuous	√			√
	Wetlands & Livelihoods Programme	Ongoing/continuous	√			√
	Biofuels & Wetlands	Ongoing/continuous	√			

Non-Governmental Organisations (continued)

Organisation	Name of project/programme	Status	SAP Thematic Areas			
WIOMSA	Support to Western Indian Ocean Marine Association (WIOMSA)	Ongoing-'12	√			√
	The Sustainable Coastal Communities and Ecosystems (SUCCESS)	Ongoing-'10	√			√
	Pearl farming and jewelry making in Zanzibar: Empowering women economically	Ongoing-'10	√			
	Sustainable Milkfish Farming: Cost-Effective Methods to Increase Food Supply, Incomes and Employment in Mtwara/Lindi, Tanga and Pemba Coastal Communities	Ongoing-'10	√			
	Sea cucumbers, a poorly understood but important coastal resource: national and regional analyses to improve management	Closing '09	√			√
	The Shoreline Changes in Tanzania and Kenya, their socio-economic impacts and mitigation options	Closing '09	√			
	An economic valuation of coastal and marine ecosystem services in the WIO to identify specific beneficiaries, and the role of marine protected areas in ensuring that these services are sustained	Ongoing-'10	√			√
	Seagrass and Sea Urchins Interactions - Overgrazing and resource use in the WIO region	Ongoing-'10	√			√
	Developing management practices for ecosystem resilience: Functional group analysis of the degraded Grand Récif deToliara, Madagascar	Ongoing-'10	√			
	Preparing for Climate Change through the Assessment of Biodiversity and Management Preferences across a Scale of Environmental Variation in the Western Indian Ocean	Ongoing-'10	√			√
	The effectiveness of community-based organizations in managing coral reefs in the Western Indian Ocean	Ongoing-'10	√			√
	The Relationship between Community-Based Organizations and Effective Management of Coastal and Marine Resources in the WIO region	Ongoing-'10	√			
	Analysis of Benefits from Coastal Resources and Mechanisms for Equitable Benefit Sharing in Selected WIO Countries	Ongoing	√			√
	Global Markets and the Livelihoods of Coastal Communities in the WIO Countries: Implications for Sustainable Coastal Management	Ongoing-'10	√			√
	Migrant fishers and fishing in the Western Indian Ocean: Socio-economic dynamics and implications for management	Ongoing-'10	√			
	Small-scale community-based, grow-out aquacultures of mud crabs <i>Scylla serrata</i> as a sustainable livelihood in East Africa	Ongoing-'10	√			
Is there a Western Indian Ocean "coral triangle"?	Ongoing-'10	√			√	

Non-Governmental Organisations (continued)

Organisation	Name of project/programme	Status	SAP Thematic Areas			
WWF EAME	Marine and Coastal Forest Ecoregional Support Programmes	Ongoing-'10	✓			✓
	Coastal Forest Protected Area System in Kenya	Ongoing-'11	✓			
	Sustainable livelihoods in Kwale Landscape.	Ongoing-'10	✓			
	Ecoregion Action Programmes (Eastern Arc)	Ongoing-'10	✓			✓
	CSO capacity building project in Tanzania	Ongoing-'12	✓			✓
	Payment for Environmental Services (PES)	Ongoing-'10	✓			
	Oil for Development Project (Ke, Tz, Mz)	Ongoing-'12	✓			✓
	WWF Sustainable Fisheries Programme for Ke, Tz and Mz	Ongoing-'10	✓			✓
	Marine Fisheries Certification Programme	Ongoing-'10	✓			✓
	Lower Zambezi River Conservation Programme	Ongoing-'10	✓		✓	✓
	Climate Change Vulnerability Assessment and Development of Adaptation Strategies for Mangroves and Coral reef	Ongoing-'10	✓			
	SCaFCom (Tanzania) and RaCCom (Kenya) Projects	Ongoing-'10	✓			
	Ruaha River Catchments Project	Ongoing-'10	✓		✓	✓
	Kwale Landscape Restoration Project	Ongoing-'10	✓			
	Udzungwa Mountain Forest Conservation Project	Ongoing-'10	✓			
	Eastern Arc Mountain Conservation endowment Fund (EAMCEF)	Ongoing/continuous	✓			✓
	Sustainable financing of MPAs in Mozambique	Ongoing/continuous	✓			✓
	RUMAKI Seascape Programme	Ongoing/continuous	✓			
	Primeiras and Segundas Conservation Area	Ongoing/continuous	✓			
	Quirimbas MPA (Mozambique)	Ongoing/continuous	✓			
Mnazi Bay MPA (Tanzania)	Ongoing/continuous	✓				
Mafia Island MPA (Tanzania)	Ongoing-'10	✓				
Kiunga MPA (Kenya)	Ongoing/continuous	✓				
WWF MWIOPO	Marine protected areas network of the Indian Ocean Commission countries	Closing '09	✓			

International Organisations

Organisation	Name of project/programme	Status	SAP Thematic Areas			
			A	B	C	D
UNEP	Nairobi Convention Clearinghouse Mechanism	Ongoing/continuous	√			√
	Addressing Land-based Activities in the Western Indian Ocean (WIO-LaB)	Ongoing-'10	√	√	√	√
	Cleaner Production Technology Centres	Ongoing/continuous		√		
	Global Programme of Action for the Protection of the Marine and Coastal Environment from Land-based Sources and Activities (GPA)	Ongoing/continuous	√	√	√	√
	Improving Municipal Wastewater Management in Coastal Cities in ACP Countries	Closing-'09		√		
UNDP	Agulhas and Somali Current Large Marine Ecosystems Project (ASCLME)	Ongoing-'12	√			√
World Bank	South Western Indian Ocean Fisheries Project		√			√
	WIOFISH	Ongoing/continuous	√			√
	Marine and Coastal Environmental management Project (MACEMP)	Ongoing-'11	√	√		√
	Western Indian Ocean Marine Highway Development and Coastal and Marine Contamination Prevention Project	Ongoing-'11	√	√		√
UNIDO	Coastal Tourism	Ongoing-2013	√	√		√
	Cleaner Production Technology Centers	Ongoing/continuous		√		
IOC-UNESCO	Ocean Data and Information Network for Africa (ODINAFRICA)	Ongoing/continuous				√
	Improving Emergency Response to Ocean-based Extreme Events through Coastal Mapping Capacity Building in the Indian Ocean (COAST-MAP-IO)	Ongoing	√			√
	Capacity Development Programme in the Western Indian Ocean Region	Ongoing-'12	√	√		√
	Climate Variability and Predictability (CLIVAR)		√		√	
	Global Ocean Observation System (GOOS)	Ongoing/continuous	√			√

Inter-Governmental Organisations

Organisation	Name of project/programme	Status	SAP Thematic Areas			
			A	B	C	D
Indian Ocean Commission (IOC)	Regional Programme for the Sustainable Management of the Coastal Zones of the Indian Ocean Countries (ReCoMaP)	Ongoing-'11	√	√		√
	Marine Protected Areas Network of the Indian Ocean Commission	Ongoing/continuous	√			
	African Monitoring of Environment for Sustainable Development (AMESD)	Ongoing/continuous	√	√	√	√
	WIO Cetacean Conservation and Research	Ongoing/continuous	√			
	Climate Change Adaptation in the WIO States	Ongoing-'11	√		√	√
	Western Indian Ocean Marine Highway Development and Coastal and Marine Contamination Prevention Project	Ongoing-'11	√	√		√
	Environmental Education Programme (ARPEGE)	Ongoing/continuous				√

Others

Organisation	Name of project/programme	Status	SAP Thematic Areas			
			A	B	C	D
European Union	Transboundary Network of Marine Protected Areas for Integrated Conservation and Sustainable Development (TRANSMAP)	Closing '09	√			√
Royal Netherlands Institute for Sea Research (NIOZ)	Long-term Ocean Climate Observations (LOCO)	Ongoing-'12	√			√
Southern African Institute for Aquatic Biodiversity (SAIAB)	African Coelacanth Ecosystem Programme (ACEP)	Ongoing/continuous	√			√

