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**THE STATUS AND MANAGEMENT OF  
LAND BASED SOURCES OF POLLUTION  
TO THE MARINE ENVIRONMENT IN  
KENYA**

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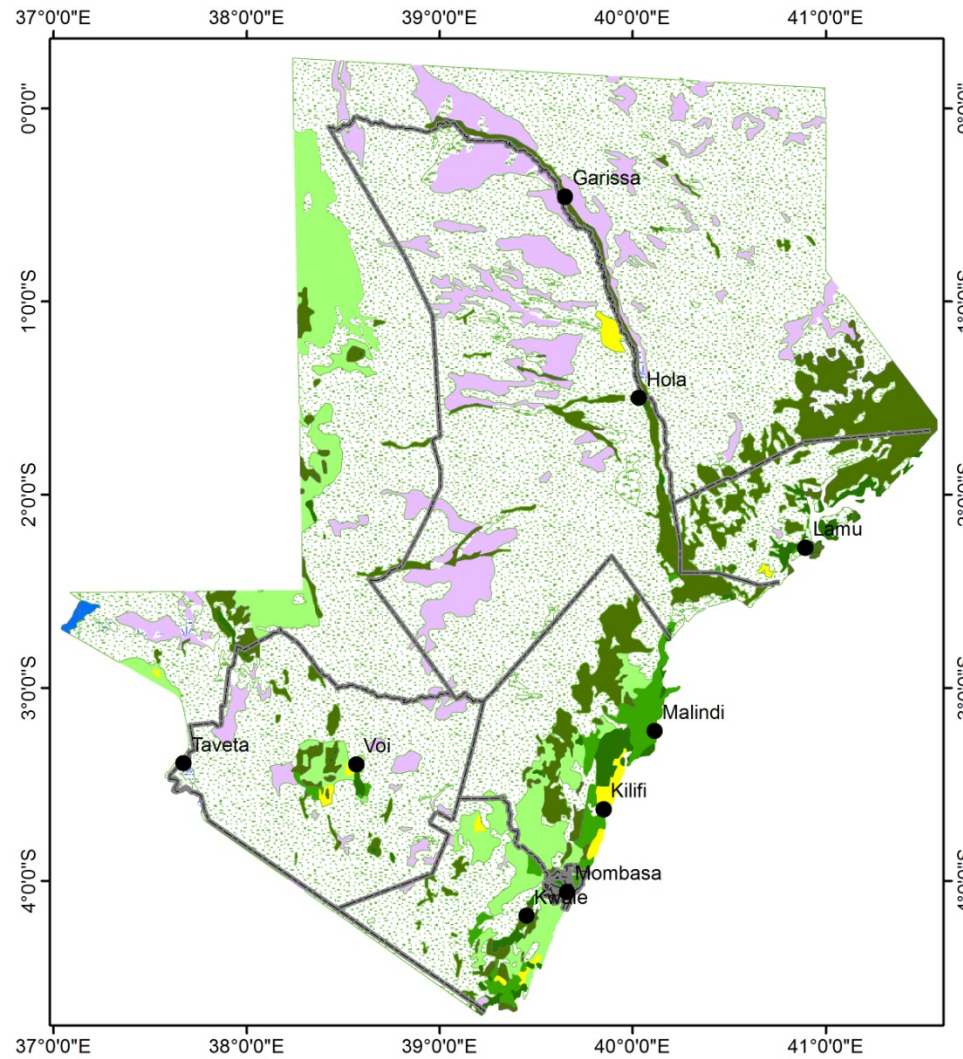
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# Introduction

- Kenya: lies astride the equator; land area of 580,000 km<sup>2</sup>
- Kenyan coastline runs about 600 km long in a south-westerly direction
- Marine and coastal wetlands rich in biodiversity.
- Important resources include a fringing coral reef broken at places where rivers discharge and estuarine creeks open into the sea.
- The estuaries are typically fringed with highly productive and extensive mangrove swamps.
- In the nearshore areas between the mangroves and fringing coral reef are lagoons that harbour highly productive and diverse seagrass meadows.
- These ecosystems are multiple use ecosystems providing various goods and services of ecological and socio-economic significance.

## *Introduction...*

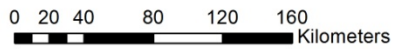
- Major drainage basins; the Tana and Sabaki-Galana-Athi basins drain into the Indian Ocean.
- Tana River, is the longest, drains a catchment area extending from Mt. Kenya and discharges into the Ungwana bay.
- The Sabaki-Galana-Athi River basin extends from the Aberdare Range and discharges into the Malindi Bay.
- Other river systems and streams discharging into the sea include Ramisi, Mkurumuji, Kombeni, Tsalu, Mwache and Uмба (which rises from the Kilimanjaro-Usambara hills in Tanzania)
- The river discharge areas are major sources of the freshwater and sediments entering the sea.



Landuse/cover	
	agriculture (dense)
	agriculture (sparse)
	bushland (dense)
	bushland (sparse)
	forest
	grassland
	plantation
	swamp
	waterbody
	woodland



Coverage showing general land use classes derived from Landsat TM data



# Land Based Activities that are Sources of Pollution

- These ecosystems receive large quantities of riverine and coastal watershed discharge which include high loads of nutrients, sediments, suspended particulate matter, heavy metals and petroleum hydrocarbons associated with municipal wastewater and agricultural runoff
- This has adverse impact on the water and sediment quality, productivity, biodiversity and system functioning.

# *Drivers*

- The driving forces that lead to environmental pressures that impact on the marine and coastal area include
  - natural conditions such as climate, vegetation, hydrological and oceanographic conditions, and
  - socio-economic factors such as population growth, land use, tourism, and industrial and agricultural activities.

# Emerging issues

- Major industrial expansion in Mombasa and Kilifi Counties and rapid urbanisation
- Mining, e.g. Titanium mining in Kwale County, limestone mining for cement manufacturing in Kilifi and Mombasa County, salt extraction in Kilifi
- Major infrastructure developments; LAPSET and Coal Power Plant in Lamu County, SGR in Mombasa
- Large-scale agricultural activities, e.g. Galana irrigation scheme for food security
- Offshore oil and natural gas exploration and production, seismic surveys

# Consequences of land-based sources of pollution

- Industrial emissions, e.g. Lead pollution – Uhuru-Owino slums; Silicosis in Kaloleni attributed to cement plant
- Major infrastructure projects: dredging in Lamu and Msa affecting marine ecosystems; coal power plant will emit CO<sub>2</sub> a GH gas, SO<sub>2</sub> and NO<sub>2</sub> acid forming gas
- Titanium and salt extraction cause salination of groundwater
- Agriculture; excessive fertilizer (eutrophication) and pesticide residues
- Oil and gas exploration and production; oil pollution and seismic waves cause noise pollution affecting communication of marine mammals etc.



# Policy development and legal frameworks

- Environmental Management And Co-ordination Act, 1999 (Act No 8 Of 1999); amended 2015
- Marine Pollution Control Act 2013
- Agriculture Act (CAP 318)
- National Wetlands Conservation and Management Policy of 2014
- Integrated Coastal Zone Management (ICZM) Policy of 2014
- National Environment Policy, 2013
- National Water Policy, 2012
- Mining Act (Cap 306) Revised Edition 2012

# Regulations and guidelines

- The Environmental Management and Co-ordination (Plastics Bags Control and Management) Regulations, 2018
- Guidelines on water quality and effluent monitoring, EMCA (Section 50)
- Guidelines on control of pollution in the coastal zone.
- Air quality regulations, 2014, EMCA (Section 78)
- Environmental (Impact, Audit and Strategic Assessment) regulations 2009, EMCA (Section 43(c))
- Environmental management and coordination (waste management) regulations, 2006
- Environmental management and coordination (wetlands, river banks, lake shores and sea shores management) regulations, 2006, EMCA (Section 29(b))

# International conventions

- The Constitution of Kenya 2010 Art 2 (5) and (6) recognises international conventions to be part of Kenyan laws once ratified; example
  - International Convention on Oil Pollution Preparedness, Response and Cooperation (1990)
  - United Nations Framework Convention on Climate Change (UNFCCC 1992)

# Current Initiatives addressing marine pollution

- Kenya Coast Guard Service launched recently addresses pollution control and sanitation measures as well as the prosecution of offenders
- Community involvement in afforestation projects, mangrove rehabilitation addresses control of CO<sub>2</sub>, global warming and acidification
- Kenya PET Recycling Company, an NGO in Watamu, promotes effective plastic waste management through recycling.

# Opportunities

- Strengthening of the ICZM process in Kenya, currently the action plan is under review
- County governments through County Development Plans (CIDPs) and municipalities have the primary responsibility to manage wastewater and solid waste
- Community based groups are receptive to waste management initiatives that provide opportunities for income generation
- Private sector involvement in waste management can be encouraged by appropriate concessions by the concerned authorities.

# Recommendations

- Effective enforcement of environmental laws and regulations remains a challenge due to limited staff and financial resources
- Need for improved resource allocations for training and employment of adequate officers at the national and county levels
- Need to prioritise policy development and management planning, and implementation of the policies and resource management plans and strategies.
- Need for particularly national projects for the govt to observe best practice in environmental management