

## PREFACE

### Introduction

Under the Kenya Vision 2030, the long-term national planning strategy of the country, Kenya aims to be a middle-income - rapidly industrializing - nation by 2030 with a clean, secure and sustainable environment. For a country whose development is largely contingent upon the environment, this vision creates many challenges not only for the sustainability of the ecosystems and the natural resources they provide, but also for mitigating the effects of climate change starting to appear around the country.

Kenya and Flanders/Belgium share almost 30 years of collaboration in marine sciences and have built up extensive expertise in various marine research fields in Kenyan coastal areas. The Belgian partners - with complementary fields of research expertise - have collaborated in national and international frameworks and together represent a network of different universities, both in the Flemish and Belgian context. Through their link with international MSc programs (Oceans & Lakes resp. Erasmus Mundus Tropimundo, and others) they constitute entry points to a large student and alumni network. The Kenyan partners have developed their research fields in collaboration with Belgian partners. Many of the individual Kenyan researchers have received training in Belgium (Flanders) and returned to either academia or policy making and policy support in Kenya. These researchers study a wide range of subjects, including coastal ecosystem management, coastal forestry, aquaculture and fisheries and have intensive links with the Kenyan society.

To this end, this conference brings together Kenyan, Flemish and regional researchers, university teachers and students, policy makers/advisors and other key stakeholders involved or interested in marine science activities with development relevance for Kenya, to:

- provide insight in some of the most important recent and ongoing research and education projects and initiatives, including the Kenya Coastal Development Project, and in the Belgian, Kenyan and regional expertise existing in the various research fields;
- discuss critical needs, gaps and challenges identified in the Kenya Vision 2030 for the sustainable development of Kenya's coast and ocean, such as overexploitation of fisheries resources, mangrove degradation, climate change, aquaculture development and Marine Protected Area (MPA) management and put forward opportunities for future collaborations in these development relevant themes;
- establish a roadmap that defines the future marine research and education priorities in Kenya in line with the nation's development strategies and aimed at informing future policy and coordination efforts.

### Main topics of the conference

The various marine and coastal ecosystems in Kenya provide extensive natural resources that constitute unique opportunities for improved livelihoods, especially for the coastal communities. However, in the coastal region of Kenya, poverty is widespread in rural areas causing people to engage in practices that are not environmentally sustainable, such as destructive fishing practices, overharvesting of mangroves and pollution. In addition, the degradation of natural resources (e.g. mangrove forest) also contributes to climate change that in turn affects natural resources, resulting in socio-economic losses. Therefore, and in the face of Kenya achieving its nationally and internationally agreed development goals (e.g. Kenya Vision 2030, Kenya's National Climate Change Action Plan, Millennium Development Goals, National Aquaculture Development Strategy), efforts need to be directed towards sustainable development and climate change mitigations. Translating this for the coastal and marine component, the following critical challenges were identified and represent the main topics during the conference:

#### ***Sustainable use of marine resources - overexploitation, pollution and climate change***

Firstly, **marine and coastal fisheries resources** are facing a myriad of threats with overexploitation being one of the major challenges due to high fishing pressure in nearshore areas and the increasing use of highly efficient but non selective fishing methods which capture a high number of juveniles and non-target species. A great diversity of species are captured with demersal coral reef fish forming the majority of artisanal landings dominated by rabbitfish, emperors, parrotfish, goatfish, groupers and snappers. Considerable export earnings are also derived from the export of prawns, sea cucumbers, crabs, lobsters, live ornamental fish and invertebrates, squids and octopus. Offshore pelagic species in Kenya's Exclusive Economic Zone (EEZ) such as tuna, sailfish, swordfish and marlin remain virtually underexploited by local fleets due to limitations in appropriate gears and vessels. The EEZ is mainly exploited by distant water fishing nations. The current production levels are, however, deemed to be very low considering that Kenya's 200 nautical miles EEZ is located within the richest tuna belt in the Western Indian Ocean (WIO). These features pose enormous challenges for the **protection of biological diversity and for the sustainable development of fisheries exploitation.**

Secondly, **impacts of pollution and climate change** are a major threat to Kenyan ecosystems. Events such as increasing sea surface temperatures, changes in salinity, precipitation, water circulation and mixing, river runoff, contaminants and nutrient levels may result in cascading ecological effects leading to a loss of fish breeding and nursery habitats and thus eventual fishery production. Aiming at the sustainable management of exploited offshore and inshore marine resources, the Kenya government is currently investing in crucial activities such as fisheries stock assessments, understanding the biology and ecology of key target species, understanding the socio-economic dynamics of exploitation, understanding fishing gear impacts, exploring new and alternative environment friendly fishing technologies as well as monitoring the associated environmental and ecosystem interactions. In addition, the **new oceanographic research vessel, RV Mtafiti**, provides a unique opportunity to jointly explore new areas of research towards understanding the status of fisheries resources and the associated ecosystem impacts.

***Coastal resource management – blue carbon sinks, aquaculture development, integrated planning***

Targeted Kenyan coastal ecosystems for exploitation are coral reefs, seagrass beds, mangroves, estuaries,... often under overlapping responsibility of various governance bodies. Besides local dependence and utilization patterns (coastal communities), there are overlapping, aligned or conflictual interests, e.g. for the tourism industry, one of the major coastal assets, and global interest, such as carbon sequestration (for which mangroves play an underestimated major role). Coastal wetlands, mangroves, salt marshes and seagrasses, sequester and store large quantities of blue carbon in both the plants above ground and in the sediment below. For example, over 95% of the carbon in seagrass meadows is stored in the soils. Mangroves on the other hand capture and store five times more carbon than terrestrial forested ecosystem. When mangroves are degraded or destroyed all that sequestered and stored carbon is released back into the atmosphere as CO<sub>2</sub> emissions. The emissions released through ecosystem conversion are now being recognized by the IPCC and UNFCCC as significant sources of greenhouse gasses. Therefore a third critical challenge is the effective management and conservation of coastal wetlands, aimed at **safeguarding and enhancing blue carbon sinks**.

A fourth critical challenge for the development of Kenya is the **sustainable development of coastal and marine aquaculture for food production**. Aquaculture is the fastest growing food production sector with an average annual growth of 9% over the past 20 years (FAO, 2010). Yet sub-Saharan Africa lags behind with a production level that has stagnated at about 1% of the world production. In spite of the vast freshwater and marine resources of several African countries, current aquaculture activities are largely traditional, extensive, and operate below capacity. Until recently, government aquaculture policy in most African countries was incoherent and resulted in rather scattered initiatives. Policy makers and research entities in Africa, as well as donor organizations, are now increasingly aware of this situation, especially in view of the aggravating food situation in many countries. Kenya has had unprecedented growth of aquaculture in the last few years as a result of the implementation of its National Aquaculture Development Strategy. Through the Economic Stimulus Program, aquaculture has been revamped from production of 4,000 MT in 2007 to over 22,000 MT in 2011. This growth has, however, been experienced only within the freshwater sector. The marine aquaculture sector has hardly been touched. Kenya aims at reaching fish production over 100,000 MT from aquaculture in the short and medium terms. This will be achieved by diversification of farmed fish species, genetic improvement programs, and intensification of present systems, diversifying into new more intensive culture systems, reduction of post-harvest losses and increased value addition and promotion of fish consumption. Marine and coastal aquaculture is expected to play a central role in enhancing fish production both in terms of diversification of species and culture systems owing to the vast unexplored resources of the Kenyan Coast.

Coastal ecosystems are integrated ecosystems, depending on both continental systems (in case catchment processes) and marine systems at various scales. In practice, policy and governance and its management bodies rarely take into account this integrated nature. Since globally and this equally applies to East Africa and Kenya, coastal populations are very dense and increase faster than the demographic average, the pressure on the relatively narrow strip is disproportionately high. This pressure combined with socio-economically critical products and services offered by coastal and marine ecosystems demands **integrated planning and implementation**.

More information about the conference outputs will be available from the website:  
[www.vliz.be/kenya](http://www.vliz.be/kenya)