

KENYA ANNEX IV. AREAS OF CONCERN

From version MEDA_FINAL_REPORT_-_KENYA_3rd_edition_v5a

2. BIOPHYSICAL ENVIRONMENT

2.4 Freshwater resources and drainage, including rivers, estuaries, deltas and coastal lakes

- Climate change and natural variability is already influencing rainfall patterns and the flow patterns of rivers, impacting on floodplains, deltas and coastal ecosystems. Climate variability also causes coral bleaching and sea level rise.
- As a dynamic zone between land and the sea, deltas are controlled by several interacting factors such as tides, periodicity of freshwater and sediment fluxes from, 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 the deltas
- Human-induced stresses range from diversion of freshwater flow, poor land use in and around deltas
- Shoreline changes (erosion & accretion) of the coast results from two main sources: changes in sediment loads from rivers and the re-suspension of benthic sediments by rough seas.
- Rapid and unmanaged transformation of the coast land and seascape and consequent loss of critical habitats that provide essential ecosystem goods and services.
- 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.
- Weakness in policy, legal and institutional structures for effective management of the coastal and marine environment, and a lack of capacity in institutions and regulatory bodies.
- Gaps in the knowledge base and inadequate awareness of the value of ecosystem goods and services provided by a healthy coastal and marine environment.
- Pollution (Influx of harmful effluents, oil spills) of the ocean either via estuaries draining to the ocean or directly introduced to the sea , affects waters and ecosystems over a large area and could go beyond a national jurisdiction.

2.6 Chemical and Biological Oceanography

2.6.4 Secondary production

- Kenya coastal waters are increasingly being impacted by land-based pollutants, more specifically wastewater. This creates eutrophic conditions, which could promote HABs development and prolong the duration of their occurrence.
- Currently, the ballast water handling facility at the Kenya Port Authority is not operational. This poses a major risk of the introduction of new plankton communities (including HABs) which might not have natural enemies in Kenya water and could flourish at the expense of the native species with possibilities of resulting into trophic cascade.
- With the current expansion of Kilindini Port and the development of Lamu as a free port, there are increased risks of oil pollution with the consequent impacts on productivity of the systems.
- Increase in development activities in the rivers watershed areas have intensified habitat destruction resulting in higher sediments fluxes into the coastal water. This has the effect of reducing the depth of the photic zone thus reducing the overall productivity of the Kenyan ecosystems.
- The impacts of global warming are already being felt globally. Kenya lies along the equator and more stable water stratification is expected with climate change. This could result into reduced advection of nutrients from the deeper water to the upper photic zone. Ocean acidification will also have adverse effects on plankton communities more particularly calcifying Coccolithophorids, planktonic Foraminifera and Pteropods species.

2.9 Macrofauna (state of biological knowledge)

2.9.1 Invertebrates

- Overexploitation of some groups of invertebrates e.g. sea cucumber and underexploitation of other invertebrate resources (Scyllaridae, Nephropidae (*Metanephrops andamanicus*), deep water prawn *Heterocarpus woodmasoni* and deep water palinurid lobsters)
- Lack of research resources (human, financial, facilities)
- Culturing of commercial species
- Destruction of habitats affecting invertebrate populations
- Destructive fishing methods (e.g. trawling, dynamite fishing)
- Pollution of the marine environment
- Sedimentation
- Global warming and climate change

2.9.2 Fish and fish resources

WIO-LaB TDA-SAP identified the following problems and issues which are related to fish resources.

- Decline in harvests of marine and coastal living resources
- Degradation of coastal habitats (mangroves, seagrass beds, and coral reefs) leading to loss of biodiversity.
- Overall water quality decline.

- Contamination of coastal waters, beaches and living resources (three pollution hot spots have been identified i.e. Mombasa, Lamu and Malindi).

Other issues/concerns included:

- Improvement of fishing techniques (vessels, gear)
- Concentration of fishers in small areas overharvesting particular resources
- Illegal fisheries: beach seine, spear gun
- Prawn trawling
- By-catch levels and decline in abundance of by-catch species
- Port expansion and new port development
- Several of the target or bycatch species of the region have high commercial value and are heavily fished by foreign fleets and on a more localized coastal scale by artisanal fishers. Some species or species groups are now considered to be vulnerable.
- Lack of information (biological, stocks and assessments, migration etc.) on both pelagic and demersal species. Under the SWIOFP, Kenya has selected 26 pelagic species and 38 demersal species to be studied.
- Lack of species specific management strategies
- Conservation of threatened and vulnerable species
- New/modern fishing techniques (e.g. ring net) on the increase, yet their impacts not known
- Security and Pirates in the region
- Migratory fishermen from neighbouring countries
- Aquaculture
- Ornamental fishery

2.9.3 Mammals

Threats include incidental capture in artisanal gillnets, trawlers and other set nets, industrial pollution, degradation of marine mammal habitats (WWF 2004, Kiszka *et al.* 2009). Tourism activities and boat traffic also threaten marine mammals through noise pollution and boat strikes. Marine mammals can undertake long-distance movements of up to several hundred kilometres in a few days. Given this capacity to move across jurisdictional boundaries, the transboundary issues of concern are similar to those of sea turtles, namely interactions with artisanal fisheries and bycatch in pelagic or high seas fisheries, pollution and habitat degradation.

2.9.5 Birds

- Climate change.
- Considerably low levels of awareness amongst many stakeholders and the general public about ecological requirements for birds and other marine biodiversity, and the impact of human activities on their habitat.
- Formal instruction in ecology and conservation of marine resources is peripheral at all levels of education in Kenya (A. Mwangura, 2007) making it difficult to produce a sufficiently large pool of active marine ecologists in the region.
- Spatial scope of marine research in Eastern Africa is still much limited to the near-shore reaches of the continental shelves of Kenya and Tanzania with almost no activity on the coastal waters of Somalia despite its profound influence in the Large Marine Ecosystem.
- Government involvement in dissemination and utilization of scientific findings is low. Most research funding is undertaken by private grants.

- There is lack of regional scope in ornithology research limiting transboundary collaboration.

There is also need to facilitate wider availability of existing and future research data through a formal regional data sharing policy among relevant institutions, and establishment of a framework for multi-taxon marine monitoring process. Since seabirds and many coastal shorebird species move through widely overlapping ranges in the WIO region and beyond, collaborative strategies among scientists and across sectors throughout these ranges, including data and equipment sharing, would help bridge the gaps in knowledge required to plan for conservation action.

Finally, the use of Marine Protected Area as a concept and tool for conserving the marine resources of Eastern Africa (IUCN, 2004a), should be expanded and strengthened among the member states, particularly around Key Biodiversity Areas.

2.9.6 Exotics and invasive species

- loss of biodiversity due to preying on native species, competition for space with native species, hybridisation causing genetic dilution, changes in ecosystem function and decreased water quality.
- economic and cultural impacts due to interference with fisheries stocks, costs of clean up or control, damage to infrastructure and loss of livelihood from mass mortalities.
- human health and wellbeing impacts resulting in decreased recreational opportunities, increased incidences of parasitic and bacterial infections (IUCN-The World Conservation Union, 2000)

Risks of exotic invasions are especially high if the ecosystems of origin and introduction are climatically similar and more prevalent in disturbed, polluted and overfished areas. Outbreaks of *Vibrio cholera* and the crown-of thorns starfish *Acanthaster planci* which predate on corals have both been documented to proliferate after phytoplankton blooms triggered by increased temperature and enhanced nutrient enrichment from agricultural run-off (Invasive Species Specialist Group (ISSG), 2009, J. Brodie *et al.*, 2005). Localized starfish outbreaks are a serious threat, in terms of the health of coral reefs, and may have significant negative impacts on coral communities particularly in peri-urban areas associated with higher human impacts (N. Amiyu *et al.*, 2007). Removal of the natural predators of *A. planci*, through overfishing of its natural predators is a potential factor contributing to outbreaks.

3. HUMAN ENVIRONMENT

3.1 Coastal populations – current status and trends

- Rapid population growth. If not well planned for population growth may lead to over-exploitation of nearshore fisheries, degradation of mangrove areas, shoreline changes and cultural conflicts.
- Disposal of domestic sewage and industrial waste has become a major challenge for the main urban centres such as Mombasa. Increased use of septic tanks, soak pits and pit latrines are evident in most places. This may lead to contamination of ground and surface water resources and ecotoxicology in food chains.

3.2 Sites of religious or cultural significance

Cultural belief in *Kayas* has lessened. This development is a threat to the sacred values which have highly contributed to the conservation of these indigenous forests. Thus the gains realised in use of traditional knowledge natural resource management will be lost. Traditional knowledge has also been crucial in conservation of medicinal plants and fisheries resources. Cultural erosion has also been associated with the growth in tourism.

Social problems in Kenya coast such as high drop-out rate from schools by children, drug peddling, petty crimes, family disputes and prostitution have been blamed on international tourism (I. Sindiga, 1999).

4. COASTAL LIVELIHOODS

4.1 Small-Scale Fisheries

SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none">• The Oceans and Fisheries Policy, 2008 provides a strong policy framework for the development of small-scale fisheries. The main fisheries legislation, the Fisheries Act cap 378 of the Laws of Kenya is currently being reviewed to capture the objectives of the new policy and to make it responsive to the needs of and the changes that are occurring in the fisheries sector.• Participation of the small-scale fishers in fisheries management through the new co-management approach that gives prominence to Beach Management Unit gives voice to these fishers.• The Fisheries Department which is the main fisheries regulatory authority is being reorganized to provide an effective and efficient institutional framework.	<ul style="list-style-type: none">• Lack of management plans for specific fisheries in the inshore waters is a glaring weakness. There is need therefore to support preparation of management plans for specific fisheries.• Although co-management is being promoted, the capacity of fisher-communities to participate effectively in co-management is still low. There is need therefore to invest in sensitization and awareness programmes.• Information which is currently available to inform small-scale fisheries governance is largely inadequate. For example, there is inadequate information on fish trade especially with respect to fish from the marine waters. Trend data on quantities of different species exported, export prices, number of people involved and number of those who benefit from the export trade and the destination countries should be gathered and analyzed.• Lack of data on small-scale enterprises that are complementary to the fishing industry such as boat repairs.• Inadequate training in aspects such as statistical and socio-economic data collection, analysis, interpretation and reporting; fish stock assessments, etc.

<p>Opportunities</p> <ul style="list-style-type: none"> • A few private investors have ventured in commercial grade processing for example, Sea Harvest Ltd that buys octopus from fishers and processes before export. Private companies such as East African Sea Foods, Mombasa Ship Chandlers, Wananchi Marine Products, are currently importing fish from other countries thus showing that there is a supply deficit in the country. This provides an opportunity that small-scale fishers can tap on if they can venture into non-traditional fishing grounds. These private companies are able to provide their own transport the landing beaches where they can buy the fish from small-scale fishers thus strengthening the value chain links. • Three cold rooms have been constructed by the Government to support the small-scale fishers and these should be tapped into to ensure that fishers obtain competitive prices for their fish. • A local bank has developed a loan scheme for the fisheries sector. This loan scheme offers a good opportunity for fishers to upgrade their fishing equipment. • The ASCLME should support data generation and a programme to encourage small-scale fishers to venture into non-traditional fishing grounds. The capacity of small-scale fishers should also be built so that they are able to diversify their economic activities. 	<p>Threats</p> <ul style="list-style-type: none"> • There is evidence of over-exploitation of coral reef fisheries. • A number of fish landing sites have been lost to private property developers. • There has been some stiff competition from prawn trawlers who share the same fishing grounds with the small-scale fishers in the Malindi-Ungwana bays. This is a serious threat if not addressed. • There is competition over market from recreational fishers who sell their catch to the local tourist hotels who are also the buyers of fish landed by small-scale fishers.

4.2 Tourism

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Variety of tourism products including endemic coastal forests, marine parks and wildlife sanctuaries. • Several well-known luxury beach hotels exist along the coastline of this country. • Potential benefits for communities near protected areas eg Kisite Marine park and Arabuko butterfly projects. • Kenya Wildlife Service has improved and branded national parks and reserves at the coast. • Kenya's coast long standing popular destination since the 1960's • Known to tour operators • Quality wildlife and beaches • Customer awareness • Hospitable friendly people • Excellent all-year climate • No jet lag from Europe • Good tourism training facilities • English speaking 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Lack of data and statistics on benefits, bed occupancy, number employed in the sector • Lack of a national tourism master plan the one developed in 1995 is largely unknown. Kenya's coastal tourism industry has developed largely in the absence of any formal planning processes • Deteriorated infrastructure especially road networks • Insecurity and crime • Mass market image • Perceived as cheap beach destination • 'Tired' hotel infrastructure • Anti-competitive trade practices in the marketing and sales distribution system • Limitations on air access & seat capacity • Beach harassment • Malaria and HIV/AIDS • Entry and visa impediments • Lack of quality control and standards
<p>Opportunities</p> <ul style="list-style-type: none"> • Provision in the Environmental Management and Coordination Act, 1999 to develop a spatial coastal integrated plan that is participatory and will include local communities • Existence of Tourism parastatal (CETF, TTF) and NGOs that support tourism entrepreneurs through funding of community ecotourism projects. • Finalizing the tourism policy and legislation • Kenya's PRSP for economic recovery and wealth creation for the period 2003 - 2007 is important for enhancing growth in tourism • Vision 2030 to guide development • Ecological and topographic diversity • Diverse heritage, cultures and traditions 	<p>Threats</p> <ul style="list-style-type: none"> • Infrastructural deficiencies, static and un-innovative products • Increased regional competition • Unplanned and skewed tourism development, poor employment opportunities for the local people • The quality of coastal tourist attractions is increasingly being reduced. • High poverty rates • Increased rural to urban migration • The time and cost of starting a business is high • Acts of terrorism • Negative travel advisories • Increased competition • Tour operator price pressures • Community envy/resentment • Human-wildlife conflict • Animal poaching • Shortage of future investment capital

<ul style="list-style-type: none"> • East African co-operation 	<ul style="list-style-type: none"> • Over-reliance on a few major markets • Corruption and bribery
---	--

4.3 Mariculture

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • High quality seawater • Enthusiasm and dedication of Kwetu • Research support capacity at KMFRI • Willingness of the DoF (Coastal and Marine Branch) to develop the sector • Willingness and eagerness of coastal communities to adopt mariculture • High number of potential candidate species for small (and large) scale mariculture • Development mandate of the Coastal Development Authority (CDA) and their active participation in assisting mariculture groups • Support of silviculture by the Forestry Department 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Absence of a sector plan • The absence of a one stop shop (for applications) • Extension capacity • Access to the coast • Absence of marine fish farming capacity at KMFRI, DoF and CDA (all available fish farming expertise is in fresh water fish culture) • Poor understanding of farm-made feeds • CBO organisational capacity is weak • High soil porosity in coastal zone
<p>Opportunities</p> <ul style="list-style-type: none"> • Dedicated government and or bilateral support for mariculture development. • Greater and dedicated NGO involvement. • Expansion of farmer appropriate demonstration facilities at Kwetu. • Hands-on training of trainers and extension agents in Kenya. • Providing support to develop a sector plan 	<p>Threats</p> <ul style="list-style-type: none"> • Hotel strip development. • Land tenure. • Privatisation of state land for tourism development. • High cost of coastal land hence developments are often restricted to communal areas. • Governance constraints. • Theft and vandalism. • Possible water quality problems in creeks (coliform bacteria).

4.4 Agriculture and Forestry

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Subsistence agriculture supporting coastal livelihoods (e.g. crop farming cassava, sweet potatoes, maize, coconut, cowpeas, rice, citrus, mangoes, bananas, pineapples, watermelons) • Cash crop farming (mainly for export) providing income from crops including cashews, bixa and sisal as well as fruits and vegetables • Coastal forests and mangroves providing a wide range of useful resources (timber and non-timber) • Wide recognition that coastal forests are important to livelihoods in coastal communities, and recognition of the strength of coastal agriculture • Evidence of positive planning, management and policy moves to strengthen community capacity and achieve participatory resource management in coastal areas 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Ongoing forest depletion and unsustainable natural resource use weakening the natural resource base and worsening the already existing coastal poverty levels, which fuels the unsustainable resource use • Continuing population pressure putting further strain on resources (Kenya has high population growth rate, fuelled by rural-urban migration in the coastal zone worsening pressure on resources in coastal towns and centres) • Predominance of marginal lands in coastal region limits the scope for further agricultural expansion
<p>Opportunities</p> <ul style="list-style-type: none"> • Integrated Coastal Management Policy (ICMP) in place and offering potential for constructive and participatory way forward in improving resource management and livelihoods development in the coastal region • Lots of interest in supporting projects from big donors like the World Bank and UNEP-GEF means there is not a lack of funds going into sector, and alternative income-generating activities (i.e. activities not dependent on coastal resources) are integral parts of these projects • Predominance of marginal lands in coastal region offers scope for further development of livestock production e.g. on the 60 ranches in the area which are not presently operational 	<p>Threats</p> <ul style="list-style-type: none"> • Current political turmoil and volatility could impact on coastal development through broader impact on Kenya's economic growth and overall ability to expand exports and develop further • Relatedly, government policies at high level are in place but there may not be the will or capacity to implement them at local levels given endemic corruption in the Kenyan system

4.5 Energy

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Clear willingness of building up a comprehensive development framework based on “vision 2030” • Social and environmental issues are among top priority in “Vision 2030”. • Strong environmental regulation • Government supports oil exploration • Strong development strategy papers 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Governance, law enforcement and equity are major sectors to be improved as outlined by “vision 2030” • Oil and Gas sector is not a priority in “Vision 2003, nor biofuels development and industrial crops framework (PSRP 2010)
<p>Opportunities</p> <ul style="list-style-type: none"> • Oil and gas sector development could generate employment • Oil and gas activities are implemented by large companies generally engaged in corporate social responsibility • ICZM to be made operational soon 	<p>Threats</p> <ul style="list-style-type: none"> • Increase in oil operations (drilling, exploitation, transport, processing, storage,...) shall increase oil spill risks. • Private companies from emerging countries are not always respectful of environmental and social regulations • Investors in biofuel sector seek for the best locations (fertile lands, available workforce, good transportation networks,...) and are not attracted by “marginal lands”

4.6 Ports and Coastal Transport

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Stable legal framework. • Agricultural potential and rainfall. • Strategic location relative to landlocked neighbours. • High proportion of entrepreneurial classes. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Corruption and inefficiency in public sector (including the port and transport system). • Lack of development capital. • Local government obstruction of investments in modern agriculture.
<p>Opportunities</p> <ul style="list-style-type: none"> • Development of Lamu Corridor (including deepsea port and terminal for mining exports from landlocked 	<p>Threats</p> <ul style="list-style-type: none"> • Failure of manufacturing economy to compete with imports from the East. • Lack of training institutions and skills

<p>countries and opening up the interior and coast for development).</p> <ul style="list-style-type: none"> • The currently planned modernisation measures in Mombasa will enhance efficiency and capacity, and promote further local industry. • Planned upgrades to cross-border procedures on the Northern Corridor will increase and improve transit trade to interior countries, along with creating further opportunities for the coastal communities. 	<p>deficiencies for sustainability of port and transport operations.</p> <ul style="list-style-type: none"> • Competition from other corridor developments, e.g., Central Corridor in Tanzania. <p>Political instability of landlocked countries which would affect traffic volumes on Lamu and Northern Corridors.</p>
--	--

4.7 Coastal Mining

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • Strong environmental regulation • Government supports mining development • Strong development strategy papers 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Much of Kenya has not yet been prospected • No national legislation for coral and sand mining. • Quarrying and sand harvesting activities are regulated by local authorities.
<p>Opportunities</p> <ul style="list-style-type: none"> • Proposed development of Kwale Heavy Sands Project • ICZM to be made operational soon 	<p>Threats</p> <ul style="list-style-type: none"> • Over exploitation of coral and sand in the coastal zone would affect the environment.