



**United Nations  
Environment Programme**



**Global Environment  
Facility**

# **Framework for a Strategic Action Programme for Addressing Land-based Sources and Activities in the Western Indian Ocean Region**

**DRAFT FOR DISCUSSION**

26 September 2007

---

## Table of contents

<b>1. Context</b>	<b>4</b>
1.1 <i>The setting</i>	4
1.2 <i>Global and regional significance of the WIO region</i>	5
1.3 <i>A call for action</i>	6
1.4 <i>Purpose of the TDA and SAP and relationship to the Nairobi Convention and NEPAD</i>	7
1.5 <i>Boundaries and conditions of the TDA and SAP</i>	7
<b>2. Status of TDA development</b>	<b>7</b>
2.1 <i>Status of TDA development</i>	7
2.2 <i>Key transboundary problems identified in the TDA</i>	10
<b>3. Towards a SAP for Addressing Land-based Sources and Activities in the WIO Region</b>	<b>12</b>
3.1 <i>Proposed workplan for SAP development</i>	12
3.2 <i>Main elements for SAP development</i>	13
<b>Annexes</b>	
Annex 1	Schematic presentation of the TDA process
Annex 2	Main contributors to the TDA
Annex 3	Schematic presentation of the SAP process
Annex 4	Main elements for SAP development

## Definitions

### Transboundary Diagnostic Analysis (TDA)

Within the context of GEF, a TDA may be defined as a scientific and technical fact-finding analysis used to scale the relative importance of sources, causes and impacts of transboundary waters problems. Among the key principles of an effective TDA are:

- The TDA should be an objective assessment and not a negotiated document.
- The analysis should be carried out in a cross sectoral manner, focusing on transboundary problems without ignoring national concerns and priorities.
- In order to make the analysis more effective and sustainable, the TDA should include a detailed ‘governance analysis’ which considers the local institutional, legal and policy environment.
- The TDA should be developed in consultation with all relevant stakeholders, and the stakeholders should be involved throughout the subsequent steps in the TDA process.

### Strategic Action programme (SAP)

A SAP may be defined as a negotiated policy document which should identify policy, legal and institutional reforms and investments needed to address the priority transboundary problems. The SAP should embed the following key principles:

- Endorsed at the highest level, it should establish clear priorities for action to resolve the priority transboundary problems which were identified in the TDA. Within this context, the TDA identifies the priority problems, the underlying causes, and the root causes of the problems, while the SAP outlines the actual actions needed to resolve the priority problems.
- The preparation of a SAP is a cooperative process among the countries of a given region.
- The SAP sets out specific actions for each country that can be adopted nationally (preferably through National Action Programmes) but harmonised with the other concerned countries.

## 1. Context

### 1.1 The setting

The Western Indian Ocean (WIO) region extends from Latitude 12<sup>0</sup> to 30<sup>0</sup> S and Longitude 30<sup>0</sup> to 80<sup>0</sup> E. The region represents a large array of marine and coastal settings, ranging from small island states and large countries with extensive coastline and tropical and subtropical climates. The continental coastal states are Somalia, Kenya, Tanzania, Mozambique and South Africa and the island States are Mauritius, Comoros, Reunion (France), Seychelles, and Madagascar (see Figure 1).



- Figure 1: Map of the WIO region

The WIO countries share common biological resources and climatic features but also many historical, cultural and economic ties. Despite these commonalities, the countries in the region are at different stages of both political and economic development, reflected among others in the fact that individual economic indicators for countries in the region range from those with a per capita gross national product of over \$ 7,000 per annum (Seychelles and Reunion), to those with less than \$1,000 per capita (Comoros, Tanzania, and Madagascar).

Some 40 million people inhabit the coastal areas of the region and so overall population density of the region is not remarkably high. However, while large areas are almost unpopulated, such as in Somalia, certain areas are indeed very densely populated. Urbanization pressures are most marked in the mainland states, where main urban centres

such as Mombasa (Kenya), Dar es Salaam (Tanzania), Maputo (Mozambique) and Durban (South Africa) have arisen.

The same coastal settlements are centres of economic activities in the WIO region, sheltering internationally important ports and harbours that handle most of the region's incoming and outward-bound ship-borne cargo. Also, in particular the mainland countries are rich in mineral deposits; although most of the mining activities are taking place inland, coastal mining is significant in South Africa, Kenya, Mozambique and Tanzania (SEACAM, 2003).

During the last three decades, tourism industry played a significant role in the economic development of most of the countries of the WIO region. Tourism expansion has been actively pursued by national governments because of its positive effects on national income, the level of employment and diversification of the economic structure. Much of the tourism activities take place in coastal areas.

## **1.2 Global and regional significance of the WIO region**

The marine and coastal environment in the Western Indian Ocean (WIO) is recognized for its high ecological and economic value. The region is considered a distinct subdivision of the tropic Indo-West Pacific, the world's largest marine biogeographic province (Sheppard, 1987; 2000). The region contributes to a high level of biodiversity, including more than 1500 species of fish, 200 species, of coral, 10 species of mangroves, 12 species of seagrass, 1000 species of marine algae, several hundred sponge species, 3000 species of molluscs, 300 species of crabs and 250 echinoderms (Richmond, 2001). The WIO region is also a region of relatively high diversity in both corals (Veron, 1995) and reef fish (McAllister et al., 1994), which is attributed to the occurrence of a large number of species endemic to the region; in terms of the 52 tropical inshore fish families, endemism reaches 22% compared to, for example, the Red Sea (13%) and Eastern Indian Ocean (6%). Moreover, five of the world's seven turtle species nest on beaches of the region and more than 20 cetacean species are found here.

The biological richness and natural beauties of the WIO region, including beaches, coral reefs, flora and fauna are the basis for the regions growing tourism sector, attracting visitors from over the world. Its marine waters, and in particular its continental shelves, coastal margins, lagoons and estuaries are furthermore important fishing grounds. The productive and diverse coastal habitats of the WIO, such as mangroves, sea-grass meadows and coral reefs provide coastal protection, food, shelter and safety for fishes, crustaceans, molluscs and other organisms of ecological and commercial value.

Although the WIO region is still one of the least ecologically disturbed oceans relative to other region, it is in increasing jeopardy. In the recent past, coastal and marine environment have started showing signs of degradation, attributed to both natural factors (coral bleaching) (Lindén & Sporrang, 1999) and a variety of human activities, acting at different intensities and in various combinations. The coastal zone of the WIO region is the site of most major cities, harbours, industries and other socio-economic infrastructure, which increasingly affect the environment: Pollution from domestic, industrial and agricultural sources causes the degradation of water and sediment quality, resulting in loss of biological diversity, human health problems and a reduction in fish stocks; Human activities also lead to the destruction of critical habitats such as mangrove forests, sea grass beds and coral reefs, and cause physical alteration of the coastal zone (e.g. coastal erosion).

### 1.3 A call for action

Most countries in the region currently lack both the capacity and regulatory framework to adequately manage the before-mentioned threats. Moreover, it is generally realized that the protection, management and development of the shared ecosystems of the WIO would require a regional approach; the impacts of the above-mentioned sources and activities do not respect borders, since the mobile components of the WIO do not respect geopolitical boundaries, and over-exploitation, habitat destruction or degeneration in water quality in one part of the WIO may adversely impact on one or more neighbouring countries.

Recognizing this fact, the First Meeting of the Contracting Parties to the Convention for the Protection, Management and Development of the Marine and Coastal Environment in the Eastern African Region (Nairobi Convention) in March 1997 called for concerted action to address the increasing impact of human activities on the WIO coastal and marine environment. Based upon this call, UNEP, as the host for the Secretariat of the Nairobi Convention, took the lead in developing a preliminary Transboundary Diagnostic Analysis (TDA) and Strategic Action Plan (SAP) for the WIO region, facilitated through a Global Environment Facility (GEF) Project Development Facility Block B (PDF-B) Grant.

The preliminary TDA and SAP, which were finalized in 2002, defined a number of priority areas for intervention, as well as identified gaps in information to be filled in order to make better founded management decisions, thereby building strongly upon others on the outcome of the GEF MSP Project “Development and Protection of the Coastal and Marine Environment in Sub-Saharan Africa” (often referred to as “The African Process”). Subsequently, a number of regional projects were developed within the GEF context in order to undertake further data collection and analysis and to define and demonstrate appropriate strategies to address priority problems in the WIO region. These projects concern:

1. The UNEP implemented project Addressing Land-based Activities in the Western Indian Ocean (WIO-LaB), whose mandate preliminary is focused on the issues related to land based sources of pollution and other activities that are impacting on the marine and coastal environment;
2. The UNDP implemented Agulhas and Somali Current Large Marine Ecosystems (ASCLMEs) project, whose scope is focused on issues related to productivity, artisanal (subsistence) fisheries and to a certain extent marine pollution (heavy metals and POPs);
3. The World Bank implemented South Western Indian Ocean Fisheries Project (SWIOFP), which concentrates on the issue related to deepwater (offshore) fisheries.

The Project first launched was the Project “Addressing Land-based Activities in the Western Indian Ocean (WIO-LaB)”. The project was officially launched in Madagascar in July 2004 during the Fourth meeting of the Contracting Parties to the Nairobi Convention. The project is a direct follow-on to the 2002 World Summit for Sustainable Development (WSSD) and the related Johannesburg Plan of Implementation, which calls for “advanced implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA)”.

One of the key outputs expected of the WIO-LaB Project is a TDA and SAP focussing on land-based sources and activities. The WIO-LaB TDA/SAP process will be closely coordinated with the ASCLMEs and SWIOFP projects, which started of during the course of 2007, and its results will eventually be integrated in the overall TDA and SAP for the Agulhas and Somali Current LMEs.

## **1.4 Purpose of the TDA and SAP and relationship to the Nairobi Convention and NEPAD**

The WIO-LaB Project forms an integral part of the work programme of the Nairobi Convention. It is intended that the TDA and SAP resulting from the Project will provide the basis for the further implementation of the Nairobi Convention in the WIO region, as well as other regional and international Conventions and policy frameworks such as the Millennium Development Goals; the regional and global priorities identified under Agenda 21 (Chapter 17); the Convention on Biological Diversity; the Programme of Action for the Sustainable Development of Small Island Developing States (Barbados, 1994); the Pan-African Conference on Sustainable Integrated Coastal Management (Mozambique, 1998); the Arusha Resolution on Integrated Coastal Zone Management (ICZM) in Eastern Africa including the Island States (April, 1993); the Seychelles Conference Statement on ICZM (October, 1996); and the Marine Turtle Conservation and Action Plan for the WIO region.

The TDA and SAP are 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), the Nairobi Convention functioning as one of its main implementation mechanisms in the WIO region.

## **1.5 Boundaries and conditions of the TDA and SAP**

In terms of geographical scope, the TDA and SAP cover the shared waters of the WIO, including river basins within its catchment and in particular the eight WIO-LaB project countries, namely: Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa, and Tanzania. Although not officially part of the WIO-LaB Project, information and data from Reunion (France) and Somalia have been included in the analysis as far as possible.

In terms of thematic scope, the TDA and SAP are confined to issues related to land-based sources and activities affecting the coastal and marine environment.

## **2. Status of TDA development**

### **2.1 Status of TDA development**

Preparation of the TDA is currently in an advance stage. A schematic presentation of the process being followed is presented in

---

Annex 1. The five main steps in the TDA development process may be distinguished as:

1. Establishment of the TDA Drafting Team
2. Initial identification of transboundary problems
3. Fact finding (Data collection and analysis)
4. Causal Chain and Governance Analysis
5. Review **and validation**

The status of each of these steps is further described in the following sections.

#### **Establishment of the TDA Drafting Team**

The TDA development was led by a regional TDA Drafting Team consisting of scientific and institutional experts from the WIO Region, covering the following fields of expertise:

1. Marine Pollution
2. Coastal Habitats
3. River-coast Interactions
4. Policy, Legal and Institutional Aspects
5. Socio-economics

The function of Coordinator of this Team is held by the WIO-LaB Project Management Unit, in order to ensure close interaction with the other parts of the Project workplan. The other members of the TDA Drafting Team are listed in Annex 2.

#### **Initial identification of transboundary problems**

Based upon the “major perceived issues and problems” identified as part of the Preliminary TDA (2002) and the African Process, and using available documentation and seeking expert advice where necessary, the TDA Drafting Team embarked upon an initial review of transboundary problems. The findings of this exercise enabled the team to establish a clear workplan with division of responsibilities for each of the team members, as well as to establish activities and mechanisms for consultation with national and regional stakeholder groups on the issues.

As a next step in the process, the TDA Drafting Team facilitated a regional TDA/SAP workshop (Nairobi, Kenya, 19-22 April 2007), in order to:

- identify and validate the perceived priority transboundary problems;
- undertake an initial root-cause analysis of the identified transboundary problems;
- identify data sources and gaps related to each of the transboundary problems and establish mechanisms to fill such gaps;
- undertake an initial analysis of governance and socio-economic aspects related to the identified transboundary problems;
- establish criteria for the prioritization of transboundary problems and undertake a preliminary prioritization of the identified problems based upon expert opinion; and
- identify key areas for intervention/solutions to the identified transboundary problems.

The first TDA/SAP workshop gathered over 40 experts from the various technical Task Forces established by the WIO-LaB Project, as well as representatives of key academic and research institutions in the region and other regional organizations, including NGOs, active in marine ecosystem conservation in the WIO region.

#### **Fact finding (Data collection and analysis)**

As a next step, the Team embarked upon a detailed analysis of the perceived priority transboundary problems, based upon available scientific and technical data and information.

Much of such data was collected as part of thematic assessment studies undertaken as part of the WIO-LaB Project, or through other initiatives<sup>1</sup>. The results of these detailed studies feature as the main supporting documents of this TDA and concern in particular:

1. The State of Pollution in the WIO Region (Nairobi Convention/WIO-LaB, 2007)
2. The Status of Municipal Wastewater (MWW) Management in the WIO Region (Nairobi Convention/WIO-LaB, 2007)
3. Regional Overview & Assessment of Marine Litter Related Activities in the WIO Region (UNEP/Regional Seas Programme, 2007)
4. Regional Overview of Physical Alteration and Destruction of Habitats in the WIO Region (Nairobi Convention, 2004)
5. Regional Overview of River-coast Interactions in the WIO Region (Nairobi Convention/WIO-LaB, 2007)
6. Regional Review of Policy, Legal and Institutional Frameworks for Addressing Land-based Sources and Activities in the WIO Region (Nairobi Convention/WIO-LaB, 2007)
7. Regional Review of the Status of Ratification of International Conventions related to Land-based Sources and Activities Management in the WIO Region (Nairobi Convention/WIO-LaB, 2007)

### **Causal Chain and Governance Analysis**

Based upon these detailed studies, and seeking specific expert advice and consulting additional documentation where needed, the TDA Drafting Team undertook a comprehensive causal-chain analysis of the priority transboundary problems.

Furthermore, detailed consultations on the various topics were held within the context of the WIO-LaB Technical Task Forces, more in particular:

1. The third meeting of the Regional Legal and Technical Review Task Force (Stone Town, Zanzibar, 31 January – 2 February 2007);
2. The second meeting of the regional MWW Task Force (Toliara, Madagascar, 3-5 June 2007);
3. The second meeting of the regional PADH Task Force (Toliara, Madagascar, 3-5 June 2007);
4. The third meeting of the regional Working Group on Water, Sediment and Biota Quality (Maputo, Mozambique, 19-20 July 2007);

The final step in the analysis involved a detailed governance analysis. Within the context of the WIO-LaB project, such governance analysis was undertaken through the regional legal, policy and institutional review process undertaken by the Legal and Technical Review Task Force established by the WIO-LaB Project.

### **Review and validation of the TDA**

An important step in the development of the TDA involves validation of the results by respected experts and institutions in the region. The principal mechanism for validation of the WIO-LaB TDA report is the Scientific and Technical Advisory Committee (STAC) established by the project. The STAC was constituted by selected heads of academic and research institutions (or their delegates) as represented in the Forum for Academic and Research Institutions in the WIO-Region (FARI), as well as delegated experts of key organizations active in the conservation of the WIO marine and coastal ecosystems.

---

<sup>1</sup> Such as the African Process, the Global International Waters Assessment (GIWA) programme, the Eastern African Marine Systems (EAMS) programme, GESAMP, TransMap and various reports prepared by the UNEP Nairobi Convention Secretariat, the UNEP Global programme of Action for the Protection of the Marine Environment from land-based Activities (UNEP/GPA).

A first meeting of the STAC has been scheduled for 27 October 2007 and will review the existing draft TDA. Based upon the comments received from the STAC, the draft TDA will be updated and subsequently circulated for final review and comments by the STAC. Final endorsement of the TDA would be provided by the WIO-LaB Project Steering Committee during its third regular session in Q1 2008.

## **2.2 Key transboundary problems identified in the TDA**

The identification of key transboundary problems is primarily based on the results of the regional TDA/SAP workshop held in April 2007 in Nairobi, Kenya. The individual problem areas were further defined in more detail by the TDA Drafting Team in consultation with the various Task Forces and Working Groups as described in section 2.1. The main transboundary problem areas related to land-based sources and activities as identified through this process are the following:

1. Pollution from land-based sources and consequent degeneration of water quality;
2. Physical alteration and destruction of habitats; and
3. Alteration in fresh water flows and sediment loads from rivers.

A short description of each of these problem areas is presented below.

### **Pollution from land-based sources and consequent degeneration of water quality**

A significant amount of pollution loads to the sea emanate from land-based activities such as municipal and industrial discharges, contaminated surface and sub-surface run-off, agricultural returned flows and atmospheric emissions. Pollutant loads from land-based activities are typically disposed of in the coastal zone where it affects some of the most productive areas of the 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:

- Microbiological contamination
- Suspended solids
- Chemical pollution
- Marine litter
- Eutrophication (or nutrient over-enrichment).

### **Physical alteration and destruction of habitats**

One of the priority transboundary problems for the WIO region is the transformations and loss of habitats. These transformations are both physical, as in the dredging of waterways, deforestation, diversion of fresh water flows, and construction of ports and jetties, tourist resorts, and housing developments; and biological, as in over-exploitation of living resources such as coastal forests, mangroves, sea grass beds and coral reefs. In addition, global climate change, which is a crosscutting concern attributed to human activities has led to abnormal rainfall patterns, droughts, floods, and sea level changes. Also, land reclamation for agriculture, development as well as extensive upland deforestation are acute problems in the major river catchments in the region as witnessed in Tana, Sabaki, Rufiji and Zambezi. The cumulative impacts of these problems have been significant physical and ecological changes in the region and an overall decline in many ecosystem services.

The physical alteration and destruction of habitats is not purely an ecological issue but also, an economic as well as social issue. Major economic sectors, particularly fisheries and tourism are directly dependent on the biological resources provided by the ocean. Tourism is very important economic sector in terms of providing employment as well as its contribution

to foreign exchange earnings for the countries such as Kenya, Mozambique, Mauritius and Seychelles. More importantly, the sustainability of the tourism industry itself depends on a healthy environment.

**Alteration in fresh water flows and sediment loads from rivers.**

One of the key areas of concern for the WIO region relates to the interaction between river basins and the coastal and marine environment. The seriousness of this concern is furthermore in the LOICZ Global Change Assessments and Synthesis of River Catchment – Coastal Sea Interaction and Human Dimension of African Basins (LOICZ Reports and Studies No. 25, 2002). The TDA distinguishes two broad categories of transboundary problems:

- a. Alteration of river flows: The alteration of the natural river flow is a factor found in all major river basins in the WIO region. Flow alterations can occur in different forms, (i) overall reduced flow due to consumptive uses of water, (ii) increase of river surface area along sections of the river due to impoundment, (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) to name the most common ones. These are coupled with the large-scale realities and uncertainties brought about as a consequence of climatic change, with some basins predicted to receive more rainfall and others less. The alteration of river flows can lead to a wide range of impacts, the most common of them are:
  - Increased water pollution levels due to reduced pollution absorption capacity and reduced self purification capacity of rivers.
  - Increased salinisation of agricultural land (flood plain agriculture) due to lack of flooding
  - Increased salt water intrusion in estuary and downstream end of river
  - Modification of ecosystems (riverine and estuarine),
  - Loss of wetlands due to lack of flooding and erosion
  - Changes in fish habitats, nurseries and spawning areas
  - Changes in bird habitats
  - Reduction of shrimp size and catch due to effect on shrimp larvae
  - Possible reduction of available natural living resources (fauna and flora)
  - Reduced groundwater recharge
  - Loss of biodiversity
  - Vegetation changes along estuaries
  
- b. Alteration of sediment loads: A number of factors, such as changing climatic conditions, (bad) land use practices, dam construction etc. have lead to changes in the sediment load carried by the rivers in the WIO region. The alteration of sediment loads broadly manifests itself in three ways – some rivers experience increased sediment loads whereas in other rivers sediment loads are strongly reduced. In some rivers both phenomena can be observed; increased sediment loads due to erosion in upstream areas and reduced sediment transport downstream of dams following the trapping of the sediments behind the dam wall. Some of the impacts known to be caused by increased sediment loads are:
  - Changes to mangrove habitats
  - Vegetation changes along estuaries
  - Changes in fish habitats, nurseries and spawning areas
  - Changes in bird habitats
  - Reduction of shrimp due to affect on shrimp larvae
  - Reduction of areas for livestock and agriculture

Impacts known to be caused by reduced sediment loads are:

- Changes to mangrove habitat
- Vegetation changes along estuaries
- Changes in fish habitats, nurseries and spawning areas
- Changes in bird habitats
- Reduction of shrimp due to affect on shrimp larvae
- Possibility of freshwater marshes being replaced by saline grassland

### **3. Towards a SAP for Addressing Land-based Sources and Activities in the WIO Region**

#### **3.1 Proposed workplan for SAP development**

A schematic presentation of the SAP process is presented in Annex 3. The proposed process of SAP development involves four main steps:

1. **Establishment of a SAP Drafting Team**
2. Bridging the TDA and SAP
3. Detailed examination and definition of strategic actions
4. National and regional stakeholder consultations
5. Finalisation of the **SAP**

Each of these steps is further defined in the following sections.

#### **Establishment of a SAP Drafting Team**

A SAP Drafting Team will be constituted to lead the process of SAP development, similar to the approach applied for the TDA Drafting Team. The specific Terms of References and the desired constitution for such SAP Drafting Team will be established during the TDA development process.

#### **Bridging the TDA and SAP**

As a first step in the SAP development process the SAP Drafting Team will link the findings of the TDA to specific (long-term) strategic objectives, and therewith provide a basis for detailed analysis of priority areas for intervention and governance options to address specific problems. The two elements of this bridging exercise are:

1. Development of a long-term ‘vision’, representing a clear representation of the characteristics for the future environment.
2. Development of candidate Environmental Quality Objectives (EQOs), representing, for each of the priority problems identified in the TDA, a regionally acceptable environmental status that would be a sign of a solution for a specific problem.

The proposed long-term vision and candidate EQOs will be further refined and endorsed during a second TDA/SAP workshop, where also the results of the TDA process will be discussed. The same workshop will furthermore define potential actions at both the short- to medium and long term.

#### **Detailed examination and definition of strategic actions**

Step 2 in the SAP process involves the elaboration and detailed examination of possible scenarios and strategic options. This analysis will involve:

- Assessment of technical feasibility of options.
- Economic analysis of options.
- Assessment of political and social acceptability (and desirability) of options.

The detailed examination process will result in clear targets and indicators for the various areas of intervention. The examination process will be led by the TDA Drafting Team in consultation with the various regional Task Forces and Working Groups established under the WIO-LaB Project.

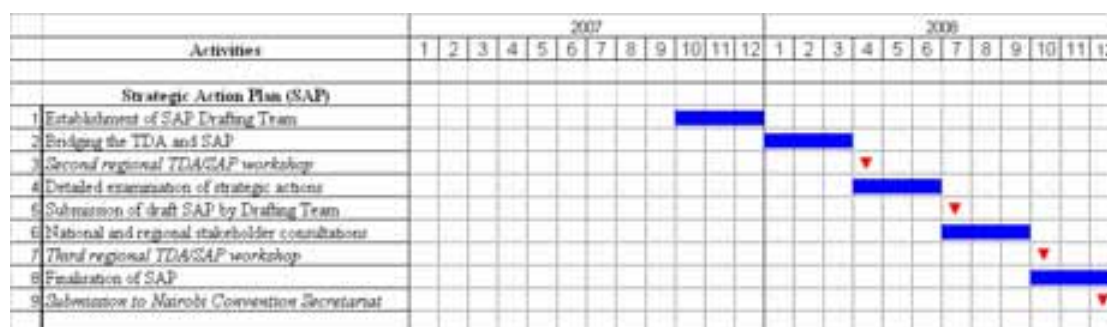
### National and regional stakeholder consultations

Following the definition and examination of the various scenarios and strategic options, consultations will be organised at both the national and regional levels in order to get a stakeholder perspective on the proposed scenarios and options. At the national level, the principal mechanisms to be applied for this purpose are the National (Inter-Ministerial) Project Coordination Committees (or similar existing national mechanisms) established under the WIO-LaB Project. At the regional level, the results of the detailed examination will be presented to the third TDA/SAP workshop, for advice and recommendations.

### Finalisation of the SAP

The final step in the SAP development process involves incorporating the feedback received from the political process in a final SAP, with prioritized actions and areas for intervention, as well as clear targets and monitoring and evaluation indicators. The final SAP will be presented to the Conference of Parties of the Nairobi Convention for formal endorsement.

The proposed timing of the above-described SAP development process is presented below.

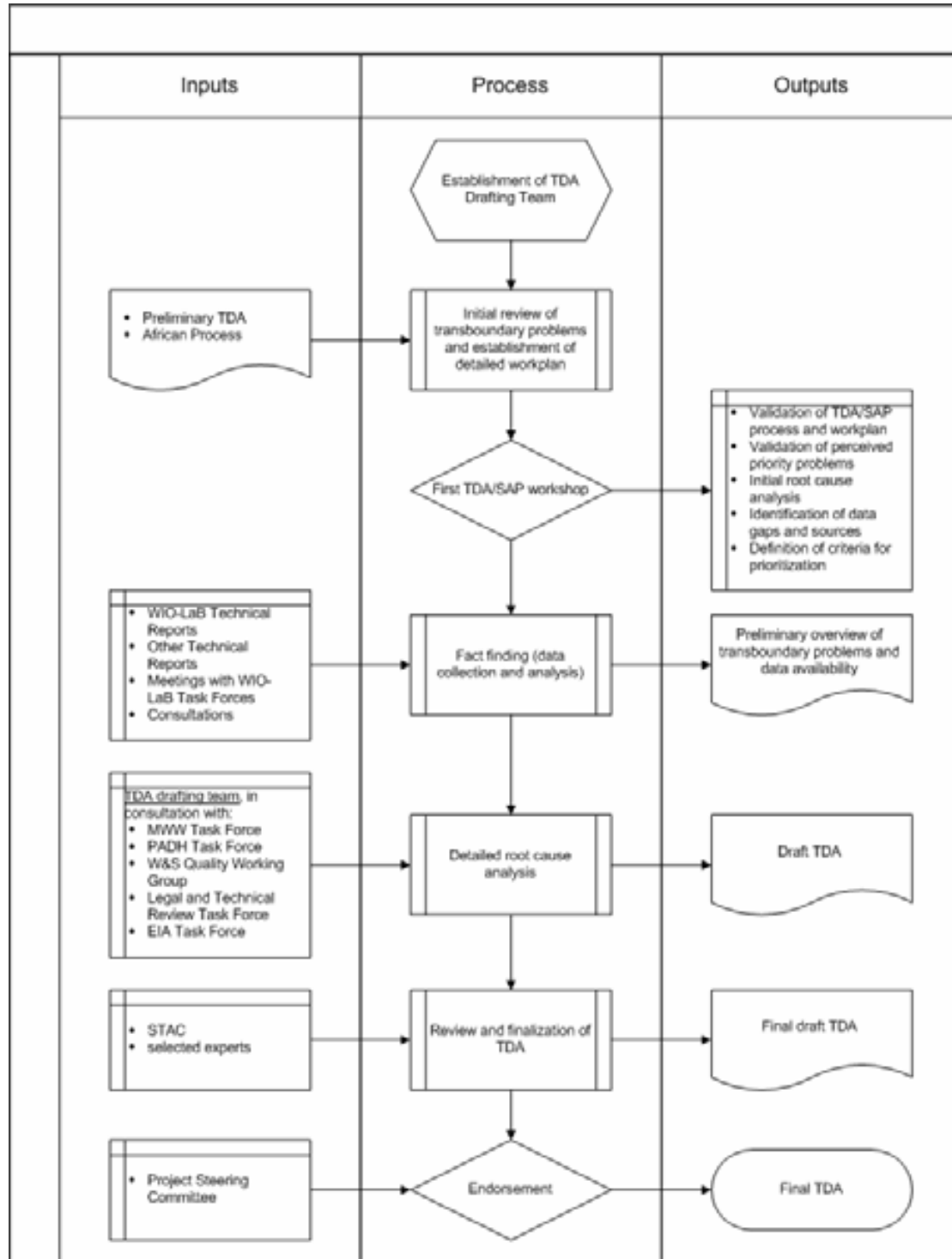


## 3.2 Main elements for SAP development

The TDA identifies the key transboundary problems related to the impacts of land-based activities on the marine and coastal environment of the WIO. Throughout the different steps of the TDA and in particular during consultations with stakeholders, a number of priority areas of intervention to address such problems were identified. These areas of intervention will form the basis for development of the SAP. An overview of these priority areas of intervention is presented in Annex 4.

During the various steps of the SAP development, the areas of intervention will be further defined, detailed and prioritized. Consultations with stakeholders will be held to define specific, targeted interventions, including investment plans and required policy, legal and institutional changes. At the national level, attention will furthermore be paid to the mainstreaming of SAP activities into national policy and legal frameworks, development plans and budgets. At the regional level, supporting activities will be defined, including activities directed at capacity building, strengthening of the regional legal framework and financial mechanisms.

### Annex 1 Schematic presentation of the TDA process





---

## **Annex 2 Main contributors to the TDA**

### **Members of the TDA Drafting Team**

Prof. Jan Ignacy Glazewski (University of Cape Town, South Africa), Governance Expert  
Mr. Akunga Momanyi (Nairobi University, Kenya), Governance Expert  
Mr. Jacob Ochiewo (KMFRI, Kenya), Socio-Economic Expert  
Dr. Susan Taljaard (CSIR, South Africa), Pollution Expert  
Dr. Sixtus Kayombo (UDSM, Tanzania), Pollution Expert  
Dr. Salomao Bandeira (UEM, Mozambique), PADH Expert  
Dr. James Kairo (KMFRI, Kenya), PADH Expert

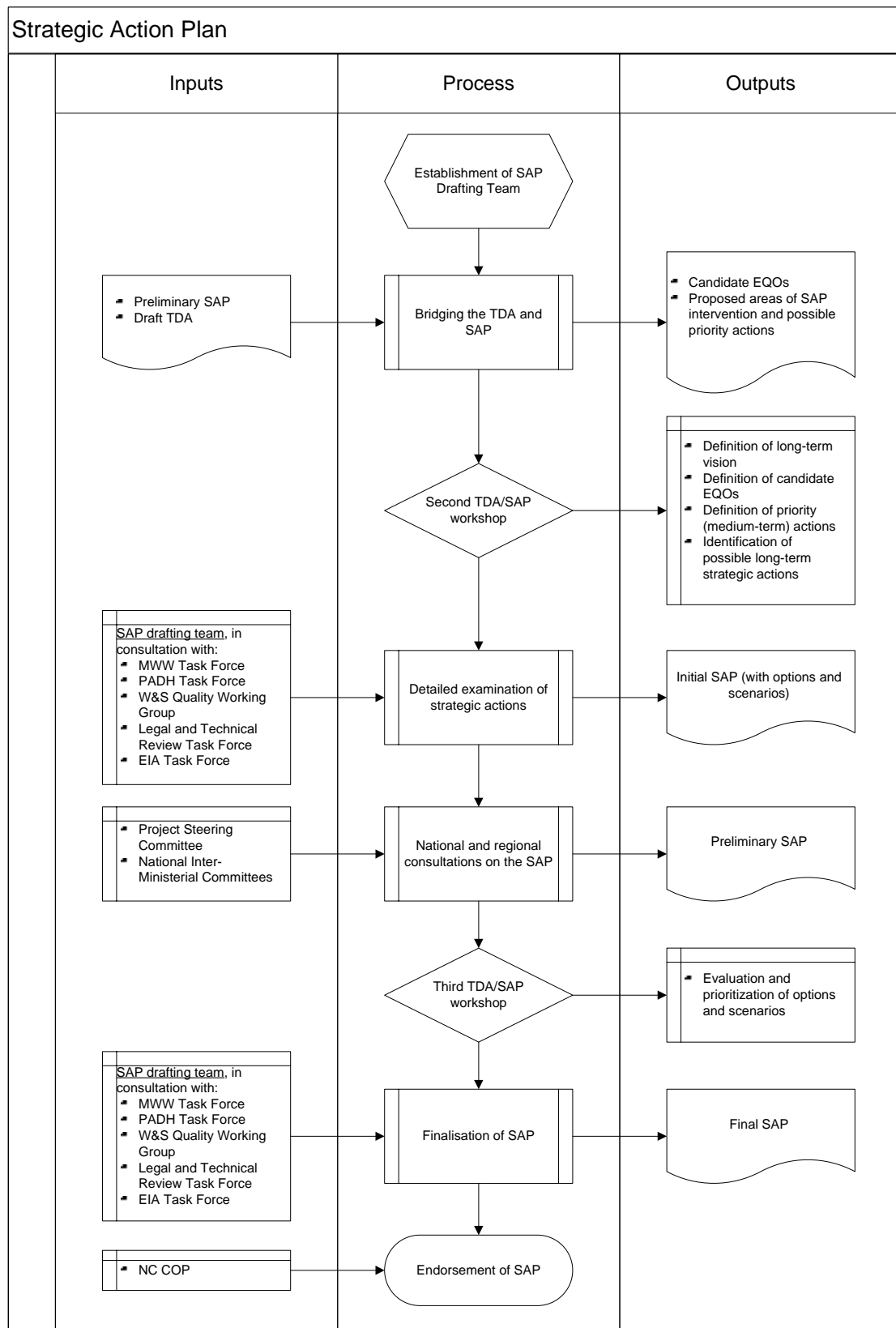
### **Technical Editor**

Dr. Mathew Richmond

### **WIO-LaB Project Management Unit**

Dr. Peter Scheren, Project Manager  
Dr. Johnson Kitheka, Project Scientific Officer  
Ms. Angelina Musera, Project Assistant

### Annex 3 Schematic presentation of the SAP process



## Annex 4 Main elements for SAP development

### Pollution from land-based sources

Type of intervention	Activities/solutions	Implementing Partners
<b>Monitoring and Assessment</b>	Fill gaps (e.g. identified in the national pollution status reports) in knowledge of priority pollutants, including major sources of pollution and the driving forces, with special emphasis on the identified coastal hot spots of pollution.	<b>National &amp; Local Government</b> <b>Industries</b> <b>Research Institutions</b> <b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>Industries</b> <b>IMO</b> <b>Port Authorities</b> <b>National &amp; Local Government</b> <b>Research Institutions</b>  <b>UNEP/NCS</b> <b>National Government</b> <b>Industries</b> <b>Research Institutions</b> <b>National &amp; Local Government</b> <b>Industries</b>  <b>National Government</b> <b>Industries</b> <b>Research Institutions</b>
<b>Management Tools</b>	Develop specific regional guidelines and demonstrate best practice technologies and management approaches for: <ul style="list-style-type: none"> <li>• Municipal and industrial wastewater and solid waste (including governance aspects such as holding products manufacturers responsible for the treatment and recycling of their packaging, applying the ‘polluter pays’ and ‘cradle to grave’ principles and introducing economic incentives for low-waste packaging).</li> <li>• Ports and harbours (including issues related to on- and offloading, disposal of waste from vessels, disposal of used oil and oil related products, and contingency planning in instances of accidental spills).</li> <li>• Agricultural activities (including issues related to soil erosion, agrochemical application and livestock raising).</li> </ul> Develop regional guidelines for setting effluent limit values (ELV) / standards for different industry types based on a Technology-based Approach or Environmental Quality Objective (EQO)-based approach	
	Develop targeted investment plans and proposals for the establishment of appropriate wastewater and solid waste management infrastructure in priority hot spots of pollution, e.g. based on the above-mentioned guidelines and lessons learnt from the demonstration projects.	
<b>Governance</b>	Establish sector-specific effluent limit values (ELV) / standards for different industry types based on a Technology-based Approach and/or Environmental Quality Objective (EQO)-based approach and develop mechanisms to convert such scientifically set standards into legally enforceable mechanisms.	

<b>Information management, capacity building and awareness raising</b>	<p>Mainstream the above-mentioned guidelines and investment plans into national policies, strategies, legislation and budgets.</p> <p>Enforce legislations/regulation for industries to conduct EIA studies and regular audits to assess and evaluate potential impacts on the coastal marine environment - in alignment with the overarching EQOs and sector-specific ELVs – and ensure that local level ('on the ground') mechanisms are in place to audit and enforce compliance (e.g. monitoring programmes, incentive systems and penalty systems).</p> <p>Develop a register of municipal wastewater and solid waste management facilities for each of the countries (working towards a permitting system particularly for central wastewater treatment facilities and landfills).</p> <p>Develop a register of manufacturing industries working towards a permitting system for such facilities.</p>	<p><b>National &amp; Local Government</b></p> <p><b>National Government</b> <b>Industries</b></p> <p><b>National &amp; Local Government</b></p> <p><b>National &amp; Local Government</b> <b>Industries</b></p>
	<p>Develop a register of agro-chemicals use (e.g. fertilizers, pesticides, herbicides, etc), specifying allowable products and dosages (working towards legally enforcing such specifications)</p> <p>Identification and establishment of sustainable financial mechanisms for investments in the field of wastewater and solid waste management, and cleaner production technology (including through the development of public-private partnerships)</p> <p>Develop and enroll regional training programmes to build capacity in wastewater and solid waste management (in many instances focusing on local municipalities &amp; harbour authorities)</p>	<p><b>National &amp; Regional Government</b> <b>Farmers</b> <b>UNEP/NCS</b></p> <p><b>National Governments</b> <b>IFIs</b> <b>UNEP/GPA</b> <b>UNEP/NCS</b></p> <p><b>National Government</b> <b>Educational Institutions</b> <b>UNEP/NCS</b></p> <p><b>National Government</b> <b>Education Institutions</b></p>
	<p>Develop and enroll regional education and awareness programmes to inform all sectors of society (e.g. general public, politicians and managers) on their roles and responsibilities in the generation, collection, treatment and disposal of wastewater and solid waste, as well as the consequences on the environment and socio-economic wellbeing.</p> <p>Develop and maintain a web-based regional information management system that includes information on best practice technologies, registers (listed above) as well as tools and guidelines for the selection of appropriate technology, institutional and policy frameworks and financial mechanisms.</p>	<p><b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>National Government</b> <b>IT Institution</b></p>

## Physical Alteration and Destruction of Habitats (PADH)

Type of intervention	Activities/solutions	Implementing Partners
<b>Monitoring and assessment</b>	Assess the current status of the critical coastal and marine habitats (mangroves, seagrasses, coral reef, coastal forests etc), including threats to their long term sustainability.	<b>UNEP/NCS</b> <b>Research institutions</b> <b>NGOs (WWF, IUCN)</b>
	Undertake an assessment of ecosystem goods and services, including an economic valuation of coastal and marine habitats.	<b>UNEP/NCS</b> <b>ASCLMEs Project</b> <b>Research institutions</b>
	Undertake an assessment of the vulnerability of coastal and marine habitats to climate change and variability (as far as not already done as part of IPCC assessment reports).	<b>UNEP/NCS</b> <b>ASCLMEs Project</b> <b>Research institutions</b>
<b>Management tools</b>	Generate thematic coastal-marine habitat GIS maps for the WIO region.	<b>UNEP/NCS</b> <b>National &amp; Local Government</b> <b>NGOs (WWF, IUCN)</b>
	Development of guidelines and demonstrate appropriate (management) approaches, technologies and actions to reduce and prevent the degradation of the coastal and marine environment caused by PADH.	<b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>National &amp; Local Government</b> <b>Research institutions</b>
	Development of guidelines and demonstrate appropriate (management) approaches, techniques and actions for the rehabilitation and/or restoration of degraded critical coastal-marine habitats.	<b>UNEP/NCS</b> <b>Government Departments</b> <b>NGOs (WWF, IUCN)</b>
	Development of guidelines and demonstrate appropriate (management) approaches, techniques and actions for mitigation of and adaptation to impacts related to climate change and variability.	<b>UNEP/NCS</b> <b>ASCLMEs Project</b> <b>National &amp; Local Government</b> <b>Research institutions</b>
<b>Governance</b>	Enforce legislations/regulation for EIA studies and audits to assess and evaluate potential impacts of coastal developments on the coastal marine environment and ensure that local level ('on the ground') mechanisms are in place to audit and enforce compliance (e.g. monitoring programmes, incentive systems and penalty systems).	<b>National &amp; Local Government</b>
	Development of targeted conservation and rehabilitation plans for critical coastal habitats in selected areas in the WIO Region.	<b>National &amp; Local Government</b> <b>Research institutions</b> <b>NGOs</b>

Type of intervention	Activities/solutions	Implementing Partners
<b>Information management, capacity building and awareness raising</b>	<p>Develop specific mitigation and adaptation plans for areas (in particular critical coastal and marine habitats) vulnerable to climate change and variability.</p> <p>Mainstream the above-mentioned guidelines and conservation and rehabilitation plans into national policies, strategies, legislation and budgets.</p> <p>Capacity building in the conservation and rehabilitation of marine and coastal habitats through training and workshops.</p> <p>Development and implementation of an educational and awareness raising programme with regard to the value of critical coastal habitats in selected areas in the WIO Region.</p> <p>Maintaining an online regional toolkit for PADH Management, including the above-mentioned guidelines.</p>	<p><b>National &amp; Local Government</b>  <b>Research institutions</b>  <b>National &amp; Local Government</b></p> <p><b>UNEP/GPA</b>  <b>UNEP/NCS</b>  <b>National Government</b>  <b>Educational institutions</b>  <b>NGOs (WWF, IUCN)</b>  <b>UNEP/NCS</b>  <b>National Government</b>  <b>Educational Institutions</b>  <b>NGOs</b>  <b>UNEP/NCS</b>  <b>UNEP/GPA</b>  <b>National Government</b>  <b>IT Institution</b></p>

## Changes in Fresh Water Flows and Sediment Loads

Type of intervention	Activities/solutions	Implementing Partners
<b>Monitoring and assessment</b>	Development of detailed environmental profiles (covering also river-coast interactions) for selected major river systems in the WIO region, including desktop as well as field research.	<b>UNEP/NCS</b> <b>River Basin Organizations</b> <b>Research institutions</b>
	Review gaps in existing political, legal and institutional frameworks for dealing with river-coast interactions affecting the coastal and marine environment, in particular as it concerns transboundary river basins.	<b>UNEP/NCS</b> <b>River Basin Organizations</b> <b>National Government</b> <b>Research Institutions</b>
	Undertake an assessment of the potential impact of climate change and variability on main river basins, including river-coast interaction.	<b>UNEP/NCS</b> <b>ASCLMEs Project</b> <b>Research institutions</b>
	Perform an assessment of the water-related infrastructure planned on the major river basins of the WIO region and assess their potential impacts on the marine ecosystem and possible mitigatory strategies which may be implemented.	<b>UNEP/NCS</b> <b>River Basin Organizations</b> <b>National Departments of Water</b> <b>Research Institutions</b>
<b>Management tools</b>	Based upon experiences from the region and beyond, develop a toolkit for ICARM in the WIO Region.	<b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>Research Institutions</b>
<b>Governance</b>	Development of detailed ICARM plans (or related instruments) for the main river basins, linking up with existing or planned basin management plans.	<b>GWP (link with IWRM Toolbox)</b> <b>River Basin Organizations</b> <b>National Government</b> <b>GWP</b> <b>Research Institutions</b>
	Mainstream the ICARM Plans (or related instruments) into national policies, strategies, legislation and budgets.	<b>River Basin Organizations</b> <b>National Departments of Water</b>
<b>Information management, capacity building and awareness</b>	Promote and enhance the integrated management of river basin and coastal zones through the application of the ICARM principles and their incorporation into national and regional IWRM planning processes.	<b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>River Basin Organizations</b> <b>National Government</b> <b>GWP</b>
	Capacity building in the field of ICARM through training and workshops, including topics	<b>UNEP/NCS</b>

Type of intervention	Activities/solutions	Implementing Partners
	<p>such as environmental water requirements, environmental management plans for dams and options assessment.</p> <p>Maintaining an online regional toolkit for ICARM, including the above-mentioned guidelines.</p>	<p><b>UNEP/GPA</b>  <b>River Basin Organizations</b>  <b>National Governments</b>  <b>GWP</b>  <b>Educational institutions</b>  <b>UNEP/NCS</b>  <b>UNEP/GPA</b>  <b>National Governments</b>  <b>IT Institution</b></p>

## Cross-cutting issues

Type of intervention	Activities/solutions	Implementing Partners
<b>Monitoring and assessment</b>	Prepare biennial State of the Coast Environment Reports Update, identifying information and activity gaps.	<b>UNEP/NCS</b> <b>National Governments</b>
<b>Management tools</b>	Development framework environmental legislation for LBS/A Management.	<b>UNEP/NCS</b> <b>UNEP/DELC</b> <b>National Governments</b>
<b>Governance</b>	Develop basic GIS products (regional maps, overlays) to support regional monitoring and assessments of the coastal and marine environment and its threats.	<b>UNEP/NCS</b> <b>UNEP/DEWA</b>
	Mainstream LBS/A Management in national policy, legal and institutional frameworks, including the ratification and implementation of relevant multilateral environmental agreements.	<b>UNEP/NCS</b> <b>UNEP/DELC</b> <b>National Governments</b>
	Develop realistic national strategies for managing LBS/A in the form of National Programmes of Action (NPAs) or related instruments such as ICZM plans, NEAPs, etc.	<b>UNEP/NCS</b> <b>UNEP/GPA</b> <b>National Governments</b>
	Catalyze implementation of NPAs (or related instruments) through political awareness raising, public debates and the development of targeted interventions including investment plans	<b>National &amp; Local Governments</b>
	Strengthen the Nairobi Convention EAF/RCU as the recognized and effective Regional Seas coordinating unit for all regional policies and activities related to coastal and marine resources.	<b>UNEP/NCS</b>
	Development and ratification of a Protocol on Environmental Assessment to the Nairobi Convention and promote the development of similar Protocols at the level of the Regional Economic Commissions (SADC, IOC, etc.).	<b>UNEP/NCS</b> <b>UNEP/DELC</b> <b>National Governments</b>
	Mainstream the implementation of the Strategic Action Programme in national and regional policies, strategies and budgets and undertake monitoring thereof.	<b>UNEP/NCS</b> <b>National Governments</b>
	Develop and strengthen regional and national Public-Private Partnerships related to LBS/A management.	<b>UNEP/NCS</b> <b>National Governments</b>
	Strengthen stakeholder involvement in LBS/A management.	<b>UNEP/NCS</b> <b>National Governments</b>
	Development of regional sustainable financing mechanisms to address marine and coastal environment management issues.	<b>UNEP/NCS</b> <b>National Governments</b>

Type of intervention	Activities/solutions	Implementing Partners
<b>Information management, capacity building and awareness raising</b>	<p>Operate and continuously update the Nairobi Convention Clearing House Mechanism (a regional information system on the WIO marine and coastal environment and its management).</p> <p>Develop and maintain relevant institutional and thematic expert networks related to LBS/A management as a means of regional capacity building and knowledge exchange.</p> <p>Provide support to the development and implementation of relevant environmental educational and awareness raising programs at all levels on LBS/A issues</p>	<p><b>IFIs</b>  <b>UNEP/NCS</b>  <b>National Governments</b>  <b>IT Institution</b>  <b>UNEP/NCS</b>  <b>WIOMSA</b>  <b>UNEP/NCS</b>  <b>National Governments</b>  <b>Educational institutions</b>  <b>NGOs</b></p>