United Nations
Economic Commission for Africa

THE BLUE ECONOMY

THE BLUE ECONOMY

First printing November 2016
ISBN: 978-99944-68-74-4

Disclaimer
This report is the result of the analysis of a study commissioned by the United Nations Economic Commission for Africa, Sub-Regional Office for Eastern Africa (UNECA SRO-EA). However, the report does not purport to represent the views or the official policy of the institution or of any SRO-EA member country.

Nothing in this publication represents the official view or represents the official recognition of land or maritime international or internal borders by the Secretary General of the United Nations, the United Nations Organisation, UNECA or any other body, official or office affiliated to or subsidiary to the United Nations including regional offices, commissions or individuals acting in an official capacity on behalf of the United Nations. As provided for in the Terms and Conditions of Use of United Nations Web Sites, the opinions expressed in this publication do not necessarily reflect those of the United Nations or its member States.

The terms “region” and “sub-region” are used in this report without any political significance.

Table of Contents

4 The Geopolitical Context of the Blue Economy in Eastern Africa

5 Eastern African Maritime Transport and Sea Routes

6 The Blue Economy and Deep-Sea/Ocean Energy & Mineral Resources Development

List of Figures

List of Tables

List of Boxes

Acknowledgements

This publication was directed by Antonio M.A. Pedro (Former Director, UNECA SRO-EA) and Daya Bragante (Cluster Leader, UNECA SRO-EA), and edited by Colm Foy and Christian Lionet (French version). Iris Monnereau was the Lead Author. Chapter authors and contributors were as follows:

Chapter 2: Timothy Wilson (Author), Andrew Mold, Pedro Martins, Farzana Sharmin, Yohannes Hailu, Emmanuel Hakizimfura and Chali Nondo; Chapter 3: Patricia Ramarojaona and Pierre Failler (Authors), GRID-Arendal, Dixon Waruinge; Chapter 4: Daya Bragante (Author), Alex Benkenstein, Gabor Beszterczey, François Laurent, Allan Mukungu, Philippe Murcia, and the Office of Legal Affairs of the United Nations Division for Ocean Affairs and the Law of the Sea; Chapter 5: Yohannes Hailu, Ademun Odeke; Chapter 6: Yohannes Hailu and Jeremy Webb (Authors) and Ruud Kempener; Chapter 7: Iris Monnereau (Author); Chapter 8: Joe Wadawi (Author), Rayviscic Mutinda and Geoffrey Manyara. The French version was prepared and translated by Catherine Nallet. The editorial team is grateful for all the advice and guidance they received from UNECA SRO-EA and take responsibility for any errors or omissions that may have crept into the final version. Our thanks go to the participants of the 19th Intergovernmental Committee of Experts (ICE) meeting who provided invaluable inputs into the publication.

Preface

The concept of the Blue Economy integrates a new approach to the economic exploitation of the resources of our oceans, lakes, rivers and other bodies of water. Alongside the "green economy", it represents a basis for rational and sustainable use of natural resources, both renewable and non-renewable. For the Eastern African sub-region, the Blue Economy has assumed a special significance, since the sub-region spans the entire central belt of the continent of Africa, reaching from the Western Indian Ocean to the Atlantic, and taking in the vast aquatic reserves of the Great Lakes.

The significance of the Blue Economy for the sub-region was recognised by the Intergovernmental Committee of Experts at its 19th meeting in Antananarivo from 2-5 March, 2015. At that meeting, organised by UNECA's Sub-Regional Office for Eastern Africa (SRO-EA), it was decided that an effort should be undertaken by SRO-EA to evaluate the opportunities inherent in a Blue Economy approach, while examining the challenges associated with key areas of economic endeavour in the sub-region. The areas of economic activity to be analysed – natural-resource management, maritime transport, energy, fisheries and tourism – were chosen because of their significance to the communities of the sub-region, their development potential and their importance to a Blue Economy strategy. To place these areas in context, the report presented here also includes analysis of the macro-economy of the sub-region and the Western Indian Ocean, relevant geopolitical issues and regional networks that can be used to support a Blue Economy approach to economic development.

The result is a remarkable catalogue of the opportunities and challenges associated with adopting a Blue Economy strategy for economic and social development in the Eastern African sub-region. The story told here reveals possibilities for inclusive and integrative development that has evaded policy makers hitherto. This is especially important in the context of the accelerated growth that many countries in Africa are experiencing without any concomitant reduction in poverty or significant rise in prosperity. When considered alongside the prospects for sustainable and inclusive growth already identified by a green-economy approach, the conclusions of this report represent hope for policy makers and the peoples of the region. The rich and varied ecosystems that are connected and interconnected with each other, reaching far into the hinterland and linking two oceans, can provide a basis for development that is at the same time inclusive and sustainable.

It is now up to policy makers and the international community to seize the opportunities identified and presented in this report.

Antonio M.A. Pedro,
Former Director, UNECA SRO-EA
Director, UNECA Sub Regional Office for Central Africa (SRO-CA)

Abbreviations and Acronyms

ACPC	African Climate Policy Centre
AEGM	Ad-Hoc Expert Group Meeting
AfDB	African Development Bank
AGEDI	Abu Dhabi Global Environmental Data Initiative
AIAI	Al-Ittihad al-Islami
AIMS	Africa's Integrated Maritime Strategy
AMD	Africa's Maritime Domain
AMDC	African Minerals Development Centre
AMISOM	African Union Mission in Somalia
AMTC	The African Maritime Transport Charter
AMV	Africa Mining Vision
AOR	Area of Operation
APP	Africa Progress Panel
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASCLME	Agulhas and Somali Large Marine Ecosystems
AU	African Union
AUC	African Union Commission
BCE	Before Common Era
BE	Blue Economy
CAADP	Comprehensive Africa Agriculture Development Programme
CAFRS	Comprehensive African Fisheries Reform Strategy
CBNRM	Community-Based Natural Resource Management
CC DARE	Climate Change Adaptation and Development Initiative
CC-TTFA	Central Corridor-Transit and Transport Facility Authority
CCZ	Clarion-Clipperton Zone
CEPF	Critical Ecosystem Partnership Fund
CEPGL	Communauté Économique des Pays des Grands Lacs
CGIAR	Consultative Group on International Agricultural Research
CGPCS	Contact Group on Piracy off the Cost of Somalia
CIA	Central Intelligence Agency
CIF	Carriage, Insurance and Freight
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLCS	Commission on the Limits of the Continental Shelf
CMF	Combined Maritime Forces
COFI	Committee on Fisheries
COMESA	Common Market for Eastern and Southern Africa
COMRA	China Ocean Mineral Resources Research and Development Association

COP	Conference of the Parties
CRIMLEA	Critical Maritime Routes Law Enforcement Agency
CSIC	Consejo Superior de Investigaciones Científicas – Superior Scientific Research Council
CTF	Combined Task Force
DAC	Development Assistance Committee
DEPI	Division of Environmental Policy Implementation
DFID	Department for International Development
DMTI	Dar es Salaam Maritime Training Institute
DRC	Democratic Republic of Congo
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management Strategy
DSM	Deep Sea Mineral
DWF	Distant Water Fleets
DWFNs	Distant Water Fishing Nations
EA	Eastern Africa
EAC	East African Community
EAH&RC	East African Harbours and Railways Corporation
EAME	Eastern Africa Marine Ecoregion
EASSI	East African Sub-Regional Support Initiative for the Advancement of Women
ECA	United Nations Economic Commission for Africa
ECCAS	Economic Community of Central African States
ECGLC	Economic Community of the Great Lake Countries
EEZ	Exclusive Economic Zone
EIA	Energy Information Administration
EIA	Environmental Impact Assessments
EITI	Extractive Industries Transparency Initiative
EIU	Economist Intelligence Unit
EJIM	Eritrean Islamic Jihad
ENSO	El Niño Southern Oscillations
ESA-IO	Eastern, Southern Africa and Indian Ocean
ETC	European Travel Commission
EUNAVFOR	European Union Naval Force
FAL	The Convention on The Facilitation of International Maritime Transport
FAO	Food and Agriculture Organisation
FADs	Fish Aggregating Devices
FDI	Foreign Direct Investment
FOB	Free on Board
FPA	Fishery Partnership Arrangements
GDP	Gross Domestic Product

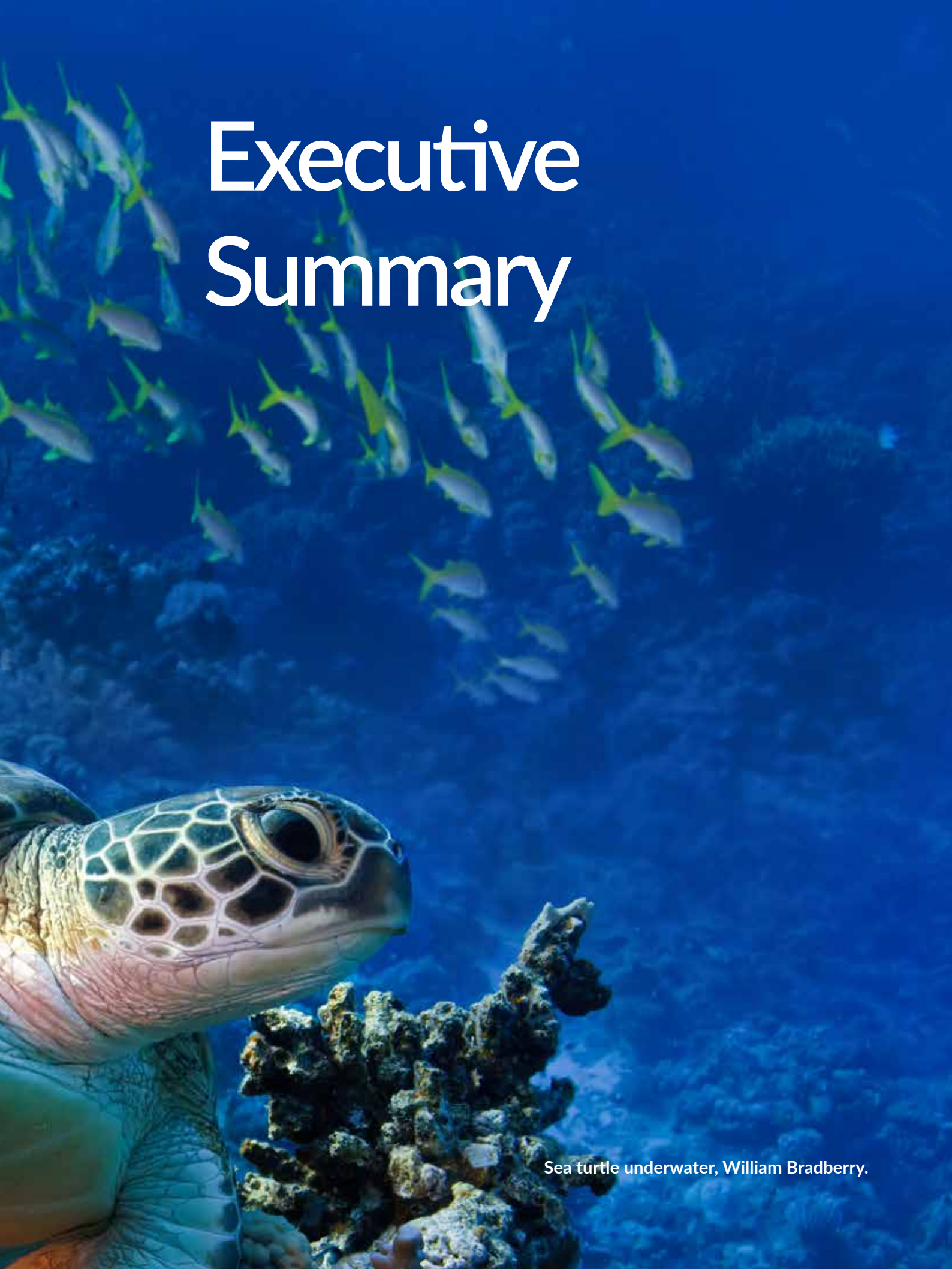
GEAS	Global Environmental Alert Service
GEF	Global Environment Facility
GHG	Greenhouse Gas
GTI	Global Terrorism Index
ICE	Intergovernmental Committee of Experts
ICGLR	International Conference on the Great Lakes Region
IcSP	Instrument contributing to Stability and Peace
ICT	Information and Communication Technology
IEA	International Energy Agency
IDP	Internally Displaced People
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policies Research Institute
IGAD	Intergovernmental Authority on Development
GLFC	Great Lakes Fishery Commission
IGOs	Intergovernmental Organisations
IGP	Integrated Growth Pole
ILO	International Labour Organisation
IMF	International Monetary Fund
IMLI	International Maritime Law Institute
IMO	International Maritime Organisation
IMSSEA	International Maritime Safety, Security and Environmental Academy
INTERPOL	International Criminal Police Organisation
INCOTERMS	International Chamber of Commerce's international trade and shipping terms
IOC	Indian Ocean Commission
IOM	International Organisation for Migration
IOMOU	Indian Ocean Memorandum of Understanding
IOR-ARC	Indian Ocean Rim Association for Regional Cooperation
IOTC	Indian Ocean Tuna Commission
IPCC	Intergovernmental Panel on Climate Change
IPOA–IUU	Illegal, Unreported and Unregulated Fishing
IRENA	International Renewable Energy Agency
ISA	International Seabed Authority
ISCOS	Intergovernmental Standing Committee on Shipping
ISPS	International Ship and Port Facility Security Code
ITU	International Telecommunication Union
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported and Unregulated
KNSWF	Kenya National Sovereign Wealth Fund

KR	Kenya Railways
LDC	Least Developed Countries
LME	Large Marine Ecosystem
LMMA	Locally Managed Marine Area
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTA	Lake Tanganyika Authority
LVBC	Lake Victoria Basin Commission
LVDP	Lake Victoria Development Programme
LVFO	Lake Victoria Fisheries Organisation
MARPOL	International Convention for the Prevention of Pollution from Ships
MASE	Maritime Security Programme
MCS	Monitoring, Control and Surveillance
MICE	Meetings, Incentives, Conventions and Exhibitions
MNRT	Ministry of Natural Resources and Tourism (Tanzania)
MOWCA	Maritime Organisation of West and Central Africa
MPA	Marine Protected Area
NAPA	National Adaptation Programme of Action
NATO	North Atlantic Treaty Organisation
NBI	Nile Basin Initiative
NC-TTCA	Northern Corridor-Transit and Transport Coordination Agency
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organisation
NGR	Narrow Gauge Railway
NTIC	New Technologies of Information and Communication
ODA	Official Development Assistance
ODINAFRICA	Ocean Data and Information Network for Africa
OECD	Organisation for Economic Co-operation and Development
OOS	Operation Ocean Shield
OPEC	Organisation of the Petroleum Exporting Countries
OTEC	Ocean Thermal Energy Conversion
PAF	Partnership for African Fisheries
PERSGA	Regional Organisation for the Conservation of the Environment of the Red Sea and the Gulf of Aden
PES	Payment for Ecosystem Services
PLF	Palestine Liberation Front
PMAESA	Ports Management Association of Eastern and Southern Africa
PNA	Parties to the Nauru Agreement
PSC	Port State Control
PwC	PricewaterhouseCoopers
RCM	Regional Coordination Mechanism

RDB	Rwanda Development Board
RE	Renewable Energy
REC	Regional Economic Community
REDD	Reduction of Emission due to Deforestation and Forest Degradation
RFB	Regional Fisheries Bodies
RFMO	Regional Fisheries Management Organisation
RMDI	Responsible Mineral Development Initiative
R-PP	Readiness Plan Proposal
RVR	Rift Valley Railway
SADC	Southern African Development Community
SAMREC	South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves
SDGs	Sustainable Development Goals
SeyCCAT	Seychelles' Conservation & Climate Adaptation Trust
SIDS	Small Island Developing States
SIOFA	South Indian Ocean Fisheries Agreement
SLOC	Sea Lane of Communication
SOLAS	International Convention for the Safety of Life at Sea
SPC	Secretariat of the Pacific Community
SRCM	Sub-Regional Coordination Mechanism
SRG	Standard Railway Gauge
SRO-CA	Sub Regional Office for Central Africa
SRO-EA	Sub-Regional Office for Eastern Africa
SSA	Sub Saharan Africa
STCW	International Convention on Standards of Training, Certification and Watchkeeping
SUA	Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation
SUMED	Suez-Mediterranean Pipeline
SWFs	Sovereign Wealth Funds
SWIOFC	South West Indian Ocean Fisheries Commission
SWP	German Institute for International and Security Affairs
TAH	Trans Africa Highway
TANESCO	Tanzania Electric Supply Company
TAZARA	Tanzania-Zambia Railway
TNC	The Nature Conservancy
TRANSMAP	Transboundary Network for Sustainable Marine Protected Areas
TRC	Tanzania Railway Corporation
TTCA-NC	Transit Transport Coordination Authority of the Northern Corridor
TTFA-CA	Transit Transport Facilitation Authority of the Central Corridor

TTFA-CC	Central Corridor Transit Transport Facilitation Agency
UAE	United Arab Emirates
UASC	United Arab Shipping Company
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNCSD	United Nations Conference on Sustainable Development
UNCTAD	United Nations Conference on Trade and Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDOALOS	United Nations Division for Ocean Affairs and the Law of the Sea
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organisation
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNODC	United Nations Office on Drugs and Crime
UNWTO	United Nations World Tourism Organisation
USA	United States of America
USD	United States Dollar
USGSS	United States Geological Survey
VCS	Verified Carbon Standard
VDS	Vessel Day Scheme
WB	World Bank
WCS	Wildlife Conservation Society
WFP	World Food Programme
WIO	Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association
WMU	World Maritime University
WOC	World Ocean Conference
WTO	World Trade Organisation
WTTC	World Travel and Tourism Council
WWF	World Wildlife Fund

Executive Summary



Sea turtle underwater, William Bradberry.

Executive Summary

The notion of the Blue Economy is receiving increasing attention as an avenue for development in Africa. At the 19th Session of the Intergovernmental Committee of Experts (ICE), held from the 2nd to the 5th of March 2015 in Madagascar, the participants recognised that the Blue Economy in Eastern Africa has an important role to play in contributing to structural transformation, sustainable economic growth and enduring social development. In this report, the Blue Economy covers all bodies of water, including lakes and rivers, in addition to seas, coasts and oceans. It thus includes land-locked States in, for example, the Great Lakes Region. The main sectors of the Blue Economy are traditional sectors such as fisheries, aquaculture, tourism, transport, and ports, as well as emerging sectors such as renewable energy and deep sea mining. These sectors do not function in isolation. They have multiple links with other sectors in the economy. Strengthening these links is important for the growth of the Blue Economy and maximising the retention of wealth creation within the region. Properly implemented, the Blue Economy can help address longer-term challenges, such as biodiversity loss, maintaining competitiveness in an era of globalisation, climate-change mitigation and adaptation, poverty alleviation and relieving increasing pressure on natural resources.

The Blue Economy is an economic opportunity for the state and the private sector act as catalysts for economic development, while observing the highest social, governance and environmental considerations. It is founded on sustainable use of aquatic ecosystems, inclusiveness, conservation and on the principles of the *Sustainable Development Goals* 6 and 14 on *"Ensure availability and sustainable management of water and sanitation for all"* and *"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"* respectively.

This report highlights the importance of traditional and newly emerging Blue Economy sectors and the issues involved in their effective development in Eastern Africa. It also provides a deeper understanding of their potential, as well as the geopolitical dimensions associated with their access and management, and reviews potential climate-change impacts on the Blue Economy and sustainable natural-resource management in the region. The report further provides reflections on the necessary actions to build the foundations and enabling environment for a thriving Blue Economy in the Eastern Africa. It serves as a building block for further development of policies to support the Blue Economy.

The International Seabed Authority (ISA), whose main function is "to regulate deep seabed mining and to give special emphasis to ensuring that the marine environment is protected from any harmful effects which may arise from mining activities including exploration and exploitation" has issued exclusive exploration permits to the China Ocean Mineral Resources Research and Development Association (COMRA) and the Republic of Korea to undertake polymetallic sulphides exploration in the Indian Ocean. The Authority has also given a permit to the Government of India to undertake polymetallic nodules exploration in the Indian Ocean. This is an opportunity that Eastern African countries should also exploit. The resources of the high seas are an international

public good to which all nations on planet Earth have a legitimate right. Thus, as discussed in Madagascar, Eastern African member States should approach ISA together or individually to assert their rights and establish their claims to deep-ocean resources.

The findings of the report demonstrate that, despite significant endowments in Blue Economy resources, Eastern Africa has failed to achieve growth with sustainable and inclusive development and poverty is still prevalent in the region. Traditional and non-traditional Blue Economy sectors still face challenges that belie their potential for contributing to inclusive growth. This can only be achieved if there is a better alignment between the different Blue Economy sectors and greater coherence between schemes and initiatives. This requires significant investment of time and energy on the part of decision makers who need to build stakeholder consensus and promote corporate social responsibility by engaging private-sector associations. Blue Economy development can only take place with the participation of stakeholders at all levels and at all stages. Social inclusion in the distribution of benefits is essential, as is focus on small- and medium-sized producers and the use of cutting-edge technology, while promoting food security in the region.

This report further illustrates the propensity of the Blue Economy to advance the good governance of marine and freshwater resources in Eastern Africa. Political leaders in the Eastern African region will need to articulate a clear vision of the Blue Economy, including the transition paths and the distribution of costs and benefits, as well as the environmental challenges and opportunities that will follow. A Blue Economy vision of Eastern African countries is needed and can be based on the proposed Blue Economy Handbook to build consensus on a national vision for the oceans, coastal and freshwater economy. Such a vision would help establish a framework for investments, for business, and for the understanding and management of natural capital.

Governments have many roles that are essential for the development of the Blue Economy but the private sector and civil society are also fundamental actors. Opportunities for economic initiatives to support the Blue Economy described in this report include Blue Carbon projects, Blue Bonds, seafood certification schemes, 'green fees', new fishery agreements, payment for ecosystem services and debt swaps.

A sustainable Blue Economy strategy favours those freshwater and maritime economic activities that contribute to the overall sustainability of lakes, rivers, oceans, seas and coasts. It also promotes a transformation of business models within traditional activities towards sustainable opportunities. Such a strategy promotes specific actors to develop and implement integrated initiatives that contribute to the long-term value of lakes, rivers, coast lines and sea-shores. Solutions will also require a range of long-term measures that are technically outside the Blue Economy including education and employment schemes, community support, microfinance and the development of non-marine/aquatic enterprises.

Outline of the Report

Chapter 1: Introduction

This chapter provides background information on the Blue Economy.

Chapter 2: A Macroeconomic Snapshot of Eastern Africa

The chapter provides information on macro-economic conditions in the 14 member States of Eastern Africa.

Chapter 3: Climate Change and Sustainable Natural Resource Management

This chapter explores the natural resources available, the expected impacts of climate change, natural resource management in the region in relation to the Blue Economy and the challenges in its development.

Chapter 4: Role of Geopolitics

This chapter discusses the geopolitical implications of the Blue Economy in Eastern Africa and its national and regional dimensions.

Chapter 5: Maritime Routes and Transport

This chapter discusses the importance of maritime trade for the coastal, island and land-locked States in Eastern Africa.

Chapter 6: Deep Sea Mining & Energy Development

This chapter explores the development of deep-sea energy technologies and the exploitation of off-shore oil and gas reserves. It looks at renewable-energy implications and the potential for the future energy capacity and security of coastal and island States in the region.

Chapter 7: Fisheries and Aquaculture: Trends, Opportunities and Challenges

This chapter focuses on fisheries (marine capture, freshwater and aquaculture) and the interface with food security, livelihoods, and export revenues. It examines the challenges the fishery is facing as well as the opportunities for further development of the sector in the region.

Chapter 8: Sustainable Tourism Management

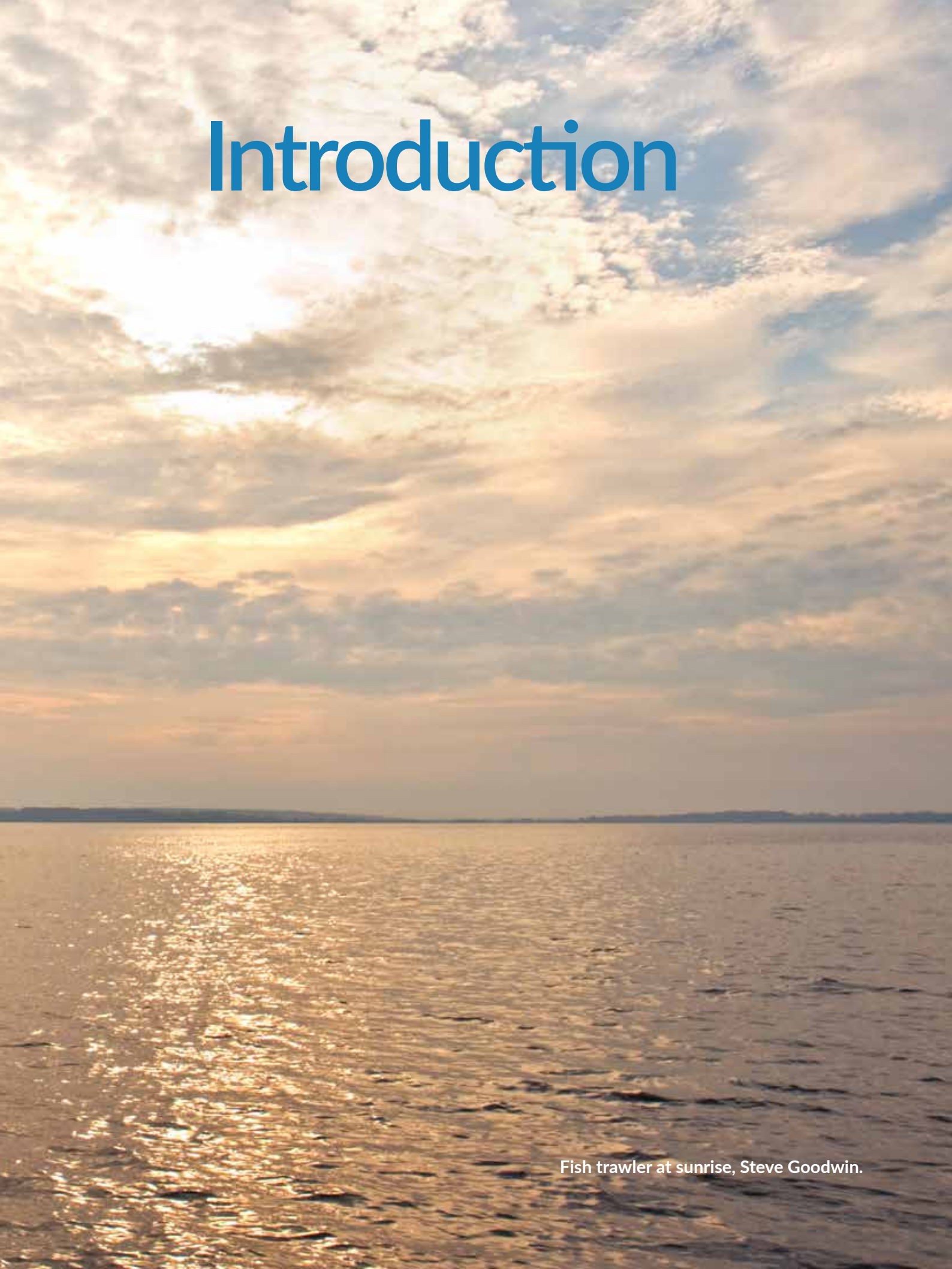
This chapter discusses the state of tourism development in Eastern Africa, including the challenges confronting the sector and its growth opportunities.

Chapter 9: Enabling Environment to Anchor the Blue Economy: Policy Frameworks, Partnerships and Regional Co-operation

This chapter outlines the policy, legal and regulatory frameworks that can foster the development of the Blue Economy in Eastern Africa. It includes recommendations for policy makers.

1

Introduction



Fish trawler at sunrise, Steve Goodwin.

1.1 Background to the Blue Economy

More than 70% of the Earth is covered by water. Water is the starting point for all life, including humanity[1]. Not only is water a precondition for the existence of life it also provides food security from fish and other sources, energy from oil and gas, transport routes and renewable energy. Blue Economy development is key to the long-term sustainability of freshwater, coastal and ocean space as healthy oceans and freshwater resources are inextricably linked to the long-term management, development and well-being of coastal and riparian populations.

Half the world's population lives within 60 km of the sea and three quarters of all large cities are located on the coast[2]. Oceans and freshwater sources provide livelihood and employment to millions of people. The UN Food and Agriculture Organisation (FAO) estimates that fish provides more than 4.2 billion people with over 15% of their animal protein intake (FAO, 2014).[3] Of the world's international trade 90% is transported by sea.[4] The global market for marine biotechnology is projected to reach USD 4.9 billion by 2018, driven by increased investments in marine biotechnology research and growing demand for natural marine ingredients. There are perhaps more than 10,000 marine species about which very little is known that could have a huge potential for developing new foods, pharmaceuticals, bioenergy, and cosmetics (The Commonwealth, 2014).[5] To meet the increasing energy demand, oil and gas will continue to be the major source of the world's energy well into the 21st century. Over the six decades from the 1950s, off-shore hydrocarbon extraction has increased tremendously. By 2015, approximately 30% of world oil and gas production comes from offshore and it is expected to continue to increase in the future.[6] Fisheries supply direct employment to over 730,000 people in the Eastern African region and millions more are engaged in the fish value chain in processing, commercialisation and marketing of fish. Many are small-scale operators supplying food to local and sub-regional markets. The Blue Economy in certain Eastern African countries contributes as much as 27% of revenues and 33% of total export revenues (see chapter 2).

New technologies are beginning to tap into these deep-sea resources and into new tidal, thermal, waves and wind sources of energy. In addition, the Blue Economy provides opportunities for leisure activities and respects cultural and religious values. The sea and rivers evoke cultural imaginations of freedom, adventure and leisure activities; coastal and riparian communities often base their identities on these natural features. Coastal habitats such as mangroves, seagrass beds and coral reefs provide protection from storms and surges, nursing habitats for ocean life and are natural carbon sinks. Tourism is one of the largest businesses in the world; coasts attract tourism that relies on clean beaches, safe water and an abundance of sea life. However, the seas and freshwater resources are also facing severe environmental degradation due to pollution, overfishing

[1] http://www.unep.org/urban_environment/issues/coastal_zones.asp
[2] http://www.unep.org/urban_environment/issues/coastal_zones.asp
[3] FAO, 2014. State of the World Fisheries and Aquaculture: Opportunities and challenges. FAO. Rome
[4] http://www.ics-shipping.org/shipping-facts/shipping-and-world-trade
[5] Commonwealth, The. 2014. The Oceans Economy for Small Island Developing States. The Commonwealth. Trade Hot Topics. Issue 110
[6] http://www.modec.com/about/industry/oil_gas.html

and the impact of climate change, among other things. Healthy oceans and freshwater resources are inextricably linked to the long-term management, development and well-being of coastal and riparian populations. This myriad of ecosystem services the oceans, coastal zones and freshwater, and provides an increasing opportunity for use by modern technology but requires a holistic approach to development that includes exploitation of the Blue Economy that is sustainable.

That *"The Blue Economy is Africa's Future"* was the unequivocal statement made by Seychelles Deputy President Danny Faure in 2014 at the 22nd Ordinary Session of the Assembly of Heads of State and Government of the African Union. In the African Union's *2050 Africa's Integrated Maritime Strategy (AIMS)* the Blue Economy is described as the "new frontier of African Renaissance". The fairly new concept of the Blue Economy has also been at the centre of the AU's Agenda 2063, where it was unanimously declared 'Africa's future': "Africa's Blue economy shall be a major contributor to continental transformation and growth, advancing knowledge on marine and aquatic biotechnology, the growth of an Africa-wide shipping industry, the development of sea, river and lake transport and fishing; and exploitation and beneficiation of deep sea mineral and other resources". Maritime zones under Africa's jurisdiction total about 13 million square kilometres, including territorial seas and Exclusive Economic Zones (EEZ) and approximately 6.5 million square kilometres for the continental shelf (for which countries have jurisdiction over only the seabed).[7] The lacustrine (or lake) zones of Africa cover approximately 240,000 square kilometres.[8]

African states are starting to recognise the importance of the Blue Economy. For instance, Seychelles has declared that development of the Blue Economy is a prime objective of the government and has established a "Ministry of Finance, Trade and the Blue Economy". The Indian Ocean Commission (IOC) has argued that the Blue Economy should be an integral part of future negotiations on the green economy and is developing a Blue Economy Action Plan for its member States. The 2050 AIMS, developed by the AU Commission as a vision for Africa's future, emphasises the socio-economic benefits of the Blue Economy and blue-growth development for future African generations.

On the other hand, South Africa is developing its own Blue Economy strategy as are some of the Indian Ocean Countries. Furthermore, the African Development Bank wants to create a platform for African countries to discuss ways to work together in developing Blue Economies and is putting this strategy at the forefront of discussions on the continents' economic future. Similarly, the UN Economic Commission for Africa (UNECA) and the African Climate Policy Centre (ACPC) released a report in 2014 that also highlighted the Blue Economy, *Unlocking full potentials of the Blue Economy: Are African SIDS ready to embrace the opportunities?* Most recently at the 8th Conference of Parties meeting to the Nairobi Convention, held from 22-24 June, 2015 (COP8) in Mahé, Seychelles, there was a special two-day workshop entitled "Blue Economy and Ocean Governance". In the decisions made at the meeting it was decided that contracting parties should be urged to apply Blue (or ocean) Economy approaches as pathways for sustained economic growth, food security, poverty eradication, job creation and environmental sustainability.

---

[7] GRID-Arendal, 2015. Area coverage of African marine spaces, compiled from unpublished raw data

[8] GRID-Arendal, 2015. Area coverage of African lacustrine spaces, compiled from unpublished raw data

The Blue Economy covers all bodies of water, including lakes and rivers, in addition to oceans and the coast. The main sectors are fisheries, aquaculture, tourism, transport, ports, energy and mining with many links to others in the economy. The Mahé meeting stressed the importance of developing these links to maximise wealth creation within the region. The Blue Economy can contribute to addressing longer-term challenges that are economic, environmental or social resulting from globalisation, climate change and pressure on finite natural resources.

The Blue Economy concept grew out of the dissatisfaction of Small Island Developing States (SIDS) and coastal nations throughout the preparatory process for Rio +20. These countries sought to extend the green economy concept to be more applicable to their circumstances and stressed a focus on the "Blue Economy".[9] The differences can, for example, be found in the importance of agriculture versus fisheries in the green economy. SIDS and some coastal States, in addition, are unable to make proper use of Reducing Emissions from Deforestation and Forest Degradation (REDD) programmes, but they nonetheless enjoy potential for renewable and non-renewable energy in coastal and offshore areas.

Globally, there is increasing attention to the need for sustainable development and to take into account its three pillars of environmental, economic and social sustainability as expressed in the 2012 Rio+20 outcome document, *The Future We Want*. The concept of the Blue Economy thus builds on the various Rio and subsequent declarations developed over the 20 years leading up to Rio+20[10] and on the increasing attention to the oceans and seas, as well as the statements of regional and national leaders. Throughout and since the Rio+20 process, there has been a growing appreciation that the world's oceans and seas and SIDS require more in-depth attention and co-ordinated action. This is reflected in various initiatives such as the:

- Three SIDS conferences and their outcomes (The Barbados Plan of Action (1994); the Mauritius Strategy (2005) and its subsequent review in 2010; and the S.A.M.O.A. pathway (2014);
- United Nations Department of Economic and Social Affairs (UNDESA) expert group meeting on Oceans, Seas and Sustainable Development;
- Work of the Global Ocean Commission;
- Global Partnership for Oceans;
- Prominence of oceans and seas in the UN five-year Action Agenda 2012-2016; and
- UN Sustainable Development Goal #14 to *"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"*;
- Signing of declaration *Because the Ocean* at the 21th Session of the Conference of the Parties (COP 21) of the UN Framework Convention on Climate Change (UNFCCC) by 22 nations with three specific objectives:
  - A Special Report on the Ocean by the Intergovernmental Panel on Climate Centre (IPCC);
  - The UN Oceans Conference in Fiji in June 2017 which will specifically focus on the Sustainable Development Goals (SDG) #14; and
  - The elaboration of an ocean action plan under UNFCCC.

[9] https://sustainabledevelopment.un.org/content/documents/2978BEconcept.pdf

[10] The Rio Declaration on Environment and Development, 1992 United Nations "Conference on Environment and Development" (UNCED); UN, 2012. The Future We Want: "Outcome document" adopted at Rio+20; and the conventions on biodiversity, on climate change and on desertification; UNEP (2013). Green Economy Definition. http://www.unep.org/greeneconomy/AboutGEI/

In addition, in the region, there have been many trans-boundary initiatives such as the Nile Basin Initiative (NBI) which is a regional intergovernmental partnership that seeks to develop the River Nile in a co-operative manner, share substantial socio-economic benefits and promote regional peace and security amongst the eleven participating countries. The Lake Victoria Fisheries Organisation (LVFO) and the Great Lakes Fishery Commission (GLFC) are regional organisations tackling decreasing levels of fish production, habitat loss and invasive species, while integrating land-use decisions into ecosystem management and addressing the negative effects of globalisation.

The United Nations Environment Programme (UNEP, 2012) notes that the Blue Economy aims at the same outcome as the "green economy" namely: "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2012). The Abu Dhabi Declaration describes the Blue Economy as a tool to promote sustainable development and poverty eradication, and create sustainable livelihoods, reduce disaster risk in coastal areas and the mitigation of, and adaptation to, climate change in SIDS and coastal countries.

This report extends to land-locked States because the risks and benefits associated with the Blue Economy are also felt in the hinterland of neighbouring countries that rely on coastal ports for export and trade. The Blue Economy also encompasses aquaculture, freshwater fishing and renewable energy, all of which are relevant to land-locked countries. At the March 2015 Antananarivo SRO-EA ICE meeting, there was consensus that the concept should apply to all bodies of water including lakes and rivers as well as to seas and the coast.

The fundamental principles of the Blue Economy are:

1. Promotion of **sustainable use** and management of aquatic ecosystems and associated resources through a multi-sectoral approach and clustering, with a special focus on value addition, job creation, skills acquisition, broad-based technology and on building links between the Blue Economy and other sectors;
2. Optimisation of the socio-economic **benefits** received from the sustainable development of aquatic environments and the participation of stakeholders at all levels and at all stages for inclusive growth including gender equality, and enhanced food security;
3. **Conservation** of aquatic ecosystems and associated resources through reduction of threats and impacts from climate change and natural disasters; and
4. Attainment of the **Sustainable Development Goals** (SDGs) # 14: *"Conserve and sustainably use the oceans, seas and marine resources for sustainable development,"* and # 6 *"Ensure access to water and sanitation for all."*

While the Blue Economy adopts the principles of the green economy to pursue its objective of sustainable use of marine and freshwater resources, there are several aspects that require special attention:

- Three-dimensional planning, as the sea space includes the surface, the water column and the seabed;
- Multiple uses within same maritime space that can result in conflicts (e.g. port development and tourism);

- A number of activities (e.g. maritime shipping and fishing) that extend over large areas and across borders requiring transnational co-ordination and regulation (not only at sea but also in the Great Lakes region, for example);
- Different jurisdictions over territorial waters, Exclusive Economic Zones (EEZs), and high seas, but frequently vague or contested demarcation of borders;
- Large EEZs in comparison to landmass/coastline and large freshwater bodies in relation to shorelines making monitoring, control and surveillance (MCS) difficult and offering opportunities for large-scale illegal activities (e.g. illegal fishing, piracy, human trafficking …);
- High level of uncertainty about the future impacts of current activities (the impacts, for example, of current fishing activities on the sustainability of the stocks) that hampers the design of appropriate policies and plans.

The Blue Economy can provide opportunities, such as the commercially viable oil and gas deposits discovered of the coasts of Kenya, Uganda, and Tanzania, with the potential for even more. Development of the 'blue frontier' thus provides great potential for accelerating structural transformation and creating inclusive and sustainable growth in the Eastern African region. However, there are also contemporary challenges associated with development of the Blue Economy in the region. These involve 'social' threats such as piracy and sustained trafficking of illicit narcotics, weapons, and people within, and via, the Indian Ocean, and 'natural' threats from tsunamis and hurricanes but also sea-level rise, ocean acidification and pollution. Overfishing caused by illegal, unreported and unregulated (IUU) fishing and other unsustainable fishing practices also pose a serious problem in the region. These challenges need to be addressed in the overall development of the Blue Economy.

The steps taken in Africa to adopt a Blue Economy approach reflect a wider appreciation at the global level of the importance of the concept. Hence, the United Nations has adopted ocean development and the concept of the Blue Economy as part of its development goals. Although the Blue Economy is not particularly mentioned, the SDG target 14.7 is of critical importance for the Blue Economy as it recommends to *"by 2030 increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism"*. This concept includes recognition that the productivity of healthy freshwater and ocean ecosystems is a pathway for water-based economies, and can ensure that islands and other coastal countries benefit from their marine resources. Blue growth is, therefore, in itself a source of opportunity, and investment.

1.2 Objective of the Report

The main objective of this report is to raise awareness about the importance of the Blue Economy to Eastern Africa and the requirements it takes to develop it in a sustainable manner. The report was prepared as an input to the 19th session of the Intergovernmental Committee of experts (ICE), a statutory meeting of UNECA SRO-EA. The event was organised in Antananarivo, Madagascar on 2-5 March 2015 under the theme "Harnessing the Blue Economy for Eastern Africa's Development". The

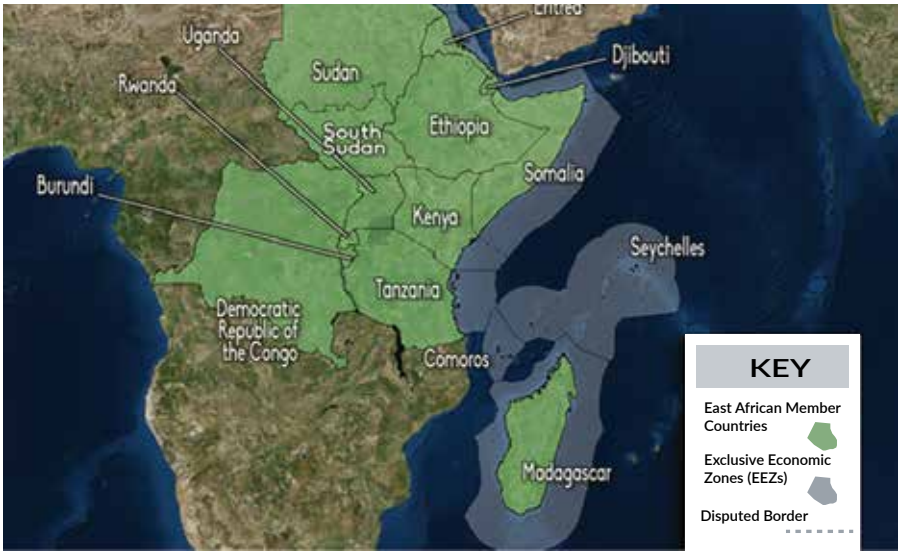
report highlights the importance of traditional and newly emerging Blue Economy sectors and identifies issues affecting their development in Eastern Africa. It provides a deeper understanding of the geopolitical dimensions impacting the exploitation and management of Blue Economy resources and how to combine these with climate-change effects and sustainable natural-resource management in the region.

1.3 Area Covered by the Report

The study focuses on Eastern Africa. As defined by UNECA SRO-EA, this is a diverse region comprising of 14 countries, 367 million people and covers approximately 7.3 million square metres. It includes the coastal States of Kenya, Somalia and Tanzania, the island States of Comoros, Madagascar and Seychelles in the western Indian Ocean (WIO), the Red Sea States of Djibouti and Eritrea and the land-locked countries of Burundi, the Democratic Republic of Congo (DRC) Ethiopia, Rwanda, South Sudan and Uganda (Figure 1.1). The region, home to about one third of Africa's population, takes up one quarter of its land area. There is a high level of interdependency especially for land-locked States that rely on access to port facilities in neighbouring coastal countries.

It should be noted that the United Nations Convention on the Law of the Sea (UNCLOS) provides that all States are entitled to lay submarine cables and pipelines on the continental shelf of the neighbouring coastal State.[11] Land-locked States also enjoy the right of access to and from the sea and the freedom of transit through the territory of neighbouring States, as well as the right of access to and from the sea for the purpose of exercising the rights provided for under UNCLOS relating to the freedom of high seas and the common heritage of mankind.[12]

FIGURE 1.1 Map of Eastern African countries including their EEZs (transparent blue)



Source: Drawn by UNECA SRO-EA

[11] UNCLOS, Article 79
[12] Ibid., Part X

The Eastern African region is broadly experiencing a period of strong economic growth. Its economy grew faster than the African average of 3.7% from 2008 to 2013 and nearly three times faster than the world average (2.0%). Ethiopia, Rwanda and Uganda were the regional leaders in economic growth. Ethiopia and Rwanda tripled and doubled their economies respectively, between 2005 and 2013. The positive developments in Africa have been tempered by a jobs crisis, youth unemployment and growing inequality. Future growth must bring jobs and equal opportunities. Economic transformation should enable sustainable development. Linking Africa's transformation agenda with development of the Blue Economy in the region is, therefore, crucial.

In Eastern Africa, the development of the Blue Economy builds on traditional sectors that have existed for centuries, such as fishing and maritime trade, but it also includes new sectors such as deep-sea mining and renewable ocean energy (Table 1.1).

Fisheries resources are an important – often the main – source of protein for coastal communities; over 3.7 million metric tonnes were landed in the region in 2009.[13] The fishing industry generates direct and indirect employment and is a source of fiscal revenues, as well as income from servicing foreign fleets in regional ports (Allison, 2011) for millions of people in the region.

TABLE 1.1 Components of the Blue Economy

Type of activity	Blue Economy sectors
Harvesting of living aquatic resources (seafood, plant marine organisms, and marine-biotechnological products)	Fishing (inland, coastal and deep seas)
	Aquaculture
	Mariculture
	Pharmaceuticals, chemicals, cosmetics, genetic research
Extraction of non-living resources and generation of new energy resources	Deep-sea and seabed mining
	Offshore oil and gas
	Renewable energy
Commerce and trade in and around the ocean and rivers	Maritime transport and port infrastructure and services
	River transport
	Tourism and recreation
Protection	Coastal protection
Cultural and religious values	Cultural and religious practices
Knowledge and information	Biophysical, socio-economic and political research Marine biotechnology

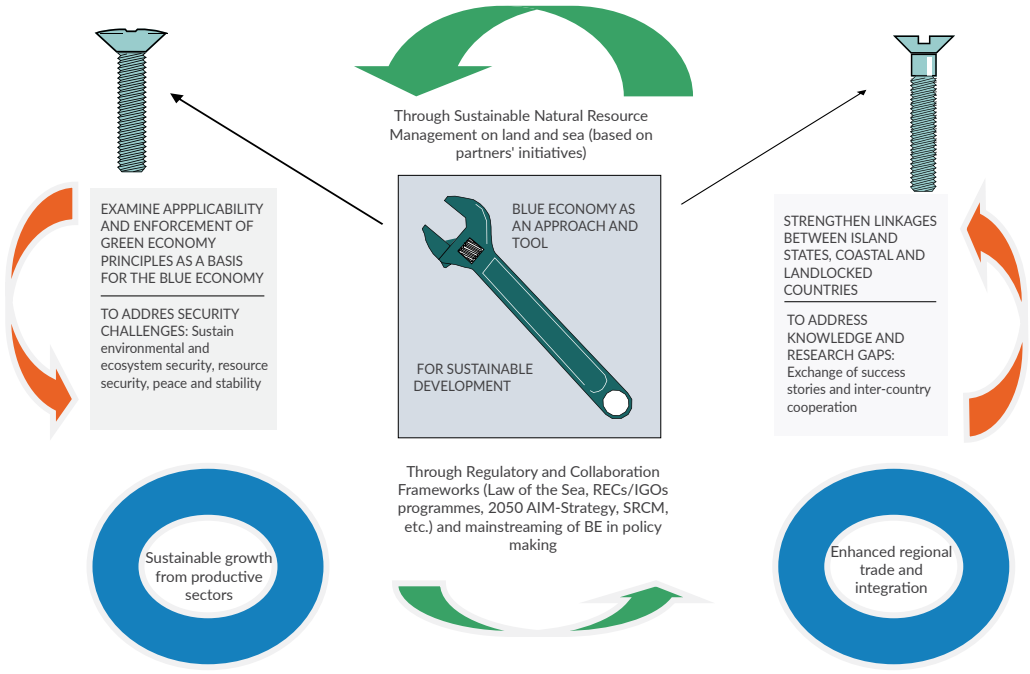
[13] FAO, 2010

The Indian Ocean serves major trade routes from Australia, much of Asia, the Middle East, the Atlantic and the Mozambique Channel, connecting to European markets. It is also a major oil shipment sea highway, which the US Energy Information Administration identifies as one of the global strategic chokepoints. The Bab el Mendeb on the northern edge of the Indian Ocean is the third largest maritime route for crude transportation, carrying 3.4 million barrels per day (bbl/d) in 2011. The sub-region's coastal and island States' seaborne trade represents about 7% of Africa's total.

Tourism has grown steadily in the Eastern African region to become a very significant economic activity for a number of countries, especially Kenya, Uganda, Tanzania and Rwanda, and a major source of foreign-exchange earnings for Ethiopia, Kenya and Uganda (UNECA, 2013), while it contributes up to 63% to the GDP of Seychelles. Eastern Africa has become a new energy exploration corridor and Eritrea, Somalia, Kenya, Tanzania and Madagascar, among others, have identified offshore exploration blocks. Exploration is expected to lead to an increase in maritime trade, as well.

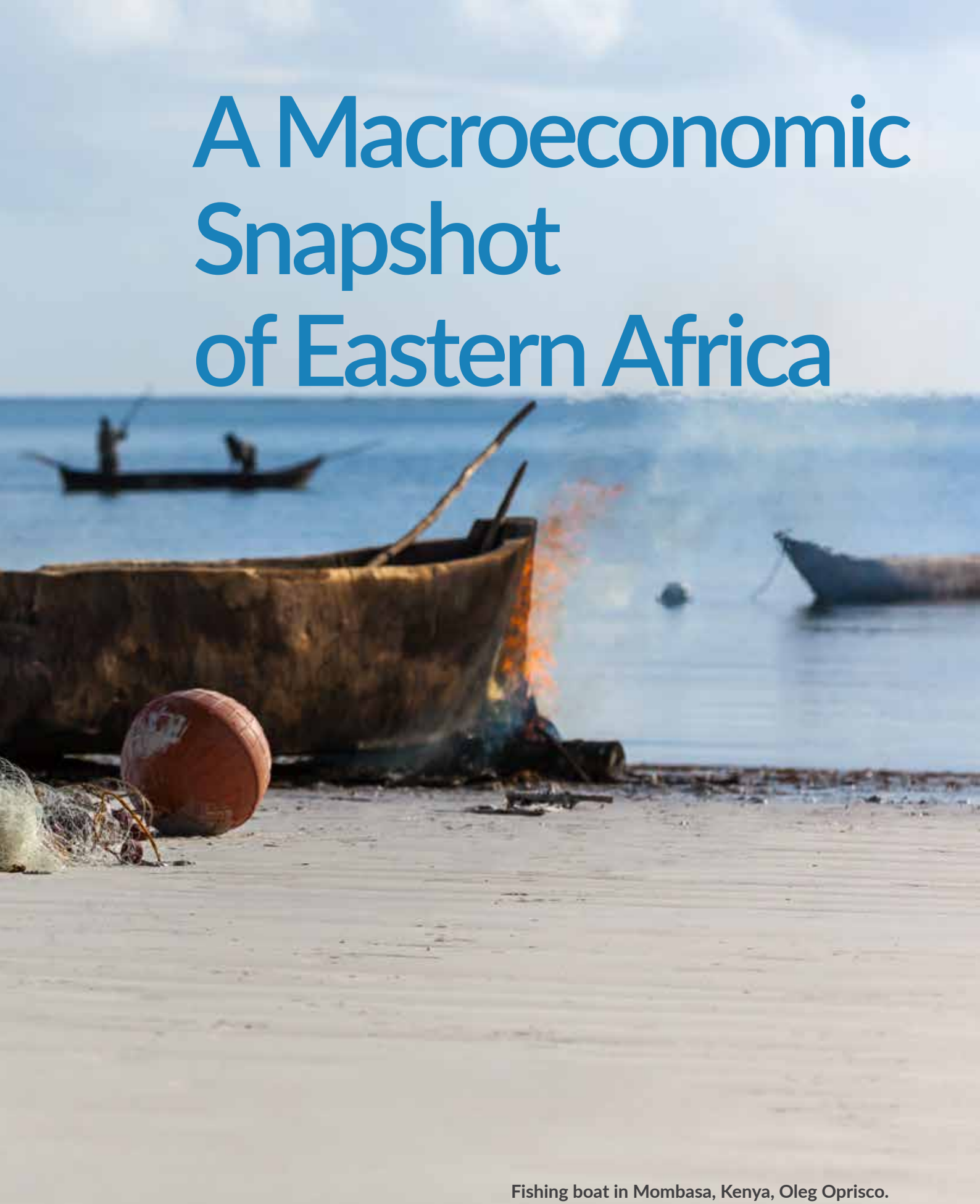
However, the development of some Blue Economy sectors may impact others through competition for natural, human or financial resources. The development of ports to service the tourism sector, for example, could also affect the environment and impede future development of the fishing industry. In addition, large-scale projects, such as oil and gas exploration or the establishment of international fishing agreements, need to ensure that any compensation or other financial rewards both reflect the real value of the natural resource and that the benefits are shared with the most vulnerable populations. Figure 1.2 shows the various components of the Blue Economy as tools to enhance development in the region.

FIGURE 1.2 Essential nuts and bolts to be tightened by the Blue Economy



Source: UNECA, 2015

A Macroeconomic Snapshot of Eastern Africa



Fishing boat in Mombasa, Kenya, Oleg Oprisco.

2.1 Introduction

This chapter provides an overview of the macroeconomic situation in Eastern Africa. It particularly focuses on those aspects that relate to the Blue Economy. Eastern Africa[1] includes 14 countries and 367 million people over approximately 7.3 million square kilometres. With about a third of Africa's population, it covers only a quarter of its land area.[2] The two African countries with the longest coastlines - Madagascar and Somalia (see Table 2.1 below) – are to be found in the region, as are five land-locked countries - Burundi, Ethiopia, Rwanda, South Sudan and Uganda. Seychelles and Ethiopia are both in Eastern Africa, but the former is an island state with the smallest population of any African country while the latter is land-locked and has the second largest population of the continent. The region also includes the second largest African country by area, the Democratic Republic of the Congo (DRC), as well as the most densely populated country on the continent (Rwanda). Ethiopia has one of the fastest growing economies in the world, but South Sudan, its neighbour in Eastern Africa, has had negative growth.

TABLE 2.1 Length of coastline in Eastern Africa

Countries	Total coastline (km)
Comoros	340
DRC	38
Djibouti	314
Eritrea	2,234
Kenya	536
Madagascar	4,828
Seychelles	491
Somalia	3,025
Tanzania	1,424
Total	**13,229**

Source: (CIA, 2014)

Despite the contrasts, there are a number of commonalities to be included in a detailed discussion of the Blue Economy in Eastern Africa. The next sub-section explains how the region as a whole grew faster than the African average (3.7 per cent) from 2008 to 2013 and nearly three times faster than the world average (2.0 per cent) over the same period. Subsequent sub-sections provide an overview of a number of trade, fiscal and labour indicators and a final sub-section evaluates the analysis through the lens of structural transformation.

[1] The Eastern Africa region is defined as including fourteen countries: Burundi, Comoros, the Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Seychelles, Somalia, South Sudan, Tanzania and Uganda

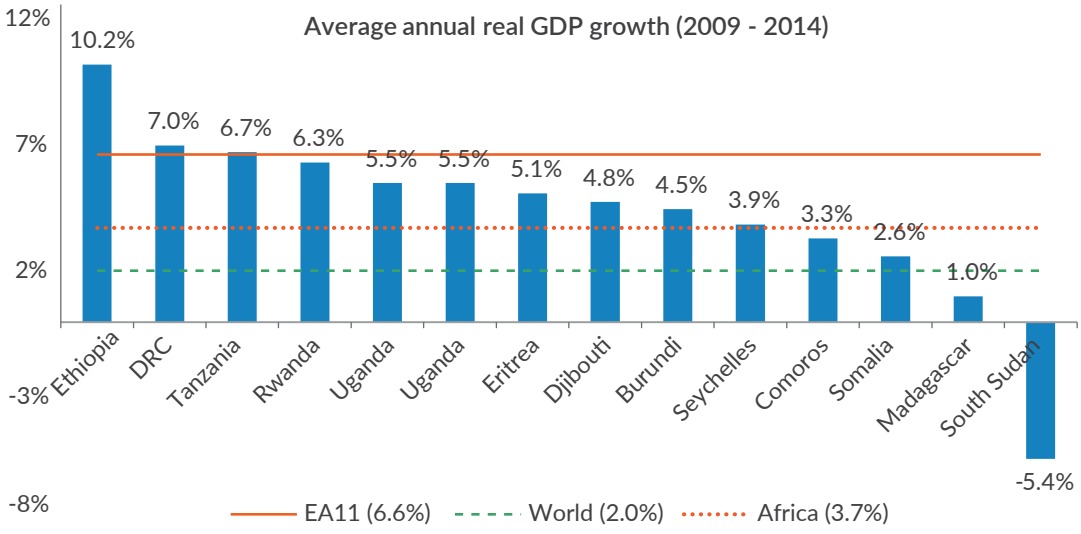
[2] As at 2013. Authors calculations based on data in (AfDB, AU & ECA, 2014)

2.2 Macro-economic Performance

2.2.1 Economic Growth

Most economies in Eastern Africa are growing rapidly. The region's real Gross Domestic Product (GDP) grew at an estimated 6.6 per cent during the period 2009 to 2014. As shown in Figure 2.1 this is faster than the African average (3.7 per cent) and three times faster than the world average (2.0 per cent). Leaving aside South Sudan and Somalia for lack of official data, Ethiopia, Rwanda and Uganda were the regional growth leaders, while Madagascar was the slowest growing economy. Kenya is the largest economy in the region, while Comoros, Eritrea and the Seychelles are the three smallest.

FIGURE 2.1 Growth in Eastern Africa



Source: National authorities, unless unavailable, in which case, UNDESA data is used. Data for South Sudan in 2014 is missing so its regional average is for the period 2009-2013

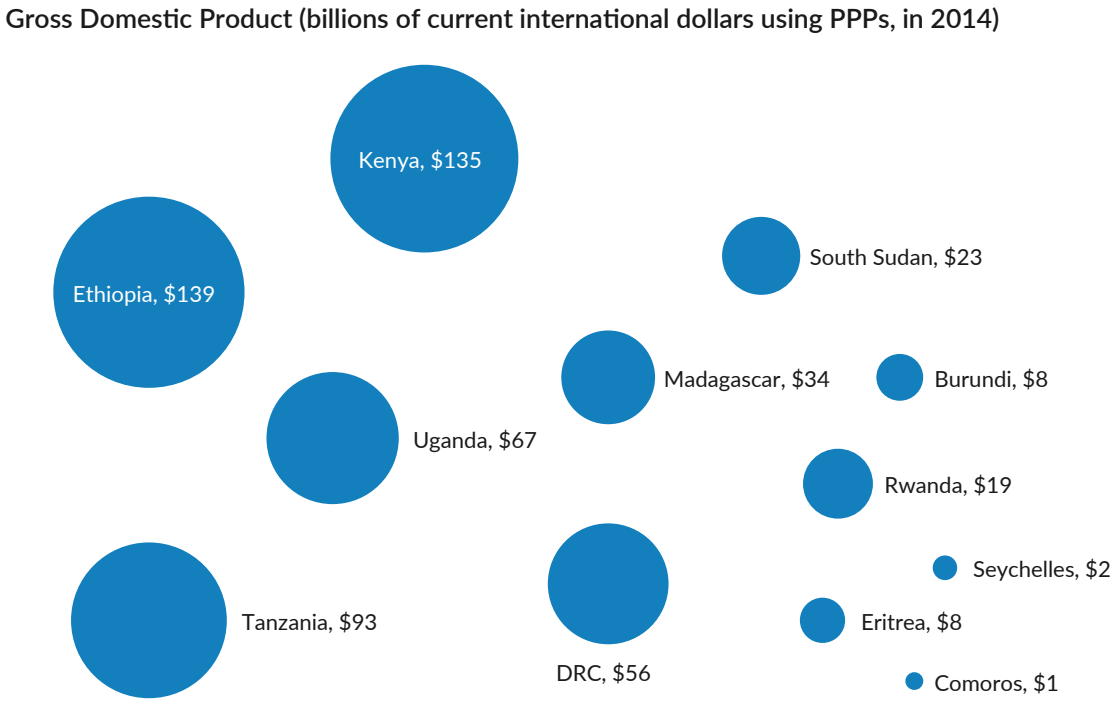
Note: EA11 includes all countries in Eastern Africa except Djibouti, Somalia and South Sudan. The regional average is calculated using weightings based on GDP Purchasing Power Parity values provided by the IMF

The region's impressive growth rates are part of a broader trend in Africa. According to the Africa Progress Panel (APP), the average income in sub-Saharan Africa will double over the next 22 years if current growth rates are maintained (APP, 2014). However, much of the growth is from a low base. In particular, apart from Djibouti, Kenya and the Seychelles, all countries are low-income or least developing countries. Ethiopia and Rwanda tripled and doubled their economies, respectively, between 2005 and 2013, yet both remain classified as least developing countries.

Furthermore, growth has generally not been accompanied by broad-based structural transformation of the economy. For example, Ethiopia's growth has largely been driven by productivity improvements within sectors, particularly agriculture and services, rather than movements across sectors (Martins, Forthcoming), while Uganda's growth

has been accompanied by only a small increase in higher-valued added sectors, such as manufacturing.[3] More promisingly, growth in Rwanda has been driven mainly by the industry and services sectors,[4] although agriculture remains the primary source of employment for most Rwandans.

FIGURE 2.2 GDP for 2014 (billions of current international dollars using Purchasing Power Parities)



Source: IMF World Economic Outlook (October 2014)
Note: Kenya, Uganda and Tanzania have since rebased their economies

Of the eight slowest growing economies in sub-Saharan Africa between 2000 and 2012, four were in Eastern Africa (APP, 2014). They were Eritrea, Comoros, Madagascar and Burundi; with the exception of the last, they are coastal or island states. By contrast, the two fastest growing economies in the region, Ethiopia and Rwanda, are landlocked. On this basis alone, there would be some scope for the development of the region's Blue Economy.

[3] The share of industry increased slightly, from 17.7 per cent in 2008/09 to 18.3 per cent in 2013/14. However, manufacturing - a sub-component of industry - declined from 8.6 per cent of GDP in 2008/09 to 7.6 per cent in 2013/14. The service sector's share increased from 48.2 per cent to 50.2 per cent, while the agriculture share decreased from 26.7 per cent in 2008/09 to 22.8 per cent in 2013/14 (ECA, Forthcoming)

[4] Industry in Rwanda grew 9.6 per cent, on average, each year between 2008 and 2013, while services grew 7.9 per cent. Agriculture is the lagging sector growing at 4.9 per cent slower than the GDP growth rate over the same period (ECA, Forthcoming)

2.2.2 Merchandise Trade

An important indicator of participation in global markets is the flow of merchandise trade. The annual balance is the difference between merchandise exports and imports for the year. As Table 2.2 shows, the merchandise-trade deficit relative to GDP fell for half of the countries in the region between 2008 and 2014. In particular, Djibouti, Eritrea, Ethiopia, Madagascar, Seychelles, Tanzania and Uganda all experienced a decrease in the size of their merchandise trade deficit relative to GDP. This represents a relative improvement in the performance of their merchandise exports.

Eastern Africa's exports are largely based on the exploitation of abundant natural resources. Fresh food made up 40 per cent or more of national exports for six of the fourteen countries in the region during 2009 to 2013. Minerals constituted 20 per cent or more of national exports for four countries during the same period. However, basic manufactures made up 10 per cent or more of national exports for only two countries in the region - DRC and Uganda. Thus, the region is a commodity exporter, with little value-added processing in the country of origin.

TABLE 2.2 Annual merchandise trade balance, 2008-2014 (current prices and exchange rates)

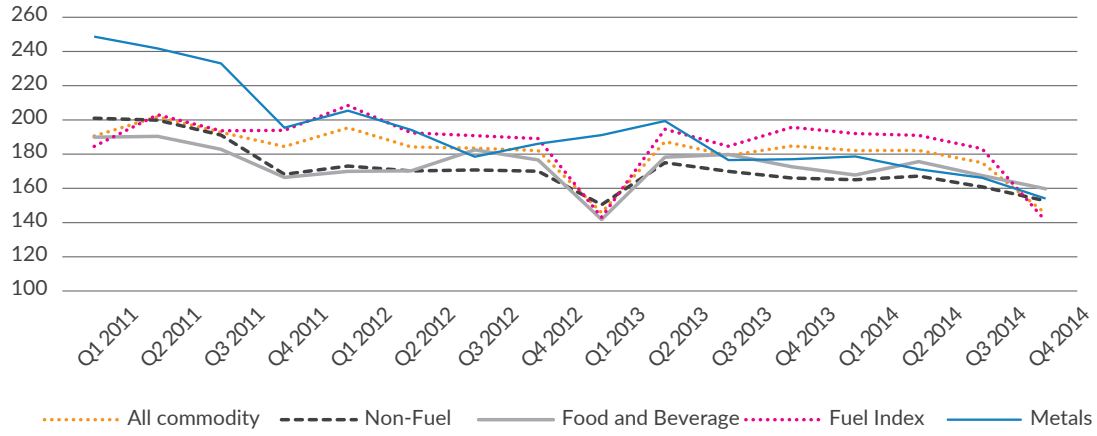
Country	Percentage of GDP	
	2008	2014
Burundi	-16.5	-17.9
Comoros	-31.6	-29.7
DRC	0.7	2.8
Djibouti	-51.9	-49.7
Eritrea	-43.7	-15.5
Ethiopia	-21.4	-19.1
Kenya	-15.9	-19.1
Madagascar	-20.1	-6.1
Rwanda	-13.0	-16.8
Seychelles	-41.7	-34.5
Somalia	-18.1	
Tanzania	-9.2	-8.6
Uganda	-12.3	-11.3

Source: (UNCTAD, 2016)
Note: Data missing for South Sudan

Commodity Prices

This relatively high concentration of commodity exports leaves the region exposed to fluctuations in international commodity prices. Indeed, some international organisations have voiced concern about the effect that falling commodity prices may have on African growth.[5] The prices of both fuel and non-fuel commodities have been falling since 2011 (see Figure 2.3). With respect to non-fuel commodities, this has been damaging for growth. For example, metal prices fell consistently between 2011 and 2014. Within metals, the price of gold fell between 2012 and 2013 and it is expected to continue dropping in 2015, as illustrated in Table 2.4. These dynamics have hampered growth in Rwanda, Uganda and DRC because these countries export metals. There have also been negative effects on gold exporters Ethiopia and Tanzania.

FIGURE 2.3 Market prices for commodities (base year =2005)



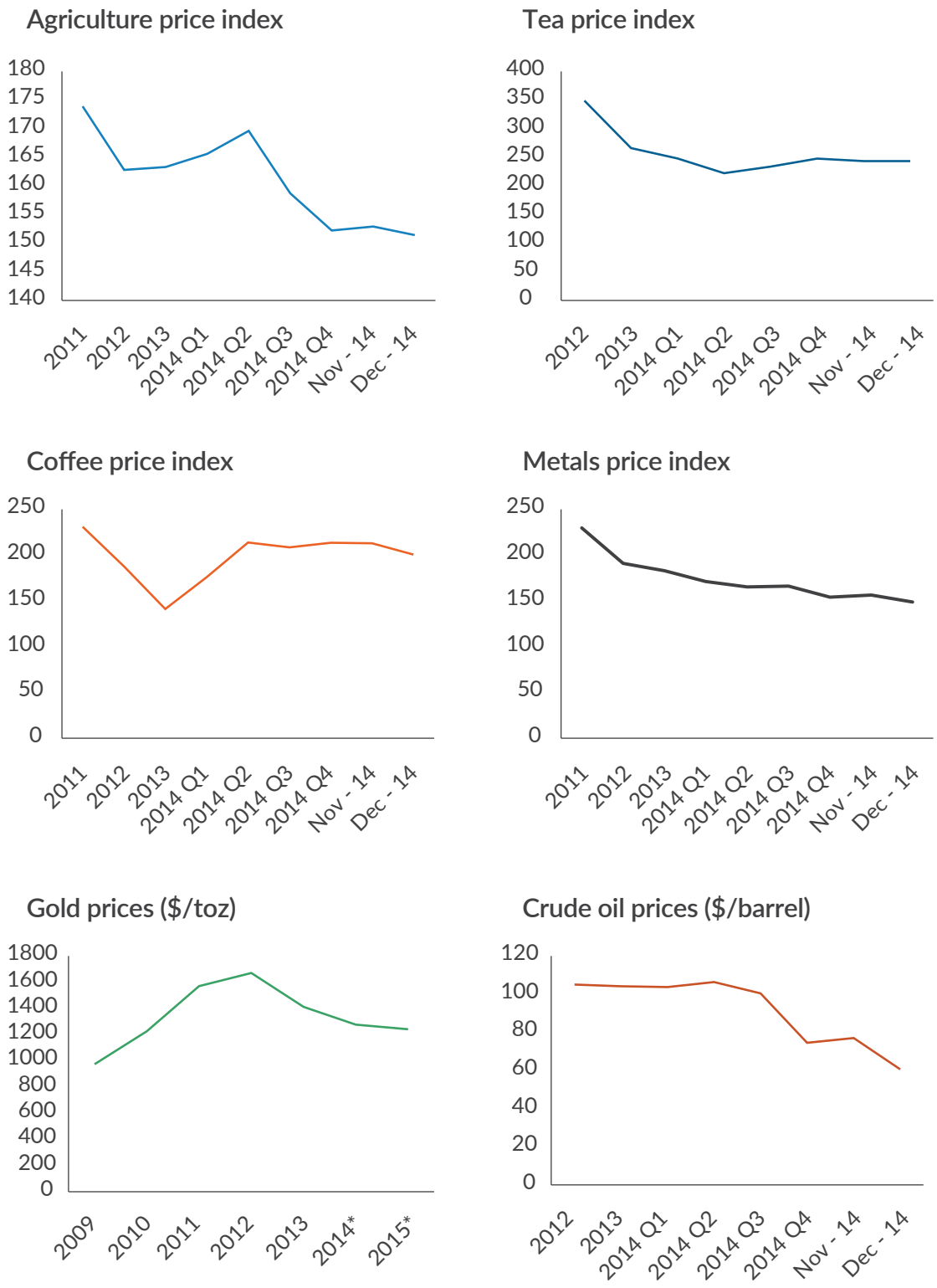
Source: IMF.

At the same time, the agriculture price index has also been falling since the second half of 2014, which has reduced export earnings but also brought down the import bill. Two of the leading agricultural exports from the region are coffee and tea. In both cases, their price has stabilised after falling significantly during 2012 and 2013.

Falling prices of fuel commodities will be beneficial for the region's economies because all of them, except South Sudan, are oil importers. Crude oil prices have been volatile since December 2014 when they averaged USD 60.6 per barrel, before dropping to USD 46 per barrel in early January 2015: a 24 per cent decline in less than a month (IMF, 2015). They have recovered in the second half of 2015 to hover around USD 50 per barrel. For oil-importing countries in the region (such as Rwanda) these developments could be beneficial, but for oil-exporting countries (such as South Sudan) they are likely to lower export earnings and have fiscal implications. The fall in oil prices could also affect offshore oil and gas exploration in Eastern Africa (see also chapter 6).

[5] For instance, the World Bank's Regional Economic Outlook for sub-Saharan Africa writes that a downside risk for economic growth in the region, including Eastern Africa, is the potential for commodity prices to drop further. For many countries, such as Tanzania, this could reduce export earnings. If lower prices persist, it could result in reduced investment in export-commodity industries, for example, metals. This would have a negative long-term impact on growth (World Bank, 2015)

FIGURE 2.4 Prices of major commodities (note different time scales)

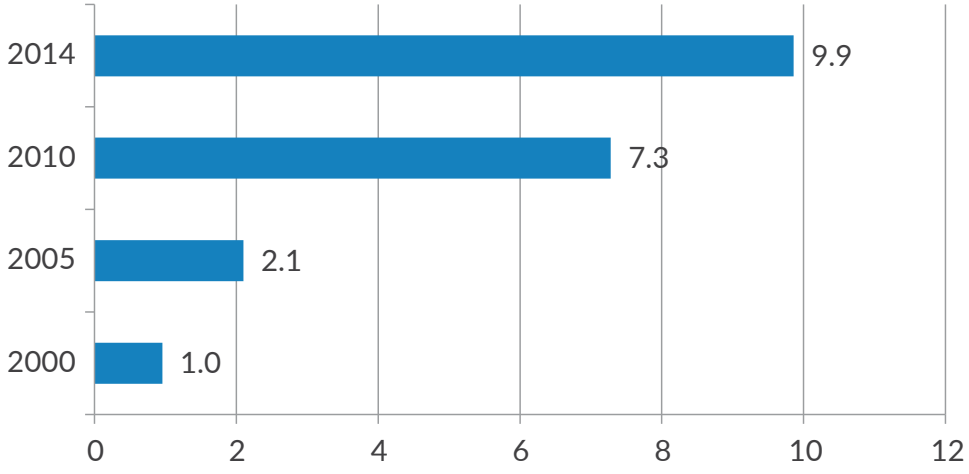


Source: (IMF, 2014a; World Bank, 2014a)
Note: * Refers to estimates only

2.2.3 Capital Flows

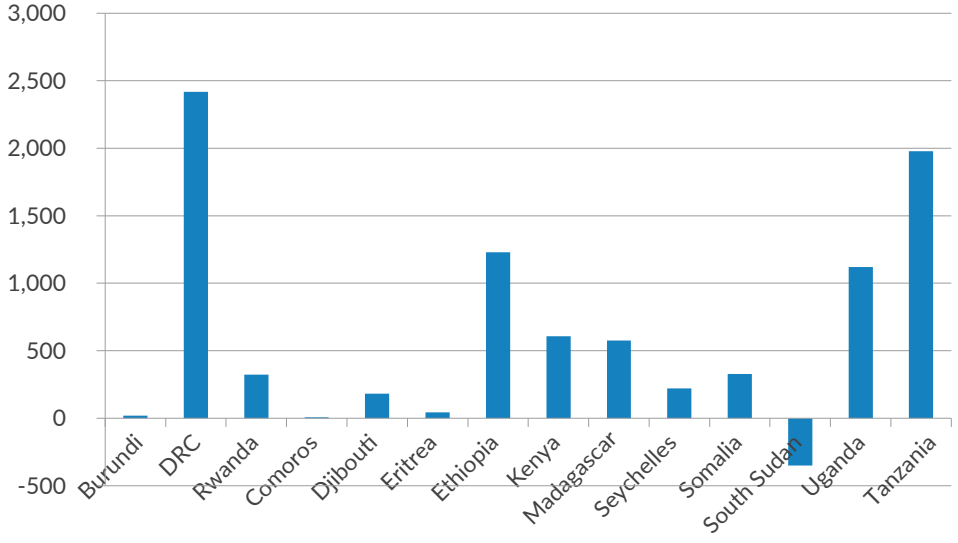
Official Development Assistance (ODA) and Foreign Direct Investment (FDI) are the two primary sources of capital flows into the region. Net FDI in Eastern Africa has been increasing rapidly since 2005 (Figure 2.5). Particularly large inflows of FDI have been received by the larger resource-rich economies of the Democratic Republic of Congo and Tanzania. But inflows have also been large in the case of Ethiopia, which has managed to attract significant FDI inflows into its manufacturing sector (Figure 2.6).

FIGURE 2.5 Net FDI Inflows to Eastern Africa (USD billion in current prices and exchange rates), 2000-14



Source: (UNCTAD, 2014)
Note: Data missing for South Sudan

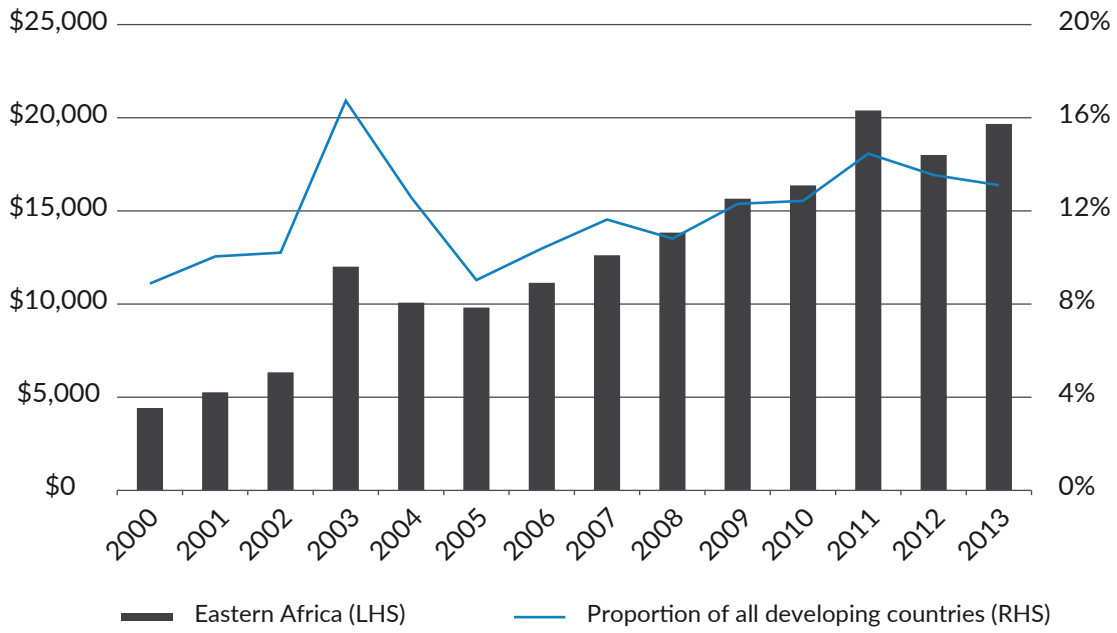
FIGURE 2.6 Average Net Annual FDI Inflows 2012-2014 (USD million Dollars at current prices and current exchange rates)



Source: (UNCTAD, 2014)

Similarly, ODA received from traditional donors to the region – OECD Development Assistance Committee (DAC) members - has increased steadily since 2000 (Figure 2.7). Indeed, total ODA increased from USD 4.4 billion in 2000 to USD 19.7 billion in 2013. Eastern Africa's share of total ODA increased from 8.9 per cent in 2000 to 13.1 per cent in 2013. The largest absolute increases were in Ethiopia, Kenya and Tanzania. Meanwhile, Burundi, Rwanda and Somalia also experienced large increases, relative to previous aid flows. Some donors (e.g. the Nordic countries or Germany) are particularly supportive of environmentally-friendly projects and ODA can potentially be used for Blue Economy initiatives in, for example, blue carbon projects, developing fisheries or ports, or supporting renewable energy technologies.

FIGURE 2.7: ODA disbursed by OECD DAC members (current prices in USD million, 2000-2013)



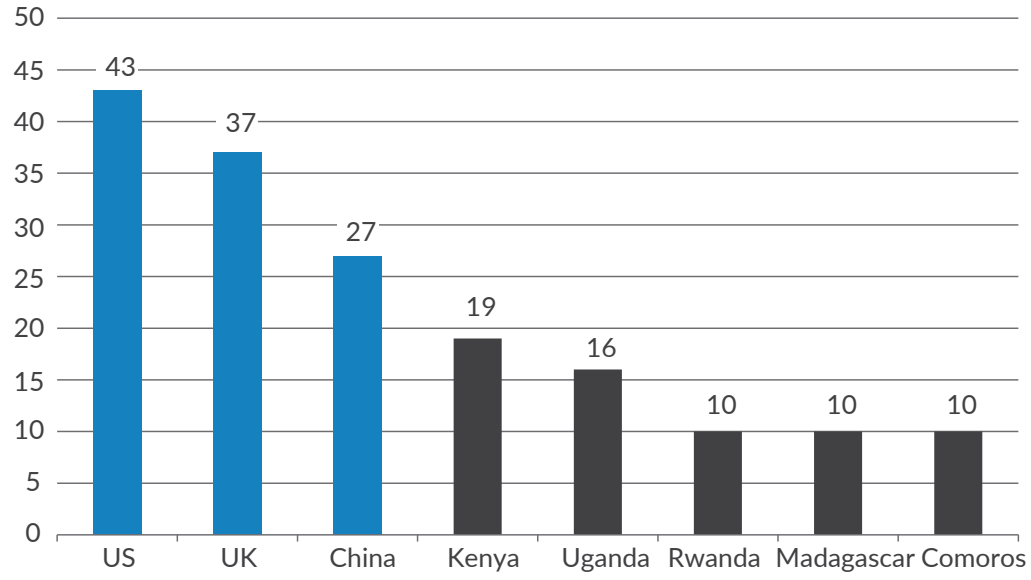
Source: Authors' calculations based on OECD data available at: http://www.oecd-ilibrary.org/development/data/detailed-aid-statistics_dev-aid-stat-data-en

2.2.4 Labour Markets

Job creation is an essential component of sustainable economic development and in Eastern Africa, there is an acute need to create more jobs. It is estimated that the labour force will increase in the region by 27 million between 2010 and 2020 (SID, 2013). The official unemployment rates of most countries tend to appear to be low, although data is scarce. However, the definition of "employed" varies making cross-country comparison difficult. Furthermore, these rates only measure formal employment, whereas the informal sector is relatively large in most countries of the region. The rates of payroll to population – the percentage of the adult population aged 18 and older who are working for an employer for at least 30 hours per week – are lower than the equivalent rates in developed and emerging economies, as shown in Figure 2.8. This may be a truer

reflection of the real employment situation than official figures. The failure of most economies in the region to create off-farm employment is of particular concern and agriculture continues to account for an average of 80 per cent of employment (Table 2.3). The Blue Economy may present an opportunity, among others, to create off-farm jobs. For the Blue Economy, it is important to create opportunities for productive jobs and secure livelihoods that enable inclusive growth and reduce poverty and inequality.

FIGURE 2.8 Payroll to Population Employment rates for 2012



Source: Gallup[6]

TABLE 2.3 Agricultural employment (percentage of economically active population)

Country	Percentage of population	Year
Burundi	87.9	2012
Comoros	94.6	2012
Djibouti	95.9	2013
DRC	57	2012
Eritrea	60.3	2013
Ethiopia	79.1	2012
Kenya	87.1	2012
Madagascar	73.9	2013
Rwanda	86.1	2013
Somalia	84.4	2013
South Sudan	62.6	2008
Tanzania	79.5	2012
Uganda	84.7	2012
Eastern African Average[7]	**79.5**	-

Source: African Statistical Yearbook 2014 *Note:* Data for the Seychelles is missing.

[6] http://www.gallup.com/poll/163841/global-payroll-population-rate-drops-2012.aspx

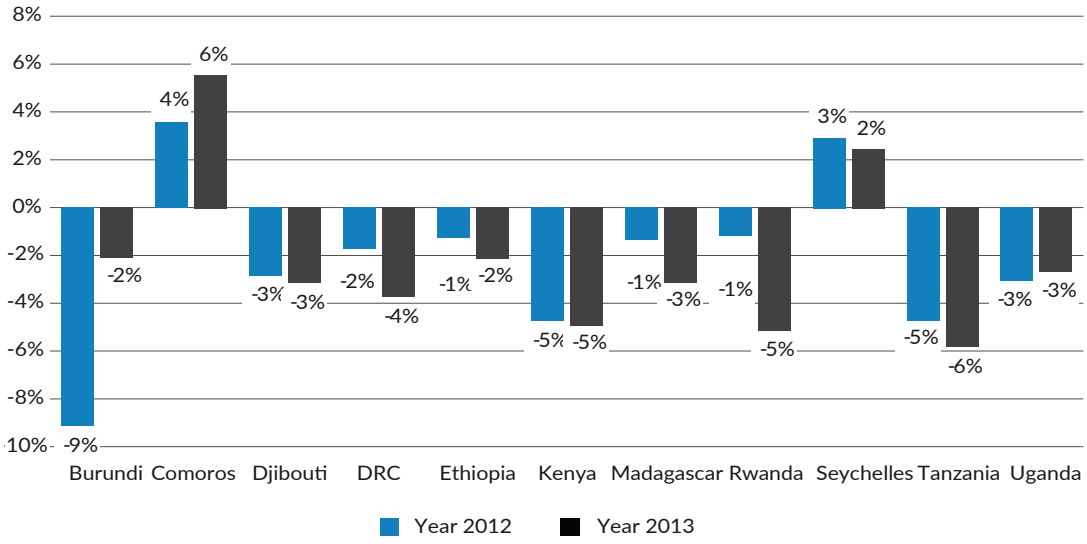
[7] Eastern African average is calculated as a simple average of the country values

2.3 Fiscal and Monetary Performance

2.3.1 Fiscal balances

All countries except Comoros and Seychelles recorded fiscal deficits in 2012 and 2013 of 2 to 6 per cent. Such rates are reasonable, according to the IMF, although they do require careful management (IMF, 2014).

FIGURE 2.9 Fiscal balances in Eastern Africa (percentage of GDP, 2012-2013)



Source: (AfDB, AU & ECA, 2014)
Note: Data missing for Eritrea, Somalia and South Sudan

A number of countries in the region have been raising finance on the international market. Kenya[8], Rwanda[9] and Tanzania[10], for example, have offered sovereign bonds internationally. The strengthening of the US dollar since the second half of 2014 and continued uncertainty around global economic conditions suggest that caution needs to be exercised before taking on further sovereign debt.

> *"To ensure that their sovereign-bond issues do not turn into a financial disaster, these countries should put in place a sound, forward-looking, and comprehensive debt management structure. They need not only to invest the proceeds in the right type of high-return projects, but also to ensure that they do not have to borrow further to service their debt."* (Stiglitz & Rashid, 2013)

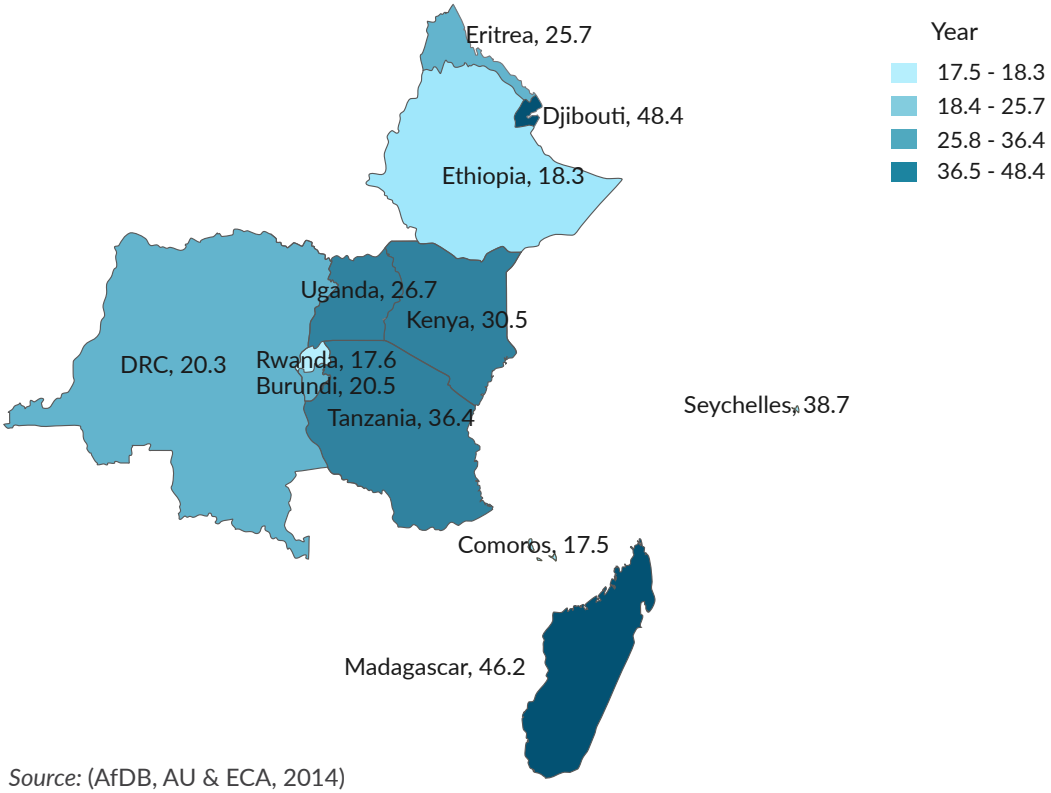
This point is particularly germane in the context of high debt to GDP conditions in most countries of the region (Figure 2.10).

[8] Kenya raised $2 billion by issuing its debut Eurobond on 16 June 2014. BBC News, http://www.bbc.com/news/business-28021749

[9] Rwanda raised USD 400 million by issuing its first Eurobond in April 2013. Country Profile Rwanda, UNECA

[10] Tanzania issued $600 million worth bond in February 2013. http://www.reuters.com/article/2013/03/01/tanzania-bond-idUSL6N0BT8WU20130301

FIGURE 2.10 Debt as a percentage of GDP in 2013



Source: (AfDB, AU & ECA, 2014)

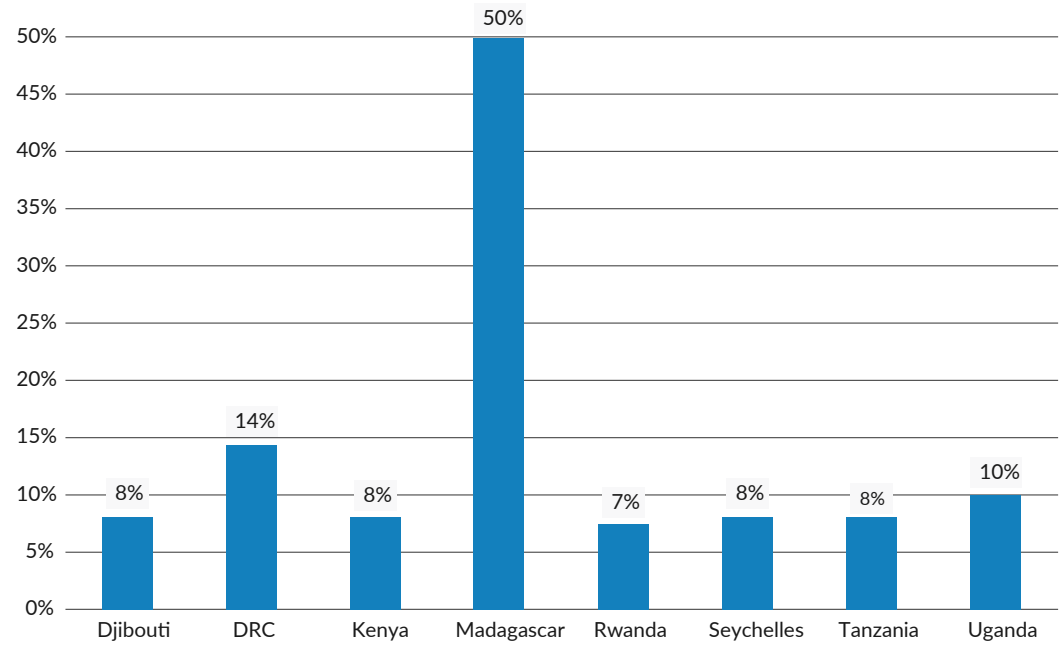
Box 2.1 Seychelles debt for nature arrangement

In recent years there have been operations known as 'debt-for-adaptation swaps' that are of interest to the Blue Economy. An NGO, The Nature Conservancy (TNC), is brokering a USD 80 million debt swap for the government of the Seychelles in exchange for their commitment to enhance marine-conservation and climate-adaptation commitments. TNC is facilitating a marine spatial planning process that engages multiple stakeholders (fishing, energy tourism, government and conservation agencies) in the development of a sustainable use plan for the exclusive economic zone of the Seychelles. TNC is also providing financial expertise to help complete the swap and the design of the permanent trust fund. The Seychelles government will set up the Seychelles' Conservation & Climate Adaptation Trust (SeyCCAT), which will purchase and restructure the debt, manage the endowment and enforce the terms of the debt forgiveness agreement. After 20 years, the endowment is expected to be fully capitalised at nearly USD 45 million and will pay out approximately USD 2.25 million per year to fund continued marine conservation and climate adaptation activities. By investing in the Seychelles' marine spatial planning process, its climate adaptation policies and a sustainable source of financing for conservation, TNC will help create a demonstration project that can be adapted to other sites in the Western Indian Ocean region, as well as globally, and support lowering the debts of countries while protecting and conserving their marine ecosystems (Kelleher, 2015).

2.3.2 Interest Rates

Interest rates on loans remain high within Eastern Africa. The eight countries where data is available from the Economist Intelligence Unit have rates of ten per cent or more and Madagascar has an exceptionally high lending rate of 60 per cent. This constrains economic growth, especially since the spreads between lending and borrowing rates available in the respective financial systems are relatively wide (Figure2.11). The magnitude of the spread in many Eastern African countries, including Madagascar in particular, is reflective of a number of factors, including lack of competition in domestic financial markets. Ultimately, this is likely to have a negative impact on investments in all areas of the economy, including the Blue Economy.

FIGURE 2.11 Difference between the lending and deposit rates in Eastern Africa (2014)



Source: (EIU, 2014)
Note: EIU data missing for Burundi, Comoros, Eritrea, Ethiopia, Somalia and South Sudan

2.3.3 Inflation

Inflation has remained generally stable or decreasing since 2000. In Rwanda, for example, inflation gradually decreased from 6 per cent in June 2013 to 1.9 per cent in November 2014. Comoros, DRC and Djibouti have kept inflation within one and three per cent (Table 2.4). A number of factors have led to this result, including well co-ordinated monetary and fiscal policies.

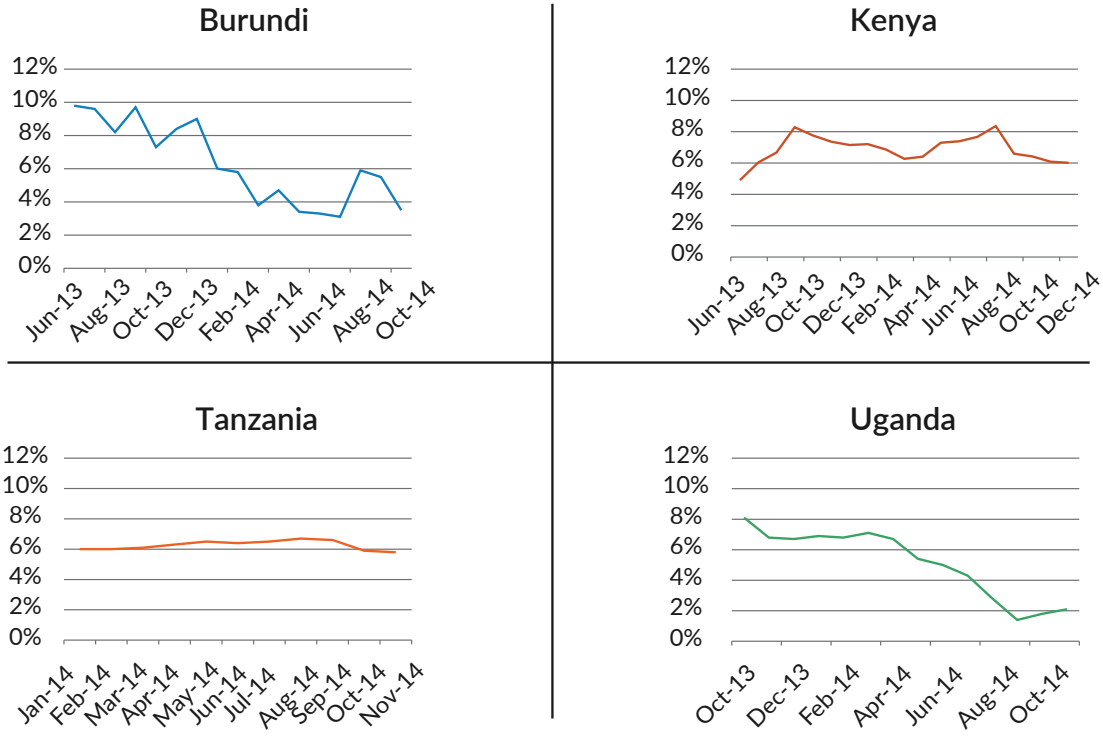
A closer look at the year-on-year inflation rate of four higher-inflation countries reveals differing patterns (Figure 2.12). For instance, in Burundi and Uganda, inflation gradually reduced through 2013 and 2014. In contrast, Kenya and Tanzania remained at roughly the same level (around 6 per cent), although there was more volatility in the case of Kenya.

TABLE 2.4 Inflation rates in Eastern Africa (2013-2014)

Country	2013 (e)	2014 (p)
Burundi	7.8	5.4
Comoros	2.5	4.2
DRC	1.1	3.2
Djibouti	2.5	2.4
Eritrea	12.3	12.3
Ethiopia	7.4	7.9
Kenya	5.7	5.0
Madagascar	6.9	7.2
Rwanda	4.2	4.4
Seychelles	4.4	4.2
Tanzania	7.9	5.8
Uganda	5.5	4.7
EA average	5.7	5.6
Africa	6.7	7.2

Source: (AfDB, OECD & UNDP, 2014)
Note: (e) refers to estimates. (p) refers to projections

FIGURE 2.12: Year on year inflation of four higher-inflation Eastern African countries



Source: Banque de la République du Burundi, Kenya National Bureau of Statistics, National Bureau of Statistics for Tanzania and Bank of Uganda

2.3.4 Exchange Rate

Between 2011 and 2013, most currencies depreciated against US dollar (Table 2.5). The Burundian Franc, the Comorian Franc and the Seychellois Rupee did appreciate between 2012 and 2013. The remaining currencies generally depreciated, unless they were pegged.

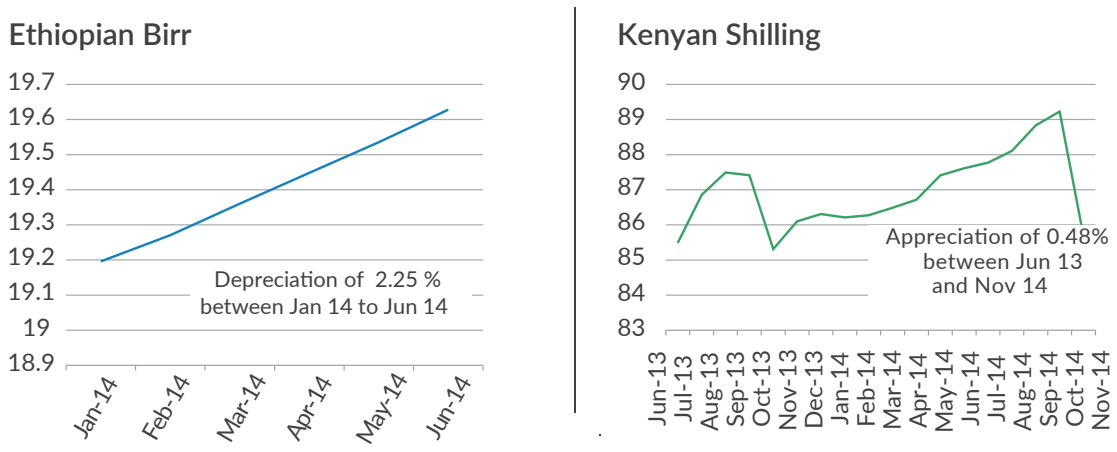
TABLE 2.5 Exchange rate against USD

Country	2011	2013
Burundi (BIF)	1441.7	1539.1
Comoros (KMF)	353.6	370.3
DRC (CDF)	919.2	919.5
Djibouti (DJF)	177.7	177.7
Eritrea (ERN)	15.4	15.4
Ethiopia (ETB)	17.0	18.7
Kenya (KES)	88.9	85.8
Madagascar (MGF)	2027.1	2218.3
Rwanda (RWF)	600.3	648.8
Seychelles (SCR)	12.4	12.1
Tanzania (TZS)	1586.2	1617.0
Uganda (UGX)	2522.7	2586.5

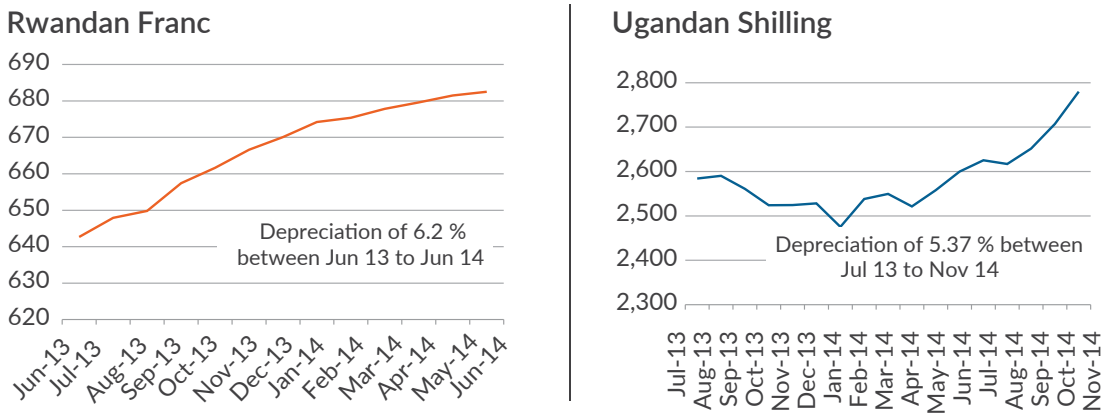
Source: (AfDB, OECD & UNDP, 2014)

A more granular analysis in Figure 2.13 illustrates a steady depreciation in Ethiopia, Rwanda and Uganda. The depreciation in the latter two countries may be due, at least in part, to the aid cuts of 2012 and 2013. The Kenyan shilling also gradually depreciated until late 2014, where it then experienced a notable appreciation.

FIGURE 2.13 Month-on-month evolution of local currencies against USD



Source: Central Bank of Ethiopia, Kenya Bureau of Statistics, National Institute of Statistics in Rwanda, Bank of Uganda



Source: Central Bank of Ethiopia, Kenya Bureau of Statistics, National Institute of Statistics in Rwanda, Bank of Uganda

2.4 Role of the Blue Economy in the Structural Transformation Agenda

Structural transformation is a key driver of economic and social development. Countries that have experienced large increases in living standards have undergone profound changes in their economic structure – both in terms of output and employment.[11] Shifts from low-productivity subsistence activities (such as agriculture) to high-productivity commercial activities (such as manufacturing and modern services) boost labour productivity, which accelerates and sustains economic growth.

In addition, structural transformation contributes to a more inclusive growth pattern, as workers move from low-earning precarious jobs to better-paid jobs with improved working conditions. The lack of structural transformation, however, undermines the equitable distribution of the benefits of growth, prolonging poverty and raising inequality. This seems to be the case of several African countries, which, despite strong economic growth since the early 2000s, have failed to improve economic and social conditions to the same extent.

As noted above, the pace of structural transformation in Eastern Africa has been slow, relative to the region's rapid economic growth. Out of the nine countries with available data, only five registered positive labour-productivity growth from 1991 to 2012 (Table 2.6). Even then, the performance of Eritrea cannot be considered a good achievement – with a meagre 12 per cent increase over the entire 20-year period. Burundi, DRC, Madagascar and Somalia all recorded declines in labour productivity, which has considerably undermined their economic growth prospects. Among the top performers, structural change contributed to about half of the labour-productivity improvement (Table 2.6). The services sector heavily contributed to this reallocation effect, although industry has also been important in Ethiopia and Uganda.

[11] Some examples include China, South Korea and Vietnam

TABLE 2.6 Decomposition of labour productivity growth (1991-2012)

Country	Labour productivity change (%)	Aggregate decomposition (%)			Reallocation effect (%)		
		Direct	Reallocation	Prices	Agriculture	Industry	Services
Tanzania	114.0	63.8	46.5	3.8	-6.7	8.2	44.9
Ethiopia	100.6	61.6	44.0	-5.0	-15.5	21.1	38.4
Uganda	69.9	37.0	32.4	0.6	-7.3	21.1	18.6
Rwanda	49.8	29.0	20.4	0.4	-4.1	0.5	23.9
Eritrea	11.6	7.7	3.9	0.0	-0.2	-2.3	6.5
Burundi	-2.1	8.9	-14.8	3.8	1.2	-10.7	-5.3
Madagascar	-15.9	-9.0	-8.3	1.4	1.8	-14.1	4.0
Somalia	-30.3	-32.1	3.0	-1.1	-2.8	0.1	5.7
DRC	-41.5	-28.2	-12.7	-0.6	2.0	-10.9	-3.8

Source: Adapted from (UNCTAD, 2014)

The Blue Economy can support structural transformation if it is able to generate relatively high-productivity jobs to absorb workers from lower-productivity activities – such as subsistence farming and fishing. African countries often have large productivity gaps across sectors, especially between the traditional and the modern sectors. This suggests that there is ample scope to boost productivity and economic growth by reallocating human and financial resources. For three countries with available data, the labour productivity of sectors directly or indirectly connected to the Blue Economy is consistently higher than the economy-wide average (Table 2.7). [12] For instance, the fishing sector is 26 per cent more productive than the overall average in Tanzania, about 150 per cent in Uganda, and more than 500 per cent in Madagascar.[13] Although the sector only accounts for about 1 per cent of total employment in the three countries, it can still play a role in increasing overall productivity and incomes – if it is able to attract workers that would otherwise be employed in lower-productivity sectors

[12] The sectoral employment data was collected from ILO (KILM 8) and the sectoral valued added is taken from UN (UNdata)

[13] Differences across countries are partly explained by varying levels of sophistication and catch value. While subsistence and traditional fishing dominate in Tanzania and Uganda (especially of Nile perch), industrial fishing of shrimp and tuna is relatively important for Madagascar

TABLE 2.7 Ratio of sectoral labour productivity to aggregate labour productivity

ISIC Rev.3.1		Tanzania (2006)	Uganda (2003)	Madagascar (2005)
A	Agriculture, hunting, forestry	0.39	0.34	0.26
B	Fishing	1.26	2.47	6.81
C	Mining and quarrying	5.99	0.95	0.87
D	Manufacturing	2.69	1.21	5.16
E	Electricity, gas and water supply	22.64	36.66	3.75
F	Construction	7.22	9.18	22.01
G	Wholesale, retail trade, repair	1.42	1.18	1.97
H	Hotels and restaurants	1.33	1.66	1.97
I	Transport, storage and communications	4.84	2.79	21.01
J	Financial intermediation	18.69	-	26.12
K	Real estate, renting and business activities	22.93	24.26	-
L	Public administration and defence	8.51	5.45	3.02
M	Education	1.30	2.85	-
N	Health and social work	2.86	2.29	-
O	Other community, social and personal services	1.01	1.14	-

Source: Calculations from data in Table 2.6 by UNECA-SRO-EA

Note: Sectors G and H were jointly considered for Madagascar. Sector J for Uganda and Sector K for Madagascar were reported as having no employees
Sector M, N and O for Madagascar did not have value added

The remaining sectors highlighted are only partially linked to the other dimensions of the Blue Economy – namely, tourism, transport and energy. Nonetheless, their above-average labour productivity levels provide further evidence that stronger investments in the Blue Economy can contribute to accelerating the pace of structural transformation. In all three cases, agriculture is the sector with the lowest labour productivity. Mining and quarrying also has below-average labour productivity in Uganda and Madagascar, probably due to the small size of the sector – less than 0.3 per cent of total output in both countries.

In conclusion, there is potential for the Blue Economy to make a greater contribution to structural transformation in Eastern Africa. In other words, it could provide a pathway for development, create more and better jobs with higher incomes and provide more inclusive growth. The following chapters provide a more in-depth analysis on each of the main Blue Economy sub-sectors.

References

African Development Bank (2010), *African Development Report 2010: Ports, logistics and trade in Africa.* Oxford: Oxford University Press

African Development Bank (2015), *Seychelles Country Strategy Paper 2011-2015*. Tunis: AfDB

African Development Bank. (2013), *Somalia Country Brief 2013-2015*. Tunis: AfDB

African Development Bank, African Union & Economic Commission for Africa. (2014), *African Statistical Yearbook 2014*. Tunis and Addis Ababa: AfDB, AU & ECA

African Development Bank, Organisation for Economic Co-operation and Development & United Nations Development Programme (2014). *African Economic Outlook 2014*. Tunis, Paris and Addis Ababa: AfDB, OECD & UNDP

Agutamba, K. (2014, December 24), "2015: The test that awaits Northern Corridor projects." *The New Times*

Africa Progress Pùnel (2014), *Grain Fish Money*. Geneva: APP

Bank of Tanzania. (2014), *Monthly Economic Review – November.* Arusha: BoT

Beerhige, M. (2012, October 2), Puntland plans to expand Bosaso Port. *Somalia Report*

Berbera Port Authority (2012), *Homepage* Berbera Port Authority: http://www.berberaseaport.net/. Accessed June 03, 2014

Briceno-Garmendia, C., & M. Shkaratan (2011) *Kenya's Infrastructure: A Continental Perspective.* Washington, DC: World Bank

Business Daily (2013, June 20), *Somalia bets big on port and airport to resurrect war-wrecked economy*

Christie, I., E. Fernandes, H.Messerli, and L.Twining-Ward (2013), *Tourism in Africa: Harnessing Tourism for Growth and Improved Livelihoods.* Washington DC: World Bank

CIA. (2014). *CIA World Factbook*. from CIA: https://www.cia.gov/library/publications/the-world-factbook. Accessed October 08, 2014

Cleophus, T. (2013, August 14), “Kenya, Somalia and the controversy over control of Kismayo”. *Sabahi Online*

ECA. (Forthcoming), *Country Profiles of Eastern Africa Countries*. Addis Ababa: United Nations

ECA SRO-EA. (2014), *Energy Access and Security in Eastern Africa: Status and Enhancement Pathways.* Addis Ababa: United Nations

EIU. (2014). *Economist Intelligence Unit - Country Reports (multiple).* The Economist

Food and Agriculture Organisation (2015), *FAO Stat*. Retrieved January 2015, from FAO: http://faostat3.fao.org/home/E. Accessed January 05, 2015

Food and Agriculture Organisation (2014), *The value of African fisheries.* Rome: FAO

Gatehouse, G. (2013, May 6), “Somalia's fight to harness the power of Mogadishu port”. *BBC News Africa*

Government of Ethiopia. (2014, October 14), Ethiopia: *The Ethiopian Railway Corporation Says the Ethio-Djibouti Railway Project Is Making Good Progress.* from AllAfrica: http://allafrica.com/stories/201410100298.html. Accessed January 29, 2015

Guardian Reporter. (2013, September 16), Government: We're improving the business environment. *IPP Media.com*

Hategeka, E. (2014, October 10), Start small but think big - Supporting SMEs to grow and export

(Part II). *The New Times - Print Version*

International Finance Corporation (2013), *Public-private partnership impact stories - Madagascar: Port of Toamasina*. Washington, DC: IFC

International Monetary Fund (2015), *Commodity Market Monthly - January 2015*. Washington, DC: IMF

International Monetary Fund (2014). *Sub-saharan Regional Economic Outlook April* Washington, DC: IMF

International Monetary Fund (2014a), *Primary Commodities* IMF, Washington, DC. retrieved from http://www.imf.org/external/np/res/commod/index.aspx (December 2014)

International Trade Centre (2014), *Country Briefs*. Retrieved January 2015, from ITC: http://www.intracen.org/

Kasasira, R. (2013, August 4), "Somalia gets back control of strategic Kismayu port." *Africa Review*

Le Manach, F., C. Gough, A. Harris, F. Humber, S. Harper, & D. Zeller (2012) "Unreported fishing, hungry people and political turmoil: the recipe for a food security crisis in Madagascar?" *Marine Policy*, 218-225

Martins, P. (Forthcoming), *Structural Change in Ethiopia: An Update*. Washington, DC: World Bank

Meriton-Jean, S., and H. Amla (2014, November 3), "From dried fish to a booming business - Seychellois entrepreneur says fish is the future. "*Seychelles News Agency*

MHD (2012, November 6), The importance of Kismayo. *Somalia Report*

Ministry of Information (2014), *Eritrean Sea Ports* - Ministry of Information, Eritrea: http://www.shabait.com/about-eritrea/erina/16707-eritrean-sea-ports. Accessed January 27, 2015

Mwangi, G. (2014, August 3), "Chinese firm signs $478.9 million Kenya Lamu Port Deal." *The Wall Street Journal - Frontiers*

Ng'wanakilala, F. (2014, October 27), "Tanzania says construction of China-funded port to start in 2015". *Reuters*

PriceWaterhouse Coopers, South Africa (2013), *Africa gearing up*. Johannesburg: PwC

Ronnas, P., K. Backéus and E. Scheja (2010), *Rwanda Forging ahead - The challenge of getting everyone on board*. Geneva: ILO

Sabahi. (2013, March 13), "Somalia: Dredging project invigorates Mogadishu, Bosaso Ports." *All Africa*

Shkaratan, M. (2012), *Tanzania's Infrastructure - A Continental Perspective, World Bank Policy Research Working Paper*. Washington, DC: World Bank

Society for International Development (2013), *The State of East Africa 2013*. Nairobi: SID Regional Office for Eastern Africa

Stiglitz, J., & H. Rashid, (2013, June 26), "Sub-Saharan Africa's Eurobond Borrowing Spree Gathers Pace - Why are an increasing number of developing countries resorting to expensive sovereign- bond issues?" *The Guardian Business - Project Syndicate Economists*

Thiong'o, P., S. Kamau, D. Asiimwe & K. Esiara. (2013, May 11), "With $11bn Bagamoyo port, Tanzania prepares to take on EA hub Mombasa." *The East African*

Tran, M. (2012, July 27), "Berbera port and pastoralism prove livestock's worth in Somaliland." *The Guardian UK*

United Nations Conference on Trade and Development (2014), *UNCTAD Stat*. from UNCTAD: http://unctadstat.unctad.org/. Accessed 05 January, 2015

United Nations Economic Commission for Africa – Sub-Regional Office for East Africa (2011), *Towards a sustainable tourism industry in Eastern Africa - a study on the challenges and opportunities*

for tourism development. Addis Ababa: United Nations

United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. (2013), *Landlocked Developing Countries Factsheet*. UN-OHRLLS: http://unohrlls.org/custom-content/uploads/2013/09/Landlocked-Developing-Countries-Factsheet-2013.pdf. Accessed February 12, 2015

Wane, W., and J. Morisset (2012, October 1), Is this a woman's world? Gender equality in Tanzania. *Africa can end poverty:* blogs.worldbank.org/africacan/. Accessed 15 September 2015

World Bank. (2014), *International Development Association and International Finance Corporation Country Partnership Strategy for the Union of Comoros for the period FY14 - FY17*. Washington, DC: World Bank

World Bank. (2014a), *GEM Commodities* World Bank, Washington, DC. retrieved from http://www.imf.org/external/np/res/commod/index.aspx (December 2014)

World Bank. (2015), *Regional Economic Outlook - Sub-Saharan Africa: January 2015*

World Bank. (2013a), Tanzania Economic Update Opening the Gates - *How the port of Dar es Salaam can transform Tanzania*. Washington, DC: World Bank

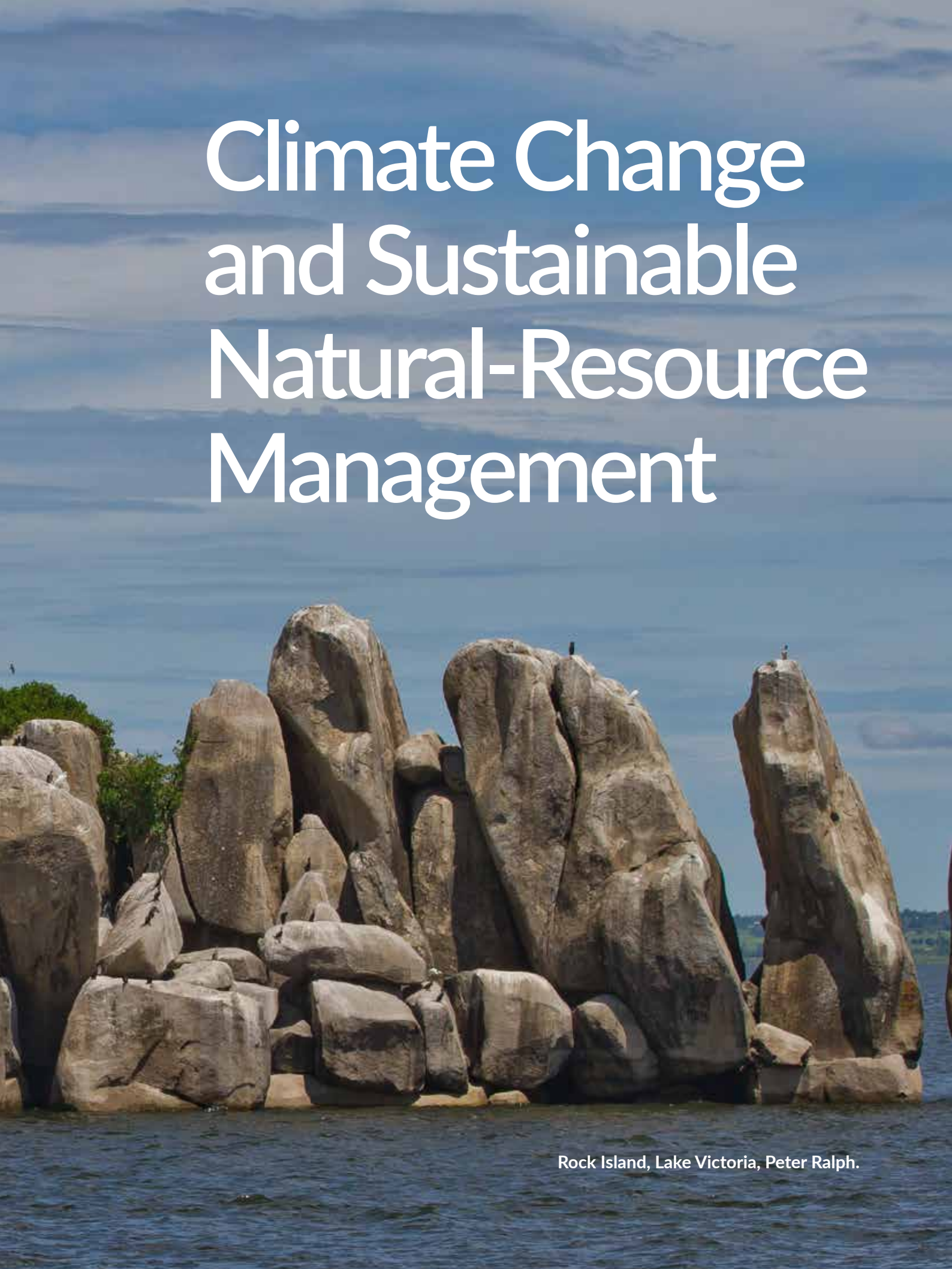
World Bank. (2013b), *Tourism in Africa: Harnessing tourism for growth and improved livelihoods*. Washington, DC: World Bank

World Bank. (2013c), *Transport and logistics in Djibouti: contribution to job creation and economic diversification*. Washington, DC: World Bank

World Bank. (2010), *Union of the Comoros Joint IDA-IMF Staff Advisory Note on the Poverty Reduction and Growth Strategy Paper*. Washington, DC: World Bank

3

Climate Change and Sustainable Natural-Resource Management



Rock Island, Lake Victoria, Peter Ralph.

3.1 Introduction

The significant loss of coral reef resulting from increased sea-surface temperatures in 1998 raised the profile of climate-change threats to the Indian Ocean (Hoegh-Guldberg et al., 2007). Seychelles for instance lost 70% of its reefs. The apparent risk that the frequency of such events will rise above the natural background rate was underlined by the Intergovernmental Platform on Climate Change (IPCC)[1]. The additional climate-related threats – such as sea-level rise, changes in coastal agricultural productivity, and catastrophic flooding or drought – have further prompted States in the Western Indian Ocean (WIO) region to assign greater importance to climate change. As a result, all the Nairobi Convention[2] signatories had ratified the Framework Convention on Climate Change by 1999 and the Kyoto Protocol by 2008. In East Africa, governments are in the process of formulating and implementing adaptation and mitigation strategies to help natural-resource users cope with climate change[3].

The fisheries of Eastern Africa are shared by the island and mainland countries (Chapter 7). Tuna species[4], mainly caught by industrial distant water fleets (DWFs), are the most important economically. They seasonally migrate, from South to North, along the East African coast before crossing to the eastern part of the Indian Ocean. Climate change seems to affect their migratory pattern and distribution (Dueri et al, 2014). Coastal resources are vital for island and coastal communities, both for nutrition and livelihoods. However, these resources face a combination of threats including pollution, habitat loss, overfishing and climate-change effects (Lester, S. et al., 2009). Inland freshwater resources are also subject to both human and natural threats from pollution and, overfishing, exacerbated by hydrometric instability caused by drought or intense precipitation.

The Blue Economy refers to a sustainable and equitable model of economic growth driven by oceans, seas, lakes, rivers and floodplains. These bodies of water are endowed with abundant flora and fauna, and marine ecosystems. They provide food and habitats for aquatic life including fish, sources of power generation, means of transportation and livelihoods in many African countries. The following chapter is structured into five sections. The first outlines the contribution of Blue Economy assets to the development process of Eastern African countries. The second section reviews biodiversity in the region and responses to threats. The third gives critical information on how climate change affects and will affect the Eastern African ecosystem in the future. The fourth section highlights the national and regional policies deployed to mitigate and adapt to climate change including the use of blue carbon and the Blue Economy, while the last section provides conclusions and recommendations.

---

1 See: https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch6s6-3-2.html

2 The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region was signed in 1985 and came into force in 1996, making it one of 17 regional seas conventions and action plans. The Contracting Parties to the Nairobi Convention are Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania and the Republic of South Africa

3 Countries have to submit a National Adaptation Plan of Actions (NAPAs) and Nationally Appropriate Mitigation Actions (NAMAs) to the United Nations Framework Convention on Climate Change (UNFCCC), indicating priority interventions

4 Mainly composed of skipjack, yellow fin tuna, big eye tuna and bluefin tuna

3.2 Economic Development and Natural Resources

Representing, on average, 43% of the annual GDP[5] of the African continent (36% in East Africa)[6], agriculture is important from an economic and livelihood point of view, especially in Burundi, the Democratic Republic of Congo (DRC), Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, South Sudan, Tanzania and Uganda. Forestry and mining are the two other major economic sectors that rely on natural resources and that are important for the economies of countries, such as the DRC where they represent 4% and 12%, respectively, of GDP. All the Eastern African countries rely heavily on natural assets for their exports (Table 3.1). Exports are mainly of unprocessed goods that generate low value added. Further, except for Kenya and, to a lesser extent, Tanzania and Madagascar, the economies of Eastern Africa are not diversified and the bulk of exports consist of three or four products such as coffee, minerals or fish.

TABLE 3.1 Three main exports, with their share in total exports

	Product I	Product II	Product III	No. of products accounting for more than 75 % of exports
Burundi	Coffee, not roasted, not decaffeinated (48.9%)	Tea, black (fermented) and partly fermented tea, whether or not flavoured (13.4%)	Niobium, tantalum, vanadium ores and concentrates (12.9%)	3
Comoros	Cloves (whole fruit, cloves and stems) (51.0%)	Vanilla (12.9%)	Vessels and other floating structures (11.1%)	3
Congo, Dem. Rep.	Cathodes and sections of cathodes (39.3%)	Copper ores and concentrates. (22.6%)	Petroleum oils and oils from bituminous minerals, crude oil (16.2%)	3
Djibouti	Wood charcoal (incl. shell/nut charcoal), whether or not agglomerated (22.9%)	Live sheep (10.6%)	Live goats (10.6%)	13
Eritrea	Gold (incl. gold plated with platinum), in unwrought forms (55.7%)	Copper ores (26.3%)	Silver (including silver plated with gold or platinum), unwrought (4.7%)	2
Ethiopia	Coffee, not roasted, not decaffeinated (31.5%)	Sesame seeds (19.5%)	Cut flowers and flower buds (11.5%)	7
Kenya	Black tea (fermented) and other partly fermented tea (16.8%)	Cut flowers and flower buds (11.8%)	Petroleum oils and oils from bituminous minerals, crude oil (10,4%)	49

[5] International Food Policies Research Institute (IFPRI), Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), Consultative Group on International Agricultural Research (CGIAR) (2013): Climate Change and Agriculture in East Africa. www.ifpri.org

[6] Own estimates from African Economic Outlook figures. See: http://www.africaneconomicoutlook.org/en/statistics/

TABLE 3.1 Three main exports, with their share in total exports (cont'd)

	Product I	Product II	Product III	No. of products accounting for more than 75 % of exports
Madagascar	Nickel (18.5%)	Vanilla (6.8%)	Shrimps & prawns (5.2%)	26
Rwanda	Niobium/tantalum/ vanadium (43.0%)	Tin ores and concentrates (16.5%)	Coffee, not roasted, not decaffeinated (15.1%)	4
Seychelles	Skipjack and bonito tuna (56.7%)	Yellowfin tuna (8.4%)	Big eye tuna (8.2%)	4
Somalia	Live sheep (31.6%)	Live goats (27.2%)	Live bovine animals other than pure-bred breeding animals (12.0%)	4
South Sudan	Petroleum oils and oils from bituminous minerals, crude oil (99.7%)	-	-	1
Tanzania	Tobacco, partly/ wholly stemmed/ stripped (9.9%)	Gold (incl. gold plated with platinum), in unwrought forms (excl. powder) (7.7%)	Coffee, not roasted, not decaffeinated (5.3%)	28
Uganda	Coffee, not roasted, not decaffeinated (28.5%)	Tobacco, partly/ wholly stemmed/ stripped (6.2%)	Fish fillets and other fish meat (4.7%)	20
Africa	**Petroleum oils and oils from bituminous minerals, crude oil (46.8%) [46.8%]**	**Natural gas, liquefied (3.8%) [13.7%]**	**Natural gas, in gaseous state (2.8%) [6.9%]**	**26**

Source: African Economic Outlook (2015)

Apart from Seychelles, whose economy is based on tuna processing and tourism, both of which are Blue Economy activities, no other Eastern African countries rely on Blue Economy assets for their economic development. Fishing activities are found everywhere but remain at the artisanal level (except in Seychelles and around the Lake Victoria where industrial companies are operating). Such extractive activities are nonetheless very important for the livelihoods of rural communities but remain mostly in the informal sector.

Despite the abundant use of natural resources and the rapid growth rate of most of Eastern African economies over the decade from 2005 (5% average annual GDP growth) food insecurity persists[7]. In 2013, Somalia, Uganda, South Sudan, Ethiopia, Kenya, the DRC and Tanzania, along with the Central African Republic and Sudan,

[7] FAO, WFP and IFAD *The State of Food Insecurity 2014*

reported an estimated 20 million persons experiencing severe food insecurity[8]. Socio-political conflicts, bad governance of natural resources and land tenure issues, insufficient agricultural production due to insufficient rainfall, premature crop failures, localised floods and droughts constitute the major causes of this crisis[9].

In the context of the 2014 Abu Dhabi Declaration[10] on the Blue Economy, East African states have to explore new ways of using their potential based on marine and inland water resources and their biodiversity for inclusive and sustainable development. The Declaration recognises the role of the fishing industry for food and nutritional security, as well as its contribution to sustainable growth. The Declaration also identifies tourism as a source of direct and indirect jobs and a major contributor to the reduction of poverty. Moreover, since the opening of the new Suez Canal expansion in August 2015, increased freight traffic into the Indian Ocean is projected. Considering the growth forecast for most Eastern African countries, the traffic increase will lead to the development of harbour facilities and improved transport infrastructure and communication networks. Nevertheless, Blue Economy development must not be allowed to depend on the destruction or the improper use of natural assets. On the contrary; growth policies need to be aligned with policies for the conservation and sustainable management of blue assets.

3.3 Biodiversity and Nature Conservation in East Africa

The Eastern African region's biodiversity is due to geographic and natural factors. Three of the eight terrestrial biodiversity "hotspots[11]" on the African continent are found in the region[12]: the coastal forests of East Africa; the Eastern Afromontane; and Madagascar and the Indian Ocean Islands. These hotspots have today a habitat surface equal to 5-10% of their original area[13].

---

[8] See Integrated Regional Information Networks: www.irinnews.org

[9] The other causes are connected to civil strife and tensions, to insecurity limiting access to agricultural lands and sources of food, and finally, to an increasing influx of refugees and internally displaced persons

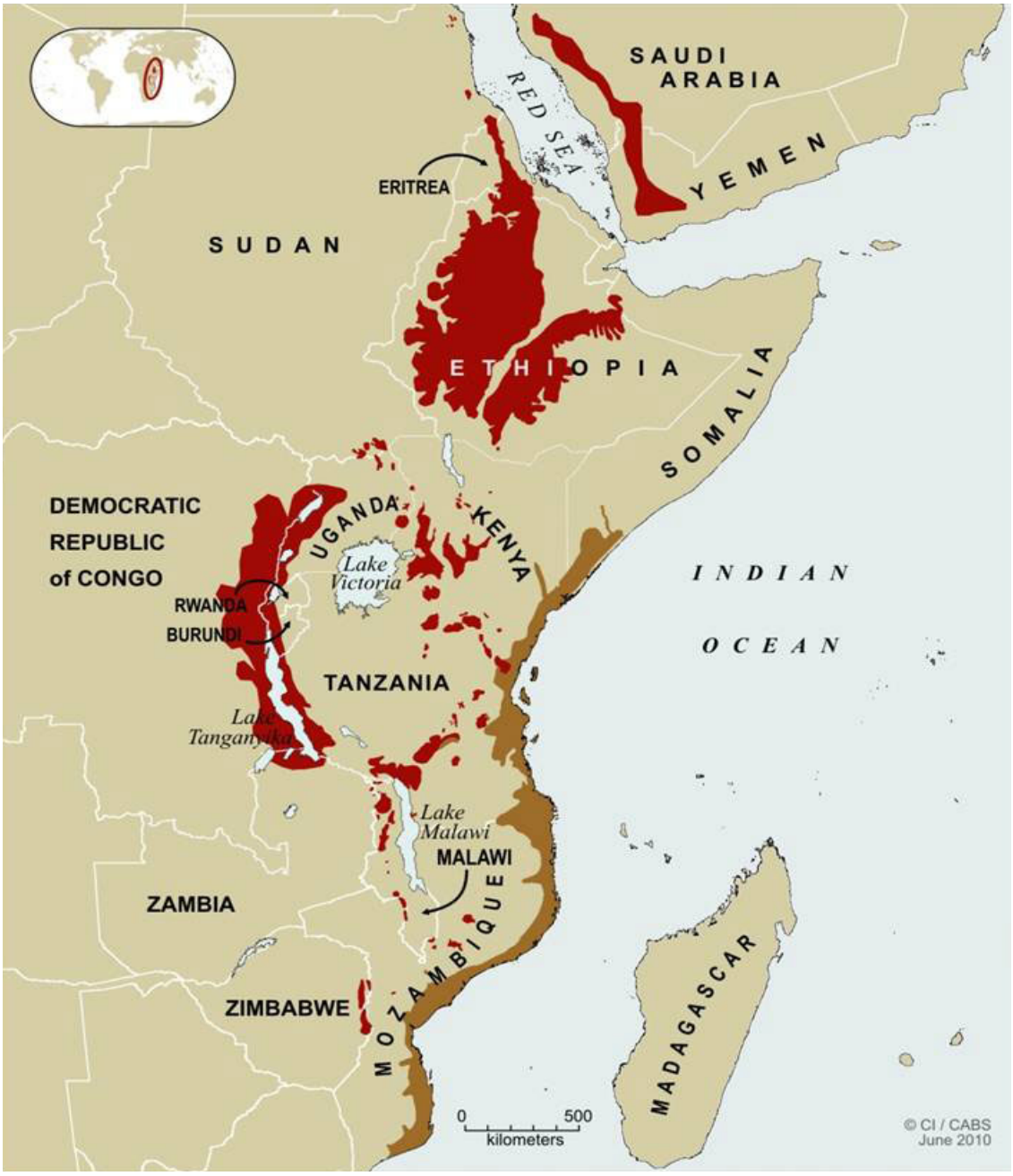
[10] Abu Dhabi summit on Blue Economy, on 20 and 21 January 2014; http://commissionoceanindien.org/activites/leconomie-bleue

[11] To qualify as a biodiversity hotspot, a region must meet two strict criteria: contain at least 1,500 species of vascular plants (> 0.5 per cent of the world's total) as endemics (species found nowhere else on Earth); and have lost at least 70% of its original habitat. Many of the biodiversity hotspots exceed these criteria. For example, both the Sundaland Hotspot in Southeast Asia and the Tropical Andes Hotspot have around 15,000 endemic plant species, while the loss of vegetation in some hotspots has reached 95%

[12] According to Critical Ecosystem Partnership Fund (CEPF), a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank. See: http://www.cepf.net/where_we_work/regions/africa/Pages/default.aspx

[13] See: www.cepf.net/resources/hotspots

FIGURE 3.1 Eastern Afromontane hotspot (in red) and coastal forests (in brown)



Source: Critical Ecosystem Partnership Fund (2015)[14]

The Afromontane hotspot comprises a discontinuous and divided chain of roughly four ranges of mountains[15]. These ranges start in the north with the Asir Mountains of Saudi Arabia and the highlands of Yemen. Below these, are the Ethiopian and Arabian Peninsula highlands and mountains, which split approximately 13 million years ago into three parts to produce the Great Rift Valley as the African continental crust pulled

[14] See: http://www.cepf.net/resources/maps/Pages/default.aspx

[15] See: http://www.cepf.net/where_we_work/regions/africa/eastern_afromontane/Pages/default.aspx

apart. Southeast of the ancient Ethiopian and Albertine massifs, more recent volcanic activity has produced the mountains of the Kenyan and Tanzanian highlands (Mounts Kilimanjaro, Meru, Kenya and Elgon, and the Aberdare range). Further south, the Eastern Arc and Southern Rift mountains form another ancient massif, running from the Taita Hills in Kenya through the Eastern Arc in Tanzania to Mounts Ntchisi and Mulanje in Malawi. Outliers of the Eastern Afromontane, known here as the Southern Montane Islands, are found in the Chimanimani highlands of eastern Zimbabwe, Mounts Gorongosa, Namuli, Mabu and Chiperone in Mozambique, and the Mafinga Mountains that straddle the Malawi-Zambia border. Of the 10,856 species identified in the Eastern Afromontane Hotspot, almost a third are endemic.

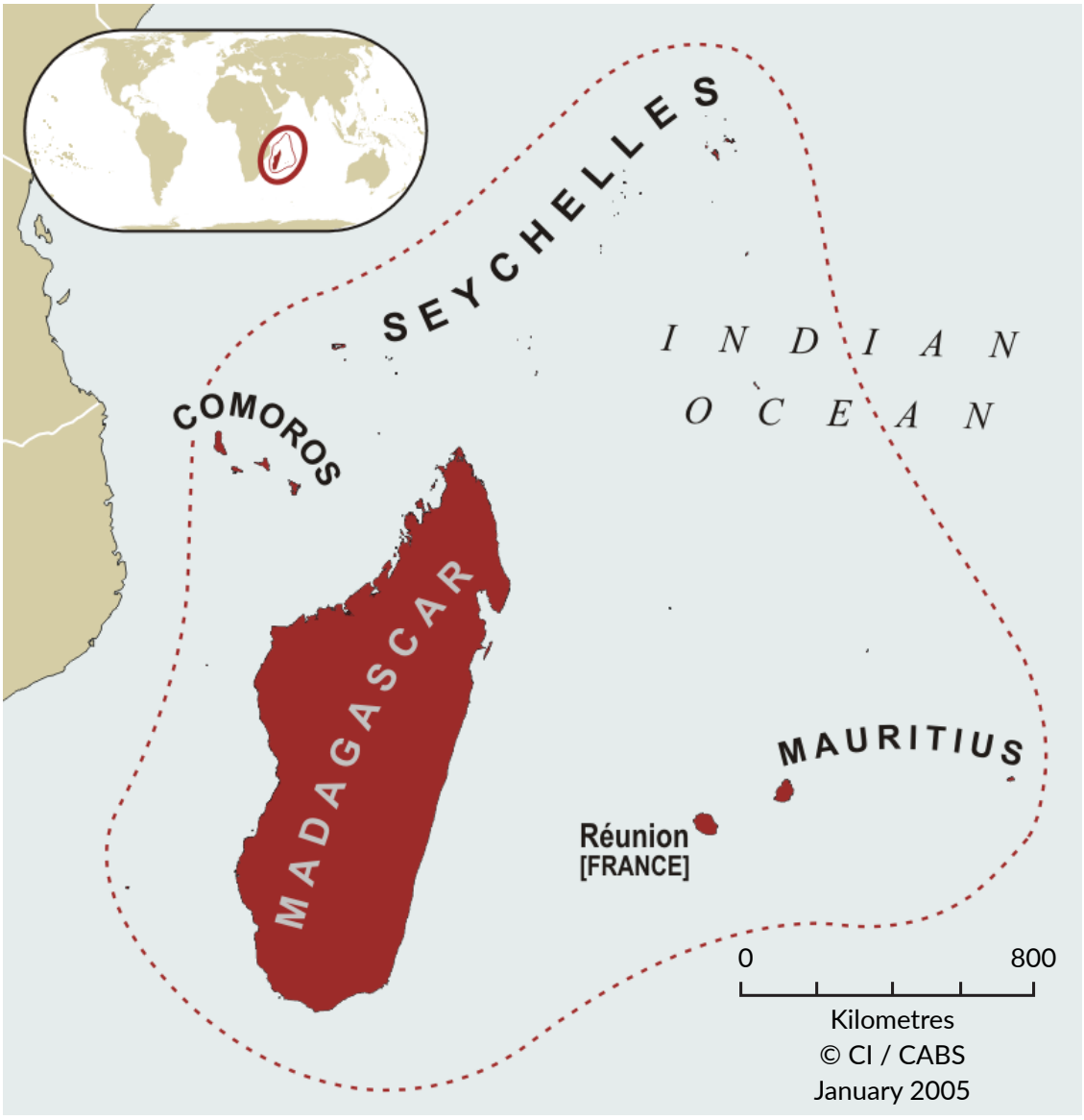
Beyond the Afromontane hotspots, Kenya is mainly known for its expansive landscapes; 30% of Kenyan territory is wooded, but only 2% of its forest is considered primary. The forests of Kenya mainly occur in the five "water towers", which are the major water catchments for all the country's main rivers, and also play important roles in climate regulation. Kenya is also known for its coastal forests and mangroves (Figure 3.1), rich in fauna and wild animals. In the south of the region, Tanzania protects this rich biodiversity in 14 National Parks. The parks system facilitates the protection of internationally recognised biodiversity and sites under "Heritages of Humanity" status. To the west, the DRC has qualified for "mega-diversity" status. Its fauna is made up of unique and rare species, and the DRC's eight national parks are classified as UNESCO World Heritage sites. The country also covers part of the tropical forest of the Congo Basin, which is the second-largest natural tropical forest in the world, after the Amazon. Burundi, contains the two habitat types of land (forests, savannah, groves, grassland), and aquatics and semi-aquatic areas. There are 13 legally protected areas but there are also equally important and biodiverse zones that do not have protected status. Rwanda's mountainous landscape contains diverse ecosystems that are protected under the Volcanoes[16], Akagera and Nyungwe National Parks, the last of which hosts the largest tropical mountain forest in Africa. Uganda's wooded savannah in the South and forests in the North and Centre are home to several animal species, some of which are protected in national parks. Although oil provides 98% of the country's income, South Sudan is at the heart of an exceptional environment: "having some of the most spectacular and important animals in Africa, being part of the migration route for many species...".[17]

The Indian Ocean islands of Madagascar, Comoros and Seychelles constitute a mega-diverse region with unique biodiversity and landscapes, as well as a variety of coastal and marine ecosystems (Figure3.2). The island of Madagascar boasts plant and animal species that have long evolved in isolation from other land masses.

[16] See: http://www.unep.org/french/wed/2010/aboutrwanda.asp

[17] See: www.wcs.org

FIGURE 3.2 Madagascar and Indian Ocean Islands hotspot



Madagascar and the Indian Ocean Islands Hotspots

Source: Critical Ecosystem Partnership Fund (2015)[18]

The natural wealth of Madagascar includes tropical rain forest in the east, dry deciduous forests in the west and a unique spiny desert in the south. The island also hosts high mountain ecosystems characterised by forest with moss and lichens. These critical ecosystems shelter at least 12,000 species of plants, 90% of which are found nowhere else. Often considered a mini-continent, Madagascar is famous for its diversity of chameleons and more than 50 different kinds of lemurs, unique primates found only here. New species are also being discovered at a rapid rate: 22 new mammal species and subspecies have been described in the 15 years from the turn of the century.

[18] See: http://www.cepf.net/resources/maps/Pages/default.aspx

While Seychelles and Comoros are the habitats of several species of highly endangered birds, Madagascar also hosts endemic species of more than 9,700 plants and 770 vertebrates peculiar to the island. While sheltering extraordinary concentrations of biological diversity, Madagascar has lost as much as 80% of its original forest cover. Slash-and-burn agriculture, mining and logging are among the main causes. Wetlands, including lakes, rivers and marshes, are also under threat from transformation to rice fields. To overcome this situation, the government has repeatedly extended protected areas. Today, more than 10% of Madagascar's territory is under protected area status, according to the IUCN classification.

The conservation of marine and coastal ecosystems can be maintained through Marine Protected Areas(MPAs). Their successful implementation in the Philippines, Solomon Islands, Indonesia and Fiji shows that MPAs lead to improved fish catches, new jobs, stronger local governance, benefits to health and benefits to women[19]. In Madagascar, villagers in Toliara (South West) set up a "no-take" MPA in 2004 to protect octopus populations[20] that resulted in an average increase in the mean weight of octopuses of 50%. The initiative led to a replication of the no-take zones along Madagascar's southwest coastline. In 2006, 23 villages came together to form the Velondriake Locally Managed Marine Area (LMMA), no-take zones in which mangroves and other marine species are conserved. The LMMA continues to protect the marine resources and to support the livelihoods of local fishermen[21]. There are MPAs throughout the region, most of which apply a community-based management approach (Figure 3.3).

Kenya, Tanzania and Seychelles have most of the MPAs in Eastern Africa. For these countries, the marine and coastal ecosystems (resources and habitats) play crucial roles in fisheries and ocean-related tourism sectors. From the north of Kenya to Mafia Island in Tanzania, many MPAs are linked to key biodiversity areas. In Seychelles, MPAs are at the heart of the economy through their role in the basic sectors of fishing, food security, trade and tourism. Proportionally to the size of the country, the number of MPAs in Madagascar is low compared to Seychelles. However, in recognition of their importance, the country has announced its commitment to triple the MPA area[22]. In Comoros, the ten marine reserves of the Moheli Marine Park cover the southern half of the island (the coastline is about 100 km). Fishing is the main activity, both as a means of subsistence and as a source of income.

[19] Craig Leisher, Pieter van Beukering, Lea M. Scherl. "How MPAs contribute to Poverty Reduction". http://www.nature.org/science-in-action/protected-areas-how-marine-protected-areas-help-alleviate-poverty.xml

[20] See:www.adaptationpartnership.org

[21] See: www.blueventures.org/news_research.htm

[22] World Congress Park, Sydney 2014

FIGURE 3.3 Marine protected areas in East Africa

Source: WWF East Africa Marine Ecoregion

Eastern African countries face similar challenges that exacerbate biodiversity vulnerabilities. These factors include:

- demographic growth that increases pressure on natural resources;
- Blue Economy potential that is not sufficiently explored or exploited because of the lack of inter-sectoral, integrated and cross-cutting approaches including key sectors, such as tourism, renewable energy, extractive industries and maritime transport;
- regional economic co-operation entities have not given rise to an effective economic bloc that could support competitiveness and resilience;
- lack of adequate infrastructures, including port facilities, and policies to facilitate trade and economic interaction; and
- inadequate knowledge and resources to understand and adapt to climate change and mitigate its effects.

Policy is insufficiently guided by the concept of sustainability and remains driven by poor governance that continues to favour or allow overfishing, resource spoliation and other illegal acts. Economic growth has not reinforced stability or reduced food insecurity. Challenges in both remain, as they do in the sustainable use of natural resources that is intrinsic to them. The management of natural resources is constrained by the lack of national policies and of a legal framework that clarifies rights, responsibilities and accountabilities. Along the coast or at sea, marine and coastal ecosystems face many challenges including a rapid decrease of fish stocks combined with reef degradation, whereas in many littoral zones, habitats such as mangroves and alga laminate keep on decreasing[23] (Kenya, Madagascar). The destruction of marine habitats and resource depletion are the first most visible consequences of climate change and contribute to food insecurity and the aggravation of natural disaster impacts.

Pollution of the oceans originates from a number of marine and land-based sources including river discharges, agricultural and industrial run-off, urban outfalls, municipal or industrial wastewater, atmospheric deposition, illegal or indiscriminate dumping, accidents, fishing operations, maritime transport and off-shore construction. Some of the largest urban agglomerations are located in coastal areas and are growing. Marine pollution occurs in the form of heavy metals, persistent organic pollutants (POPs), pesticides, nutrients (nitrogen and phosphorus), plastics, oil, hazardous substances, radioactive materials, and anthropogenic underwater noise. As an example, agriculture, in particular excessive and inefficient use of nitrogen fertilisers, can create harmful algal blooms (over 500 globally) and low oxygen “hypoxic” conditions leading to dead zones.[24] Globally, an average of 13,000 pieces of plastic litter are estimated to be afloat on every square kilometre of ocean, with the potential to kill sea birds, sea mammals and fish each year, many of which are endangered, threatened or protected under national and international law.[25] Scientists fear that the oceans’ regenerative capacity will eventually

[23] For a full review of the state of the East Africa Coast, see the June 2015 UNEP report Regional State of the Coast Report for the Western Indian Ocean: http://www.unep.org/NairobiConvention/Publications/Regional_State_of_Coast_Report_for_the_Western_Indian_Ocean.asp

[24] CBD (2010): Global Biodiversity Outlook 3

[25] UNEP (2006): Ecosystems and Biodiversity in Deep Waters and High Seas

be overwhelmed by the amount of pollution that humans inflict upon it. Reduction and degradation of freshwater resources (through unsound human activities) have dramatic repercussions on the water cycle and its sustainability, which is further exacerbated by climate change. This pollution has an inevitable impact on the development of Blue Economy activities.

3.4 Climate Change

According to the IPCC[26], the planet has warmed by an average of nearly 1°C in the past century. On a global scale this is a huge increase and it is creating serious problems for people and other living things[27]. Climate patterns change as the planet heats. More extreme and unpredictable weather patterns can be expected across the world: many places will be hotter, some wetter, others drier.

In that context, climate-change effects constitute a cross-cutting problem that affects not only ecosystems, but also several issues linked to development, poverty reduction and food security. By 2050, if temperatures rise by between 1.2°C and 1.9°C, the number of undernourished people in Eastern Africa will be increased by 50% (Munang and Andrews, 2014). In its fifth report, published in 2014, the IPCC concludes that African ecosystems are already affected by climate change and that the impact will be great[28].

Threats to the aquatic environment have hitherto come from human pressure (McCauley et al., 2015). Intensive fishing, chemical pollution, mineral prospecting and extraction, oil and gas exploitation and waste disposal have all caused damage. Climate-change effects – including rising sea levels, increased ocean acidification and worsening coral bleaching – now have to be added to these direct impacts (Figure3.4). Consequently, biodiversity in marine resources is reduced because species migrate towards locations that are adapted to their living conditions. The ocean ecosystems, especially the coral reefs will be affected by the acidification of the oceans and global warming, as well as the rise in the sea levels.

For terrestrial ecosystems, including water basins, an increase of short-term rainfall in East Africa is forecast due to the combination of Indian-Ocean warming and increased extreme rainfall during cyclones reaching the east coast of the continent, including Madagascar (Munang and Andrews, 2014). The IPCC experts anticipate a medium increase in temperature and rainfall, with local variations that could include a decrease in some regions, and an important exception concerning a strong increase in aridity over a large portion of the territory on both sides of the Tanzanian/Kenyan border moving away from the coast.[29] This dryness will extend to Sudan and Somalia.

---

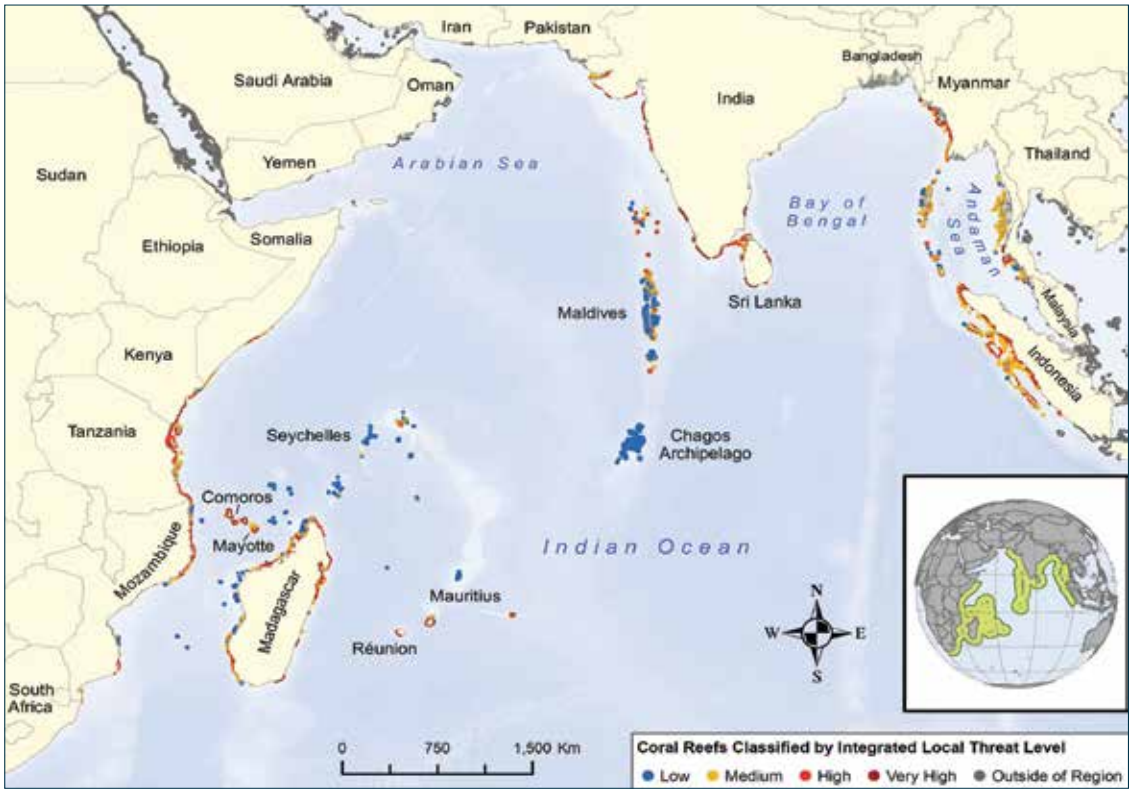
[26] 0.85° C or 1.53°F. See: http://www.climatechange2013.org/report/

[27] See: http://www.wwf.org.uk/what_we_do/tackling_climate_change/climate_change_explained/

[28] See: http://ipcc-wg2.gov/AR5/

[29] IPCC Working Group I, Working Group I Contribution to the IPCC Fifth Assessment Report (AR5), Climate Change 2013: the Physical basis. Chapter 14: Climate Phenomena and their Relevance for Future Regional Climate Change, Genève, 2013, 147p., http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_Chapter14.pdf

FIGURE 3.4 Reef at risk in the Indian Ocean



Source: World Resource Institute

In Madagascar[30] climate change appears to be responsible for higher temperatures in the South in the 1950s that spread northwards in the1970s with more variable precipitations and more intense cyclones. In the Comoros, the progressive reduction of rainfall, combined with an increase in the average minimum and maximum temperatures (20% increases in nocturnal and diurnal temperatures), has been observed since the 1980s[31]. The country is also exposed to cyclones and rising sea levels. In Seychelles[32], the archipelago is also under the influence of the conditions of the Indian Ocean. Forecasts relating to climate change concern rising sea levels and increased temperatures, as well as the intensification of the effects of tropical storms, although Seychelles is situated outside normal cyclone zones. These phenomena make the country prone to flooding and erosion. In the 1990s, Seychelles experienced a series of ENSO *(El Nino Southern Oscillations)* events. Extensive coral bleaching resulting from the ENSO event in 1998 led to the death of important numbers of marine species.

Eastern Africa is particularly prone to climatic disasters. However, relationships between environmental hazards and climate change can differ. Risks related to climate change are

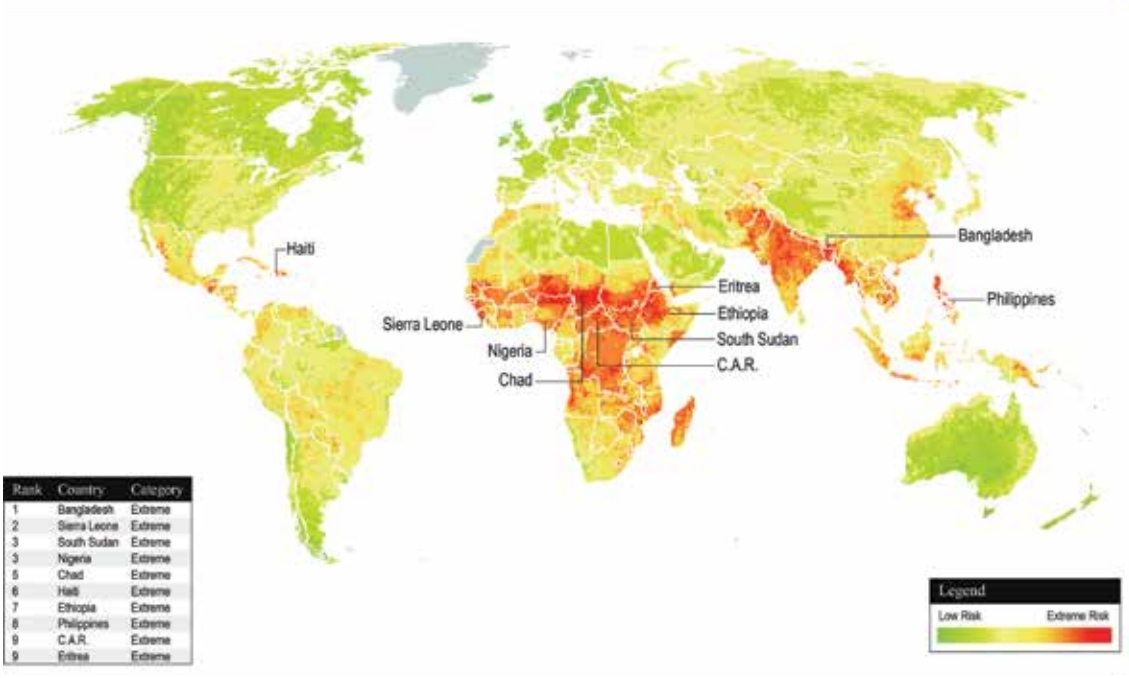
[30] Direction Générale de la Météorologie, Ministère du Transport, Madagascar, 2008. « Le Changement climatique à Madagascar"

[31] Vice presidency in charge of the Ministry of Production, Environment, Energy, industry and Crafts, General Directorate of the Environment and the Forests. 2012. "Second National Communication on Climate Change"

[32] Ministry of Home Affairs, Environment, Transport and Energy Government of Seychelles. 2011. « Seychelles's Second National Communication on Climate Change »

highly critical ("red", according to the climate change vulnerability index (Figure 3.5)). There are multiple impacts affecting specific areas differently. Increased rainfall in the eastern part of the continent can be accompanied by drought cycles and desertification that endanger agricultural systems in the Horn of Africa. Rising sea levels affect coastal communities and the island countries of the region, while the destruction of coral reefs affects almost all Madagascar and Africa's eastern coastline.

FIGURE 3.5 Map of the key impacts of climate warming



Rank	Country	Category
1	Bangladesh	Extreme
2	Sierra Leone	Extreme
3	South Sudan	Extreme
3	Nigeria	Extreme
5	Chad	Extreme
6	Haiti	Extreme
7	Ethiopia	Extreme
8	Philippines	Extreme
9	C.A.R.	Extreme
9	Eritrea	Extreme

Source: Maplecroft [33]

If climate change is already a fact, the challenge is to reduce the risk that its impact leads to social, economic, financial and environmental disasters. Unfortunately, there is little anticipation of natural disasters in the region and the tendency is to deal with them after they occur, instead of taking precautionary measures beforehand. This requires adopting policy and culture-based approaches adapted to future climate forecasts; it also means developing resistant infrastructures and effectively ensuring the rational and sustainable governance of marine and inland water ecosystems. Some countries,[34] such as Ethiopia, Kenya, Madagascar, Tanzania and Uganda, have developed national documents (policy and/or strategy) related to disaster risk reduction or management.

[33] See: http://reliefweb.int/sites/reliefweb.int/files/resources/Climate_Change_2015_Press_Countries_V01.pdf

[34] National policy for disaster management in Kenya (2009), National policy for disaster management in Ethiopia (2009), National strategy for disaster and risk management in Madagascar (2001, under revision), National policy for disaster preparedness and management in Uganda (2010)

3.5 Adaptation and Mitigation Policies

Climate change in Africa will require substantial, multidimensional efforts for both adaptation and mitigation. According to the UNFCCC, adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. The main elements of adaptation are activities that span five general components: observation; assessment of climate impacts and vulnerability; planning; implementation; and monitoring and evaluation of adaptation actions.

Adaptation measures ought to reinforce the populations' resilience at the individual, household, community and higher levels. These include, for example: urban infrastructure-protection measures such as seawalls, dykes, wave breakers and other elements of coastal-zone management; enhancement of the storage capacity of seafood at city-level; construction of climate resilient infrastructures; and all technical planning and scientific measures. Building resilience may also consist in transforming climate-change threats into development opportunities, and improving or rehabilitating existing assets for adequate preparedness for the future. Viewed in this way, the Blue Economy approach can also be considered as part of adaptation process.

In the mid-2000s the UNFCCC called for National Adaptation Programmes of Action (NAPAs) to help Least Developed Countries (LDCs) prepare adaptation plans[35] identifying priority activities that respond to their specific needs in adapting to climate-change. Some of the countries that completed their NAPA[36] by the end of 2008 with an implementation of initiatives scheduled in earlier 2010, have elaborate actions involving the coastal and marine environments (Table 3.1). With the exception of Eritrea, countries linked to marine and coastal ecosystem have provided at least one project related to the Blue Economy.

[35] The NAPAs focus on urgent and immediate needs and use existing information; no new research is needed

[36] The list of projects per country can be seen on the UNFCCC website: http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4583.php

TABLE 3.2 Projects related to marine and coastal ecosystems in NAPAs

Countries	Project related to marine and coastal ecosystem	Ranking by prioritisation[37]
Burundi	N/A	N/A
Comoros	Short conservation of fish under ice to reduce post-harvest losses caused by temperature increase	11/13
DRC	Biodiversity conservation and restoration of Mangroves Marine Park	3/3
Djibouti	Mitigation of climate change-related risks for the production system of coastal areas through an integrated, adapted and participatory management involving grassroots organisations	1/8
	Restoration of protected sites through the protection of coral reefs and mangrove vegetation	7/8
Eritrea	0	0
Ethiopia	N/A	-
Madagascar	Implementation of dams and dykes to control the gradual rise of sea level	6/15
	Rehabilitation of degraded coastal areas	7/15
Rwanda	N/A	
Somalia	Reducing risks among vulnerable populations from natural disasters	3/3
South Sudan	N/A	
Tanzania	Shifting shallow wells affected by floods on the coastal regions of Tanzania mainland and Zanzibar	3/6
Uganda	N/A	-

Source: UNEP (2009 [38])

BOX 3.1 Other adaptation initiatives

Kenya did not submit a NAPA to UNFCCC. However, it has developed its *National Climate Change Action Plan* for the period 2013-2017. In terms of adaptation, a project within the plan is related to the marine and coastal ecosystem: "Mainstream climate change risks and opportunities within and across major vulnerable sectors including the Coastal Zone Management Plan, the National Disaster Risk Management Response Plan and the National Environment Action Plan". The Seychelles government underlines existing adaptation measures and adaptation options in its *Second National Communication on Climate Change* (2011), such as management plans, structural technologies (rock armouring, sea-walls ...) to protect the shoreline against coastal erosion, drainage and floods, insurance mechanisms to protect fishermen, crop and livestock producers against natural disasters, etc.

[37] The NAPA document a list of ranked priority adaptation activities and projects identified by each concerned country

[38] UNEP/Climate Change Impacts and Adaptation Group/Division of Environmental Policy Implementation (DEPI), 2009. Preliminary Report: Organisations and Projects on adaptation to climate change in Africa

At the Eastern African level, activities relating to the management of the marine and coastal environment have been set up in the form of projects. Activities in research, data collection, basic knowledge construction, and dissemination of information on ecosystems, constitute basic elements to build these ecosystems' resilience. Table 3.3 provides a summary of principal ongoing collaborative initiatives relating to coast and islands adaptation to climate change.

TABLE 3.3 Coastal and Islands Climate Change adaptation initiatives

Initiative	Countries involved	Focus
ASCLME (Agulhas and Somali Large Marine Ecosystems)	Comoros Kenya Madagascar Mauritius Mozambique Seychelles Tanzania	Evaluation policy formulation and integration
Clearing House Mechanism of the Nairobi Convention	Comoros Kenya Madagascar Mauritius Mozambique Seychelles Réunion (France) Tanzania	Network for sharing data for capacity-building and for the dissemination of knowledge
ODINAFRICA (Ocean Data and Information Network for Africa)	Comoros Kenya Madagascar Mauritius Mozambique Seychelles Tanzania	Network for data management and for knowledge dissemination
COAST-MAP-IO	Comoros Kenya Madagascar Mauritius Mozambique Seychelles Réunion (France) Tanzania	Data collection evaluation and bathymetric mapping
TRANSMAP (Transboundary Network for Sustainable Marine Protected Areas)	Mozambique South Africa Tanzania	Transboundary network of protected marine areas evaluation integration field implementation
WIOFish database	Kenya Mozambique Seychelles Tanzania South Africa	Data collection and capacity-building on fisheries' management
WWF Coastal East Africa Initiative	Kenya Tanzania Mozambique	Addressing regional and national governance failures community based natural-resources management

Source: Rakotobe (2012)

Other key initiatives are also undertaken at the regional level, such as:

- The EAC (East Africa Community) has developed a "Disaster Risk Reduction and Management Strategy" (DRRM) for the period 2012-2016; the DRRM document aims to mainstream prevention and risk analysis into development planning, programmes and projects, considering that this approach is one of the ways to consolidate sustainable development in the region as a whole;
- As inter-governmental collaboration is essential to addressing DRR at a regional level, the fourteen countries of Eastern Africa are also part of the Africa Regional Platform for Disaster Risk Reduction[39]. The regional offices of United Nations International Strategy for Disaster Reduction (UNISDR) serve as a supportive secretariat for regional platforms;
- The Indian Ocean States also aim to strengthen their individual and collective efforts to reduce and manage disasters. With support from UNISDR, the World Bank and other partners, capacity building is provided through "Islands Project"[40] to enhance local capacities and national expertise, enabling countries to produce their own risk assessments and loss databases. Presently, the perspective of the development of a regional strategy and/or planning for DRR is underway.
- Since 2011, COMESA, EAC and SADC have been implementing a joint initiative called "The African Solution" to address Climate Change. This approach is called the Tripartite Programme on Climate Change Adaptation and Mitigation. The objective is to ensure the impacts of Climate Change in the COMESA- EAC-SADC region are addressed through successful adaptation and mitigation actions which also build economic and social resilience for present and future generations.
- UNEP and UNDP have jointly developed the CC DARE[41] initiative, implemented under the one UN Banner. The CC DARE initiative provides timely technical and financial support on request to countries in sub-Saharan Africa and to SIDS for flexible and targeted actions to remove barriers and create opportunities for integrating climate change adaptation into national development planning and decision-making frameworks. The programme is designed to complement and strengthen ongoing and planned climate change adaptation and risk management activities in these countries using quick and tailored support.

According to UNFCCC, actions on mitigation mainly consist of reducing emissions and enhancing sinks. A range of policies and various economy-wide packages of policy instruments have been effective in reducing GHG emissions in different sectors and many countries. There is substantial technical and economic potential for the mitigation of global greenhouse gas (GHG) emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels. Changes in lifestyle and behaviour patterns and management practices can also contribute to climate-change mitigation across all sectors.

---

[39] A regional platform is a multi-stakeholder forum that reflects the commitment of governments to improve coordination and implementation of disaster risk reduction activities while linking to international and national efforts

[40] The "Islands Project" is expected to build capacity in Comoros, Mauritius, Seychelles, Madagascar and Zanzibar

[41] See: http://www.ccdare.org/Home/tabid/6655/Default.aspx

The UNFCCC has developed strategies and mechanisms to enhance terrestrial "Green Carbon" sinks. In recent years, however, there has been increasing attention to marine and coastal ecosystems. The world's oceans and coastal vegetation bind carbon in living organisms. Mangroves, sea grasses and marshes capture and store most of the carbon buried in marine sediment. These ecosystems have the capacity both to sequester carbon both in their tree biomass and to draw it from the deep mud that accumulates around the roots. The abundance of mangrove forests, seagrasses and tidal marsh ecosystems in Eastern Africa makes "blue carbon" important for many of the countries' climate-change strategies.[42]

Blue carbon is a relatively recent concept that links the fields of marine and coastal management to climate-change science. Blue carbon sums up the idea of procuring the benefits of preserving, protecting, and restoring coastal habitats such as mangrove forests, sea grass meadows, and saltwater marshes, as a climate-change mitigation process (Nellemann *et al.*, 2009). Similarly to the Reduction of Emission due to Deforestation and forest Degradation (REDD) mechanism in the forest domain, blue carbon relies on the capacity of marine and coastal ecosystems to sequester carbon. In Africa, coastal habitats are abundant, which makes blue carbon important for climate-change strategies for development that include a commitment to reduce carbon emissions. In addition, blue-carbon markets may offer African countries additional economic incentives to manage resources sustainably and to restore their coastal and marine ecosystems.

In Eastern Africa, two cases can illustrate the opportunities available through the development of blue carbon. In Kenya, the Mikoko Pamoja Mangrove Carbon Conservation Project [43] aims to rehabilitate, protect and use sustainably the mangroves in the southern part of Gazi Bay, leading to the generation of estimated 3,000 tons in CO_2-equivalent of carbon credits, to be sold on the voluntary carbon market and generating approximately USD 12,000 per annum to the local community. From the experience of this project, it is expected that coastal communities throughout Kenya will benefit from the sustainable management of mangroves, supported by revenue from carbon credits. The Mikoko Pamoja project is verified under the Plan Vivo Standard. Certification is awaited soon that will allow the start of the payment.

In Madagascar, Blue Ventures (a science-led social enterprise developing transformative approaches for nurturing and sustaining locally led marine conservation) has been exploring the potential of blue carbon since 2011. A key aim of the project is to empower coastal communities to participate equitably in a mangrove REDD+-mechanism. It focuses on strengthening the methodologies for measuring the extent of the mangrove forests and preparing community-led projects along the rich west coast mangrove of Madagascar. Since 2013, the project has worked through the Verified Carbon Standard (VCS). By using this standard, specifically developed for terrestrial forest, the project will contribute to building blue-carbon projects through mangrove REDD+ not only in Madagascar but also elsewhere.

---

[42] Chevalier, R. 2012. Blue Carbon: The Opportunity of Coastal Sinks for Africa. SAIIA Policy Briefing 59

[43] Abu Dhabi Global Environmental Data Initiative (AGEDI), 2014.Building Blue Carbon Projects - An Introductory Guide

BOX 3.2 REDD+ and blue-carbon initiatives

Madagascar and the DRC are moving forward in developing their REDD+ strategies. Their efforts can be enhanced by integrating the blue-carbon concept, which might not have been considered while having developed their Readiness Plan Proposal (R-PP). Several challenges still exist, however, in blue-carbon trading. Although scientific evidence exists to support the carbon sequestration benefits of coastal ecosystems, there is currently no international regulatory framework or convention to protect the value of coastal and marine ecosystems for sequestrating carbon and mitigating climate change. Blue-carbon benefits have not yet been fully integrated into policy discussions within the financial mechanisms for climate mitigation (Ulman et al., 2012).

Other Eastern African specificities are also conducive to the promotion of the Blue Economy:

- the Western Indian Ocean offers countless opportunities in the transport sector, including the development of sea transport that can be relayed by waterways within the continent; additionally, tourism and trade will be developed;
- the Western Indian Ocean is also the cradle of rich underwater fauna and flora which, in addition to their contribution to the ecosystem, attract deep-sea diving amateurs and professionals (researchers, tourists, sports professionals);
- the conservation of the ocean guarantees the ecosystem's ecological wellbeing and biodiversity, and enhances fishing activities; and
- existing or potential offshore oil fields (Tanzania, Western Madagascar) may help boost the region's economy through job creation, exports and proximity of energy supplies if they are exploited according to sound governance rules including transparency.

Forecasts of climate change can provide opportunities for the renewal, modernisation or improvement of maritime infrastructure, while the changing lifestyles of marine species due to climate change may require further research.

Regional initiatives in sustainable development and/or climate change in Eastern Africa are often developed and supported in conjunction with the East African Community (EAC), the Common Market of East and Southern Africa (COMESA), and the Indian Ocean Commission (IOC). Under the Blue Economy, in particular, since the notion is relatively new, there have been no tangible actions or achievements of note so far. However, the concept of "Vanilla Islands" developed within the Indian Ocean Commission, grouping countries including the Comoros, Seychelles and Madagascar, should be mentioned. The marketing concept of "The Vanilla Islands" was defined in August 2010 for tourism development in Réunion, Mauritius, Madagascar, Seychelles, Comoros and Mayotte, through the pooling of resources and specific know-how. The objective is to boost the sector in order to meet international standards and to undertake new marketing development at the global level by emphasising the multiple

attractiveness of the Indian Ocean. The concept promotes sustainable tourism in the Indian Ocean, by making full use of the potential of coasts and seas. In the long term, "Vanilla Islands" can represent the perfect combination of green growth and Blue Economy in the Indian Ocean.

The creation of MPAs with sustainable management methods can be considered a Blue Economy initiative, as can the training of the Group of Experts in Marine Protected Areas of East Africa, hosted by the United Nations Environment Programme and the Western Indian Ocean Marine Science Association (WIOMSA).[44] Other regional initiatives have also contributed to advancing the development and management of MPAs, such as the programme initiated by the Eastern African Marine Eco-region (EAME).

3.6 Conclusions and Recommendations

The East African region is already involved in the sustainable development process. Inclusive and equitable growth policies are designed to foster regional-integration processes. In the context of climate change, it will be fundamental to incorporate the Blue Economy concept into the design of any future action. This will contribute to building a true political recognition within African nations and negotiations at international level. The African continent, including the east of the continent, suffers the consequence of CO2 emissions largely of countries elsewhere. To confront this situation, with a Blue Economy approach and a regional vision, climate change should be transformed into an economic factor of development. Developing adaptation and disaster risk-reduction projects, by transforming groundwater and coastlines into capital to boost fisheries, tourism, sea transport and research, and by taking advantage of the "emitter (or polluter) pays" concept, Eastern African countries can use Blue Economy strategies to protect themselves from the external impact of climate change. These projects may be financed through different mechanisms under the UNFCCC, such as the Green Fund and Adaptation Fund, and others.

However, these challenges require effective good governance, at the international, country and regional levels, willingness to invest in innovative technologies, commitment and the end of the wait-and-see attitude. Fundamentally, the countries of Eastern Africa have to rethink their co-operation mechanisms, by enhancing cross-border trade and by efficiently governing resources.

Some basic considerations have to be taken into account when addressing adaptation in the context of regional integration: scientific research and knowledge improvement, regional frameworks to meet the Blue Economy information gap (mainly in scientific information and ocean knowledge) and to promote exchanges of experiences, best and good practices (such as benefits sharing), policy strategies to mainstream finance and economic issues including fundraising. The "ecosystem-based adaptation" may be used as baseline approach to drive all these actions, by employing biodiversity and ecosystem services in adaptation strategies.

[44] IUCN/East Africa Regional Program, 2004. "Management of Marine Protected Areas in the Western Indian Ocean"

Several international recommendations have been made on oceans and can therefore be used in the approach to a Blue Economy in a climate-change context. These include the Manado Declaration of the World Ocean Conference (2009), the Bamako Declaration of the African Ministers of Environment (2010), the Rio Ocean Declaration on Adaptation (2012), and the UNEP-FAO-IOC/UNESCO-IUCN-CSCIS recommendations (2009). These different statements express and explain the importance of marine and coastal ecosystems, socio-economically, environmentally and politically.

The Addis Ababa Declaration relating to African Integrated Marine and Ocean Strategy (Strategy AIM 2050)[45] is also important. It defines a long-term, comprehensive and multidimensional vision, to face the challenge and grasp the opportunities linked to maritime issues in Africa. Security and geostrategic opportunities are the main focuses of this strategy.

The East African Community and its economic and co-operation bodies would gain by integrating the opportunities offered by the marine and coastal ecosystems into a Blue Economy approach, especially in the context of the climate change and despite the fact that the concept is still in its early stages. Besides sectors such as fishery, aquaculture, sea transport and tourism, in the mid and long terms, ocean energy and carbon trade also offer potential. A Blue Economy strategy will lead to job creation, as well as to new infrastructures, particularly ports and shipping facilities. However, the financial and economic interests should not obscure the environmental risks. Rather, economic benefits may progressively contribute to the conservation and good governance of resources and ecosystems.

Within this framework, existing regional co-operation structures could be factors of promotion, then developers of the Blue Economy through socio-economic and strategic partnerships.

The following recommendations are integral to fostering a Blue Economy in Eastern Africa:

Natural Resource Management

- Develop an efficient regional action plan to address the governance of fishery resources and adopt an ecosystem-based management system;
- Promote common environment-friendly technologies in fishing and aquaculture and develop knowledge-sharing mechanisms;
- Take into consideration the 2011 FAO Technical Guidelines on Aquaculture Certification that constitute an additional important tool for good governance of the sector;
- Develop coastal and marine biodiversity conservation strategies by considering PES (Payment of Ecosystem Services) opportunities.

[45] Second conference of African ministers in charge of marine affairs, and Fifth intersectoral workshop of African Experts in maritime areas for the Strategy AIM 2050, Addis Ababa (2012). See: www.au.int/maritime

Socio-economic Field:

- Encourage the participation of the private sector through the implementation of adequate policies and incentives geared towards regional integration, and create an enabling environment for trade;
- Mobilise financing for the environment-friendly modernisation of sea ports;
- Develop national and regional marketing strategies favourable to the Blue Economy;
- Integrate entrepreneurship and human-resources capacity building into the Blue Economy strategy;
- Promote employment in Blue Economy fields;
- Secure access to resources for individuals as well as for professional groups;
- Mainstream social and environmental risk assessments while promoting the Blue Economy;
- Encourage and empower civil society as guardians and participants in Blue Economy governance.

Regional Policy:

- Enhance the implementation of regional institutional mechanisms for knowledge sharing and the pursuit of common objectives. For example, reinforce scientific and research actions at regional level through inter-university collaboration, develop common regulation related to the development of blue carbon, integrate climate-change considerations and Blue Economy concepts into regional institutions' agendas;
- Assess the use of national, regional and international strategic, regulatory and economic guidelines to enhance the development of the Blue Economy in East Africa;
- Learn from the first Blue Economy development initiatives of the SIDSs, even though their environment is rather limited geographically and geo-politically, while developing action plans that fit into the context of Eastern Africa;
- Mobilise resources for the implementation of blue-carbon regional projects, using different financing mechanisms (Green funds, Adaptation funds, etc.);
- Continue strategic reflections on the construction of ocean-energy projects that may contribute to energy security and reduce dependence on fossil fuels, while fostering exchanges among countries;
- Develop integrated tourism-development frameworks at the regional level;
- Enhance Integrated Growth Poles in each country following the example of Madagascar's Integrated Growth Pole that could be extended to the region;
- Reinforce strategic partnerships and collaboration between UNECA, Nairobi Convention, UNISDR and other UN organisations (besides existing collaboration such as IOC and EAC);

- Extend those partnerships to security improvement and mapping of marine areas, taking into consideration pollution and inter-sectoral issues: oil industries, fisheries, conservation and research;
- Take into consideration the recommendations in Strategy AIM 2050, and contribute to the implementation of the related action plan;
- Establish global inter-sectoral policy frameworks for harnessing Blue Economy opportunities in Eastern Africa.

Research Domain:

- Promote scientific (including economic) research to support Blue Economy approaches. There is, in particular, major uncertainty about the quantification of carbon sinks that needs to be addressed urgently in the scientific community.
- Re-orient scientific research by considering the evolution from the natural sequestration to the emissions that occur upon destruction. Research also should be more applied to the Blue Economy and Blue Economy research should benefit from inter-university co-operation;
- Quantify the economic value of mangroves, sea grasses and tidal marshes to entice investment back into sustainable financing for their conservation;
- Capacity building to expand knowledge of the Blue Economy and blue carbon is of utter urgency. Multidimensional and multi-sector efforts should be considered at the national level, to be expanded to the region.

For each of these areas mentioned above, climate change is a cross-cutting issue that should be considered as fully part of the whole process. Coastal and marine ecosystems are vulnerable to climate-change impacts that need to be confronted. Both mitigation and adaptation have to be properly addressed. Complementarities ought to be found in the region and DRR related to climate should be mainstreamed into adaptation strategies and actions.

Policy makers within each country should be convinced of the necessity to secure their coastal and marine carbon sinks and to implement adequate and sustainable initiatives that significantly improve economic development, populations' well-being and improve biodiversity conservation. Reflection and actions should be scaled up to the regional level. The potential of Eastern Africa should grant it a privileged place at the table at the forefront of decision making around the Blue Economy and in the creation of policies specifically suited to its countries' needs. The effectiveness of the Blue Economy will depend on the genuine development of inter-connectivity among nations, their shared willingness to integrate and implement Blue Economy mechanisms in their development approaches, as well as in the importance accorded to the Blue Economy in their technical, financial and budget plans, both at national and regional levels.

References

Dueri S., L. Bopp and O. Maury (2014), “Projecting the impacts of climate change on skipjack tuna abundance and spatial distribution”, *Global Change Biology*, doi: 10.1111/gcb.12460

Hoegh-Guldberg, O, P.J. Mumby, A.J. Hooten, R.S. Steneck, P. Greenfield, E. Gomez, C.D. Harvell, P.F. Sale, A.J. Edwards, K. Caldeira, N. Knowlton, C.M. Eakin, R. Iglesias-Prieto, N. Muthiga, R.H. Bradbury, A. Dubi, A and M.E. Hatziolos, (2007), “Coral Reefs Under Rapid Climate Change and Ocean Acidification.” *Science* Vol. 318 no.5857. DOI:10.1126/science.1152509

Lester, S.E., B.S. Halpern, K. Grorud-Colvert, J. Lubchenco, B.I. Ruttenberg, S.D. Gaines, S. Airamé, and R.R. Warner, (2009), “Biological effects within no-take marine reserves: a global synthesis.” *Marine Ecology Progress Series*, Vol. 384, pp. 33-46

McCauley D.J., M.L. Pinsky, S.R. Palumbi, J.A. Estes, F.H. Joyce and R.R. Warner, (2015), “Marine defaunation: Animal loss in the global ocean” *Science* Vol. 347 no. 6219. DOI: 10.1126/science.1255641

Munang R. and J. Andrews, (2014),"Africa in the face of climate change", *Afrique Renouveau*, Special Edition on Agriculture

Nellemann, C., E. Corcoran, C.M. Duarte, L. Valdés, C. De Young, L. Fonseca and G. Grimsditch, (Eds), (2009), *Blue Carbon - The Role of Healthy Oceans in Binding Carbon: A Rapid Response Assessment*. Arendal: United Nations Environment Programme and GRID-Arendal

Rakotobe T., (2012), *Climate Change in the Western Indian Ocean: A Situation Assessment and Policy Considerations*. Arlington: Africa Biodiversity Collaborative Group

Ulman, R., V. Bilbao-Bastida and G. Grimsditch, (2012), “Including Blue Carbon in climate market mechanisms.”, *Ocean & Coastal Management*


4

The Geopolitical Context of the Blue Economy in Eastern Africa

Air Routes for Africa and Madagascar, Antartis.

4.1 Introduction

The Western Indian Ocean (WIO) Region is "... part of a 21st Century version of the Great Game" (Chellaney, 2013), involving peace, security and stability on one hand and a renewed scramble for resources on the other. The growing interest in the riches of the oceans – including mineral wealth – together with competition for energy supplies and concern over the security of transport routes are intensifying and fuelling sometimes controversial geopolitical strategic positioning.

The WIO spans a large latitudinal range, from the Somalia region, influenced by the strong monsoon regime of the northern Indian Ocean, to the southern temperate regime of the tip of South Africa, where the Agulhas current diverges from the northward-moving south-western Atlantic Benguela current. The WIO thus borders the entire east coast of the African continent and includes the tropical waters off Somalia, Kenya, Tanzania, Mozambique and South Africa, as well as the islands of Madagascar, Comoros, Seychelles, Mauritius, and Réunion. It has unique characteristics of high biodiversity, both in terms of species and ecosystems, which place it as one of the most biodiversity rich and interesting ocean regions of the world (UNEP-Nairobi Convention and WIOMSA, 2015). Water – fresh and saline – has and will always be crucial for life and, thus, at the core of international and regional political dynamics influenced by geopolitical considerations.

The Indian Ocean maritime route has become one of the most important global gateways, especially for the transport of crude oil to Europe, North America, and East Asia. Other major commodities such as iron, coal, rubber, and tea also transit the route, as do manufactured goods in all directions. "The security, economic, cultural, and diplomatic spheres of influence in the twenty-first century have indeed begun to shift from the northern Atlantic to far distant oceans, but not just to the Pacific(...) The Indian Ocean region has rapidly emerged as the geographic nexus of vital economic and security issues that have global consequences."[1]

The consequent geopolitical repositioning will have an impact on the development of the Blue Economy in the region. Participants in the January 2014 Blue Economy Summit adopted the Abu Dhabi Declaration, "which describes the Blue Economy as a tool to promote, inter alia, sustainable development, poverty eradication and climate change mitigation in Small Island Developing States (SIDS) and coastal countries."[2] However, the concept of the Blue Economy applies to a wider sphere than SIDS and coastal countries; it also includes land-locked countries and larger islands such as Madagascar. The Blue Economy builds on the same principles as the Green Economy[3] and provides a new and dynamic framework for the WIO region to attain sustainable development.

---

1 Black, J (2009). Kindle Edition

2 http://biodiversity-l.iisd.org/news/Blue Economy-summit-adopts-abu-dhabi-declaration/. The Declaration stresses the importance of an enhanced mechanism for governing the high seas and urges further development of an integrated ecosystem approach to maintain balanced, healthy and productive marine ecosystems, including valuing blue capital and considering blue carbon trading

3 UNEP defines a green economy as one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"

The 19th Meeting of the Intergovernmental Committee of Experts (ICE) of UNECA's Sub-Regional Office for Eastern Africa (SRO-EA) was held from 2 to 5 March, 2015, in Antananarivo on the theme of *Harnessing the Blue Economy for Eastern Africa's Development*. Participants in the meeting advocated a conception of the Blue Economy that covers all bodies of water, including lakes and rivers, in addition to the oceans and coastlines. Thus, understanding the entire water cycle is the entry point to understanding the Blue Economy, while grasping the geopolitics of the region is essential to understanding the underlying policy challenges to implementation of the Blue Economy in the WIO.

According to the African Union's *2050 Africa's Integrated Maritime Strategy (2050 AIM-Strategy)*, most of Africa's Maritime Domain (AMD) is jeopardised by a number of threats and vulnerabilities. In relation to the Blue Economy and its geopolitical context, the following three are the most important:[4]

i. transnational organised crime, including money laundering, illegal arms and drug trafficking, piracy and armed robbery at sea, illegal oil bunkering / crude oil theft along African coasts, maritime terrorism, human trafficking, people smuggling and asylum seekers travelling by sea;
ii. illegal, unreported and unregulated (IUU) fishing and overfishing, as well as environmental crimes including deliberate shipwrecking and oil spillage, and the dumping of toxic wastes;
iii. vulnerable legal frameworks, lack of and/or poorly maintained aids to navigation, absence of modern hydrographic surveys, up-to-date nautical charts and maritime safety information in a number of African Union member States.

The region faces many daunting security challenges, which have a negative impact both on community livelihoods and economically important sectors, such as tourism and maritime transport.

4.2 The Water Cycle

Geopolitics has hitherto not been strictly defined and has been considered controversial since it came into use at the end of the 19th century, but most definitions stress the "the relationship between politics, principally the composition and use of power, and geographical factors, especially space, location and distance" (Black, 2009).

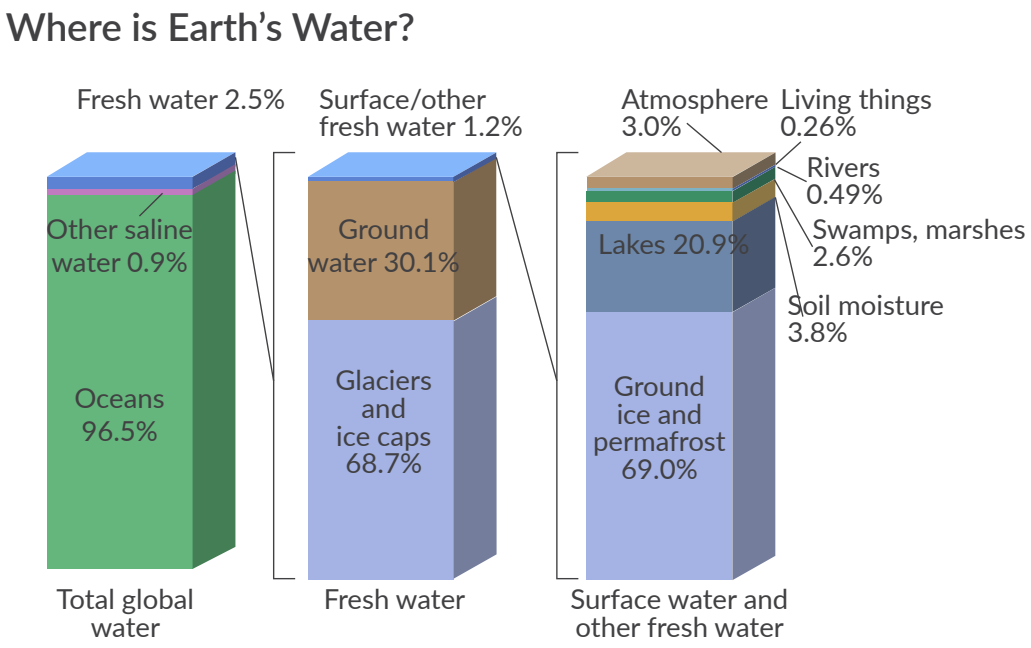
Geopolitics thus focuses on political power in connection with geographic space. In the context of the WIO region, in particular, it concerns waters within the national jurisdiction of coastal states and land territory. As an example, the freshwater, marine and coastal environment is a key resource for economically important productive sectors. "The seabed currently provides 32% of the global supply of hydrocarbons with exploration expanding. Advancing technologies are opening new frontiers of marine resource development from bio-prospecting to the mining of seabed mineral resources. The sea also offers vast potential for renewable "blue energy" production from wind,

[4] Africa Union (2012)

wave, tidal, thermal and biomass sources." [5] This new geopolitical configuration has contributed to disputes over islands and coastal lands, as well as increasing insecurity on both land and sea. The potentially large revenues derived from these resources create geopolitical tensions between countries and make the demarcation of maritime zones of countries increasingly important.

The "Blue Planet" – Earth – is "blue" because oceans cover 72% of its surface. The geophysical assessment of the planet's bodies of water (Figure 4.1) reveals a striking imbalance between reserves of freshwater (2.5% of total) and oceans (96.5%) in the world. Freshwater includes frozen water in glaciers, ice and snow, as well as fresh groundwater and soil moisture. Less than 0.01% of the world's freshwater exists as surface water in lakes, swamps and rivers. The African Great Lakes [6] constitute the largest proportion of surface freshwater in the world (27%).

FIGURE 4.1 Where is Earth's Water?



Source: Igor Shiklomanov's chapter "world fresh water resources" in Peter H. Gleick (editor) 1993, Water in Crisis: A Guide to the world's Fresh Water Resources.
NOTE: Numbers are rounded, so percent summations may not add to 100.

Source: http://water.usgs.gov/edu/earthwherewater.html

The water cycle, or hydrological cycle, (Figure 4.2) is the motion of water from the ground to the atmosphere and back again. Of the many processes involved in the hydrological cycle, the most important are evaporation, transpiration, condensation, precipitation and runoff; these processes establish a link between all the earth's water

[5] Concept note on the Blue Economy (2013) (https://sustainabledevelopment.un.org/)

[6] http://www.globalgreatlakes.org/agl/ The African Great Lakes are a series of lakes in and around the East African Rift. They include Lake Victoria, the second largest fresh water lake in the world, and Lake Tanganyika, the world's second largest in volume as well as the second deepest

bodies. The global water cycle is the foundation for the Blue Economy, thus going beyond the common focus on oceanic ecosystems and associated marine resources to include freshwater lakes and rivers as part of a whole complex ensemble with closely interrelated biochemical and physical functions. Including internal waters and oceans in the discussion highlights some of the characteristics of terrestrial areas (as indicated in the introduction) which, in turn, impact the geopolitics surrounding the oceans and internal waters. Using such an analytical framework implies considering:

a) three-dimensional planning, including the surface, the water column and the seabed;

b) multiple uses within same maritime space that can result in conflicts (e.g. port development and tourism);

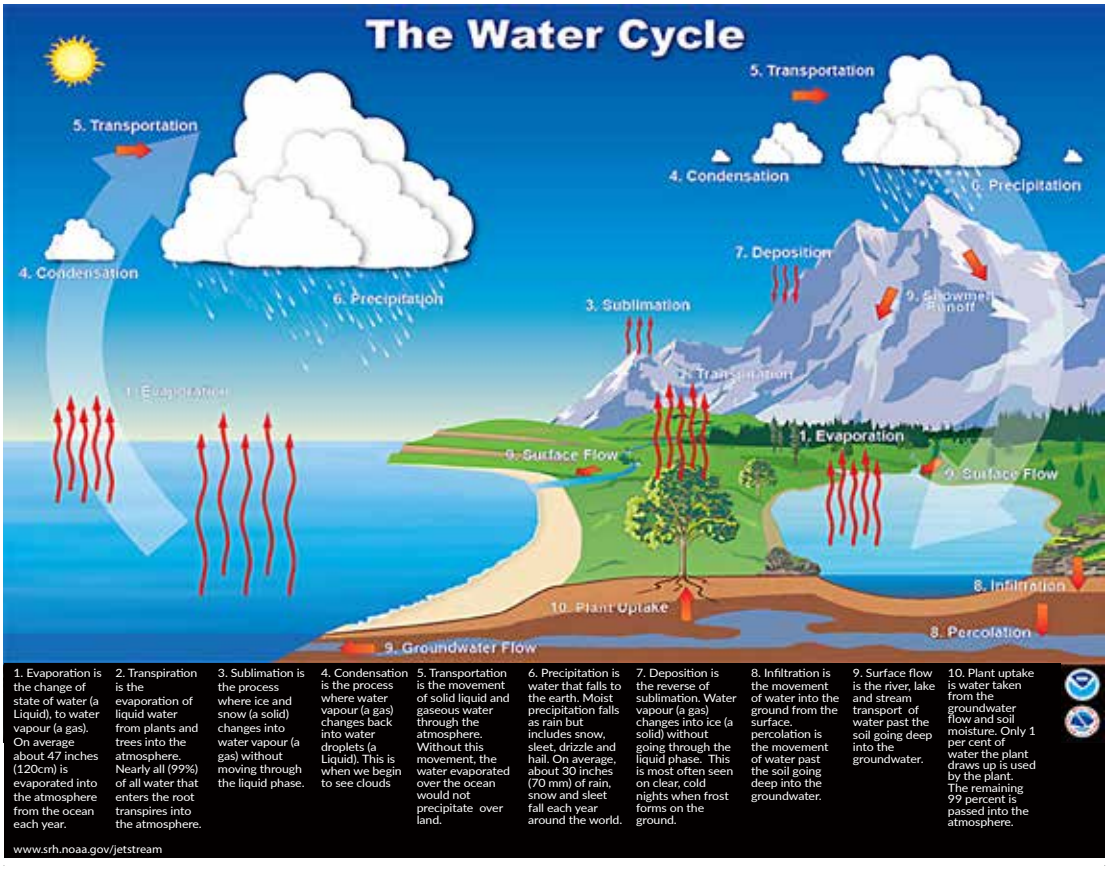
c) a number of illegal activities (e.g. piracy and transnational smuggling), over large areas and across borders requiring transnational co-ordination and regulation;

d) different jurisdictions relating to territorial waters, exclusive economic zones (EEZs), or high seas in a context of poor border demarcation; and

e) large EEZs, in comparison to a country's landmass and or coastline, making monitoring, control and surveillance difficult and facilitating large-scale illegal activities (e.g. illegal fishing, piracy, human trafficking).

These are the geopolitical dimensions of Eastern Africa's Blue Economy.

FIGURE 4.2 The Water Cycle



Source: http://www.education.noaa.gov/Freshwater/Water_Cycle.html

4.3 Geopolitics in the Eastern African Region

4.3.1. Historical Developments in the Region

The Egyptians undertook very early exploration of the WIO region starting with Somalia. They built a Suez canal almost 2000 years BCE that survived until 775 CE. The discovery of the monsoon regime in the first millennium BCE in the Indian Ocean was "the secret to long-distance travel across the breadth of the region. Trade in frankincense, spices, precious stones, and textiles brought together the peoples living along its long shoreline during the Middle Ages."[7] Continuous foreign incursions from the Arabs and Portuguese to the Dutch, Italians, English, French and Spanish, who exercised power in the region in different times, left deep marks in various fields, including conflicting colonial interests in the exploitation of resources in the region.

Early damage to the environment was caused by heavy deforestation driven by the need for timber for ship construction and repair, as well as the expansion of agriculture. The harvesting of guano, the hunting and harvesting of local wildlife and fish as food, and the introduction of harmful invasive species, such as rats, also had serious ecological impacts. Several centuries later, industrialisation, growing urbanisation and maritime transportation led to marine pollution (through waste and oil) with deleterious effects on the WIO region.

The opening of Suez Canal in 1869 was another major historical milestone for the WIO region. The Suez Canal is an artificial waterway separating Africa from Asia and providing the shortest maritime route between Europe and the Indian and Pacific oceans. It is one of the world's most heavily used shipping lanes.[8] It fostered booming trade with the Far East, brought down freight costs and had long-lasting effects on maritime flows and the local economies of the WIO Region. This, in turn, led to accelerating geopolitical competition between countries both within and outside the region, intertwined with geo-economic and geostrategic issues of which the importance of maritime trade 80% of total trade) is the main factor (UNCTAD 2014).

4.3.2. Geopolitical Power Shifts

Security in the WIO region is "now no longer the domain of colonial states or superpowers, but has become multifaceted and dynamic. New role players such as India and China have become major powers, and new national alliances are changing the scene."[9] Since the end of the Cold War, the region had become a "no man's sea" resulting in flourishing illegal activities. From the beginning of the 2000s, it evolved into a zone of insecurity on land and sea characterised by human trafficking, piracy, terrorism, illicit fishing and overfishing, and the smuggling of drugs, natural resources,

---

7 Kaplan, R. D. (2009). However, large distances and "the regional peculiarities of the monsoons rendered uninterrupted travelling from one extremity of the Indian Ocean world to the other virtually impossible in the era of sail." Several critical choke points including the Bab el Mandeb (meaning "Gate of Grief" in Arabic) between the Red Sea and the Gulf of Aden also affected travel (Alpers, E. A. (2013). Kindle Edition)

8 http://suezcanal.gov.eg/sc.aspx?show=17

9 Institute for Security Studies (2012)

weapons and goods. This had a serious effect on the regional and global economy through a drastic reduction in the sources of livelihoods from key productive sectors such as fisheries and tourism, and impacted on international relations through increased instability. The reserves and partially ungoverned richness of the WIO region in natural resources in a global context of scarcity, combined security threats on a global scale, have increasingly attracted genuine (and not-so-genuine) interest from state and non-state actors. A new scramble for resources in the region may have been launched.

BOX 4.1 Maritime boundary conflicts

The intra-regional disputes between states in Eastern Africa over their maritime boundaries have far-reaching security and geopolitical implications. Global interest in the richness of the Western Indian Ocean has risen over the past decade. The Kenya-Somalia dispute is over resources within and beneath the ocean floor and the desire to license oil/mineral prospecting firms and reap the revenues that will come with potential discoveries. In 2012 Kenya leased eight offshore blocks to oil exploration companies. Seven of these are located in the Indian Ocean in an area contested with Somalia amounting to roughly the size of Malawi. Kenya wants the border to run along the latitudes of the Indian Ocean similar to the way its border with Tanzania is aligned. However, Somalia wants the boundary to run perpendicular to the coast and believes that by leasing oil exploration blocks to the Total and Eni oil companies, Kenya has contravened Somali Law no. 37, which defines Mogadishu's continental shelf, its 200 nautical mile limit and territorial seas. Somalia is pursuing a double approach that includes pursuing arbitration through UNCLOS and a judicial process after filing a suit in August 2014 with the International Court of Justice. In addition, the Somali government announced it had completed surveys of the disputed area and planned to start issuing offshore oil and gas exploration licenses by 2015, giving Kenya reasons to worry.

Three geostrategic blocs seem to clearly emerge: the United States of America (which has drastically increased its military presence and naval forces in the WIO region following 9/11), and its partners (Australia, Singapore, Japan, India, the United Kingdom, Canada and other European countries) mainly concerned with access to resources and countering maritime insecurity; China, Iran and Russia as a counter weight to the United States and its allies; and a third grouping consisting of States from the WIO region that is the weakest of the three.[10] This last is ill-equipped through its shortage of capacity and financial resources to enforce maritime sovereignty. "The dilemma is that sovereignty must be exercised to be recognised. In the absence of this, a double jeopardy situation arises: as it is not possible to police and control the maritime domain effectively, and maritime domain awareness is low, illicit activities of all types flourish, preventing these countries from exploiting their own ocean resources properly and drawing full benefit from the potential revenue this might bring." [11]

[10] http://nationalinterest.org/feature/the-indian-ocean-great-power-danger-zone-10568

[11] Institute for Security Studies (2012)

All three blocs have started a tense power struggle to achieve energy security in the medium to long-term. [12] Oil and gas are strategic engines of world development and "the most important world's routes traverse the Indian Ocean...The security of shipping and sea lanes of communication (SLOCs) in the Indian Ocean is an issue of major strategic concern." [13]

4.3.3 Transnational Organised Crime in Eastern Africa

Organised criminality is thriving in the Eastern African region because of poverty, weak governance, widespread corruption, impunity and recurrent conflict. In general, the countries of the Horn of Africa are the poorest, followed by those in the Great Lakes, the Swahili coast, and the Indian Ocean Islands, with the exception of Madagascar. They are experiencing economic growth but from a very low base. Governance is weak, facilitating transnational organised crime, especially in the context of very large EEZs but limited technical, human and financial capacity for monitoring, control and surveillance. There are, thus, large-scale opportunities for illegal activities at sea within EEZs. In addition, the WIO includes high seas under international jurisdiction. In these waters, ocean governance is extremely difficult and, on a regional scale, the patchwork of regulations can be very complex with even less ability for enforcement.

Some smaller ports have no security measures of any significance. Other, larger ports have their own security personnel yet they are often not concerned with matters other than theft. Human trafficking as well as the smuggling of migrants, arms, drugs, and illegal natural resources, such as ivory and counterfeit merchandise, can easily find markets and will employ any form of embarkation. "A major source of concern is container traffic. As more than seven million large and small containers are moving around the world every day, the ability of port and customs officials to check their contents effectively is limited. Recent experience has indicated that containers are used to smuggle everything from al-Qaeda operatives and armaments to illegal waste". [14]

There are three, broad impacts of crime on development: 1) crime erodes Africa's social and human capital; 2) it drives business away and discourages investors; 3) it undermines the ability of the State to promote development (UNODC, 2009).

Piracy and Armed Robbery

Piracy and armed robbery at sea in the form of attacks, ransacking, hijacking and hostage taking on any type of ship has been thriving throughout the WIO region [15]. They have continued steadily with variations until modern times with the emergence of

---

[12] Kaplan, (2009)

[13] Institute for Security Studies (2012)

[14] Institute for Security Studies (2012)

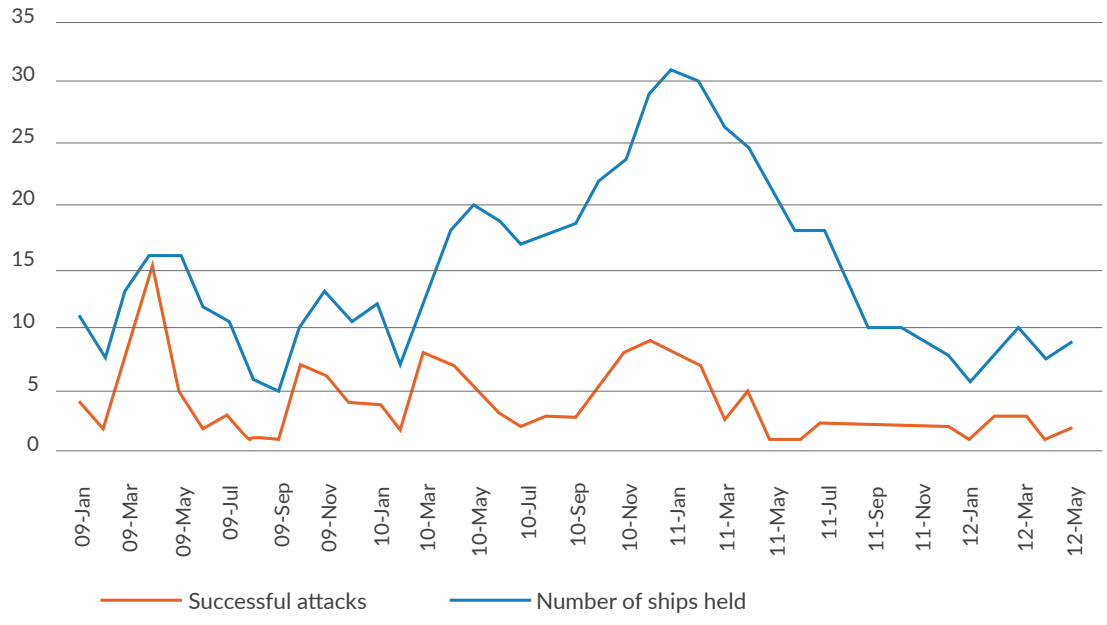
[15] Piracy as defined under article 101 of UNCLOS consists of, inter alia, any illegal acts of violence, detention or depredation committed for private ends by the crew or passengers of a private ship and directed on the high seas, against another ship or against the property on board such ship

a very specific and vibrant type of piracy off the Somali coast [16] (Figure 3.3). This latest version has been triggered by many years of sustained civil and political strife, as well as breakdown in law and order following the fall of the Siad Barre regime in 1991.[17]

Somalia has been in a state of perpetual conflict since then. In addition to the past decades of conflict, the country has also suffered from five major droughts since 2000, which have led to nation-wide catastrophes because the majority of the population depends on livestock herding and agriculture. The impact of the conflicts and drought, combined, have led to the country's having the lowest Gross Domestic Product (GDP) per capita in the world in 2011 (UNODC, 2013). Piracy, however, is estimated to have brought in USD 150 million in 2011, equivalent to almost 15% of Somalia's GDP (UNODC, 2013).

Due to Somalia's strategic position along the Gulf of Aden, piracy has had a long history in the country. However, the current wave began only in 2005. Since 2010, the frequency of pirate attacks has been declining because of improved security measures on ships, convoys, high-value ships' moving away from the coast and the decline in public support for the pirates' activities in Somalia (UNODC, 2013).

FIGURE 4.3 Recorded Somali attacks and successful hijackings by month (January 2009-May 2012)



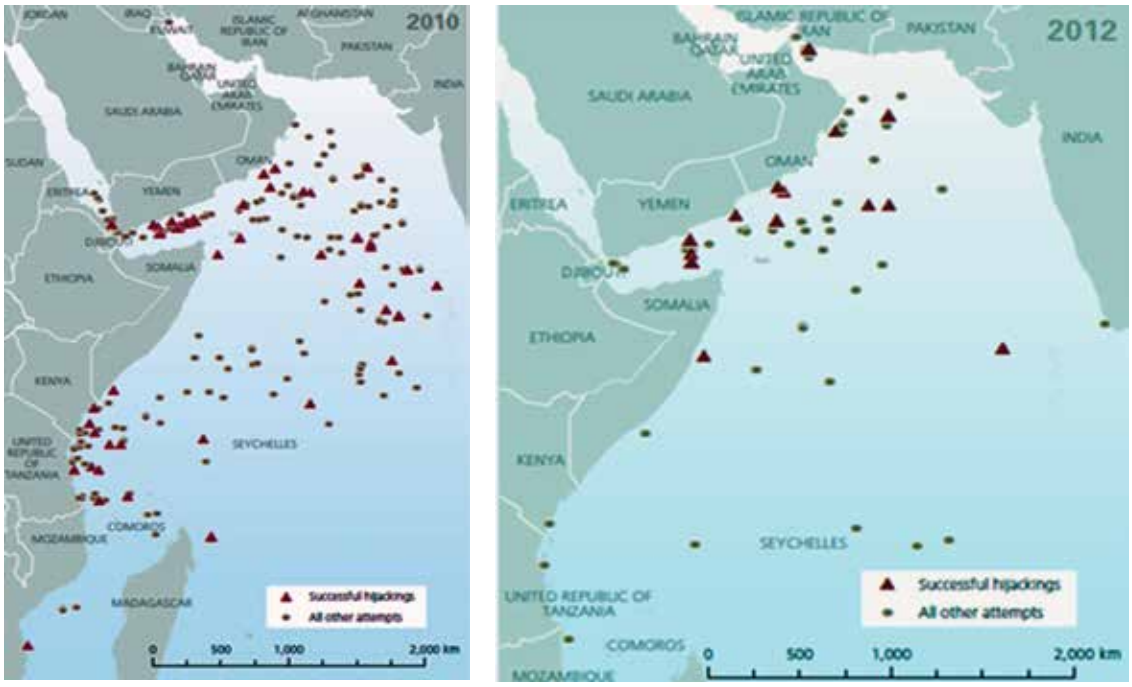
Source: UNODC-WB database (2013)

[16] Somalia is a party to UNCLOS and has recently proclaimed a 200 nautical mile EEZ

[17] "Despite the issue creating a storm of attention in the European media, the direct economic costs (of piracy) remain comparatively small." (Mair, S.ed. (2011)

Figures 4.3 and 4.4 show clearly that between 2010 and 2012 the number of incidents of piracy in Eastern Africa have declined; piracy in Eastern Africa is on the decline. However, attacks in West Africa are increasing.

FIGURE 4.4 Piracy incidents attributed to Somali pirates in 2010 and 2012



Source: UNODC-WB database

Terrorism

Terrorism has recently replaced piracy in the headlines and has become a central part of modern political concerns. Religious, political and economic aspects of geopolitics in the region are closely intertwined and often obscure the real drivers of terrorism.

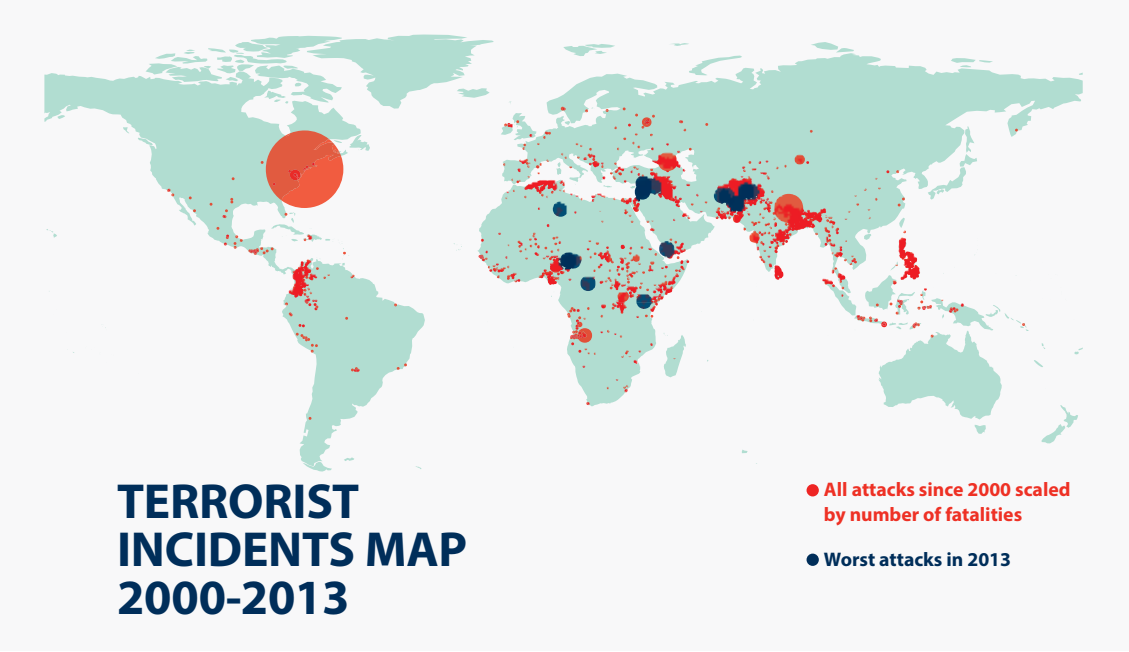
Internationally co-ordinated efforts to curb terrorism include the Combined Task Force 150 (CTF-150) on maritime security, whose mission is to promote maritime security in order to counter terrorist acts and related illegal activities that terrorists use to fund or conceal their movements. The area of operation (AOR), however, spans over 5.2 million km^2, covering the Red Sea, Gulf of Aden, Indian Ocean and Gulf of Oman (but not the Arabian Gulf, which is the responsibility of CTF-152). [18]

The 2014 Global Terrorism Index (GTI) [19] finds that, "the level of global terrorist activity has greatly increased in the last decade" (Figure 3.5). Table 3.1 shows the GTI of Eastern African countries, as well as their world ranking. Six Eastern African countries (Somalia ranking 7th, Kenya 12th, DRC 18th, South Sudan 20th, Rwanda 38th and Burundi 39th) appear among the top 40.

[18] Combined Task Force (CTF) is a multi-national naval partnership, to promote security, stability and prosperity across approximately 2.5 million square miles of international waters http://combinedmaritimeforces.com/about/

[19] Institute for Economics and Peace (2014)

FIGURE 4.5 Terrorist incidents map 2000 and 2013



Source: Visions of humanity [20], Institute for Economics and Peace (2014)

TABLE 4.1 Global Terrorism Index (GTI) in 2014 (Eastern African country rankings)

World ranking position and country	Score
7. Somalia	7.41
12. Kenya	6.58
18. DRC	5.9
20. South Sudan	5.63
38. Rwanda	4
39. Burundi	3.97
41. Tanzania	3.71
42. Ethiopia	3.7
52. Uganda	2.93
63. Eritrea	2.45
78. Madagascar	1.26
124. Djibouti	0

*Seychelles and Comoros were not reported.

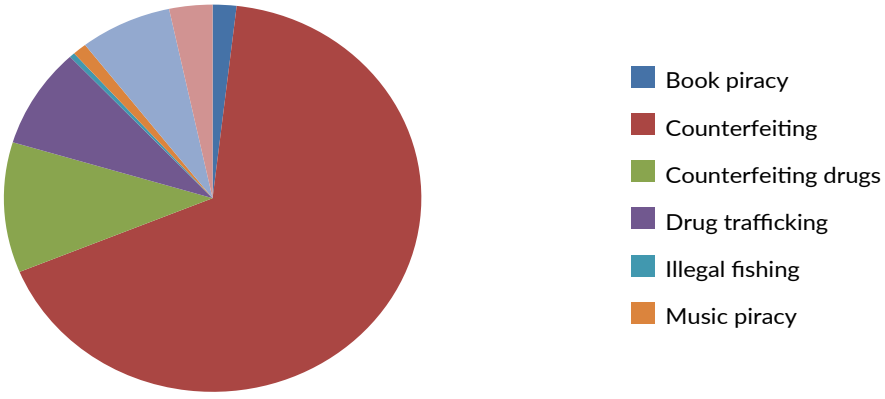
Source: Global Terrorism Index (2014) Institute for Economics and Peace

[20] http://www.visionofhumanity.org/#page/news/1128 Accessed 25 July 2015

Smuggling and Other Transnational Crimes

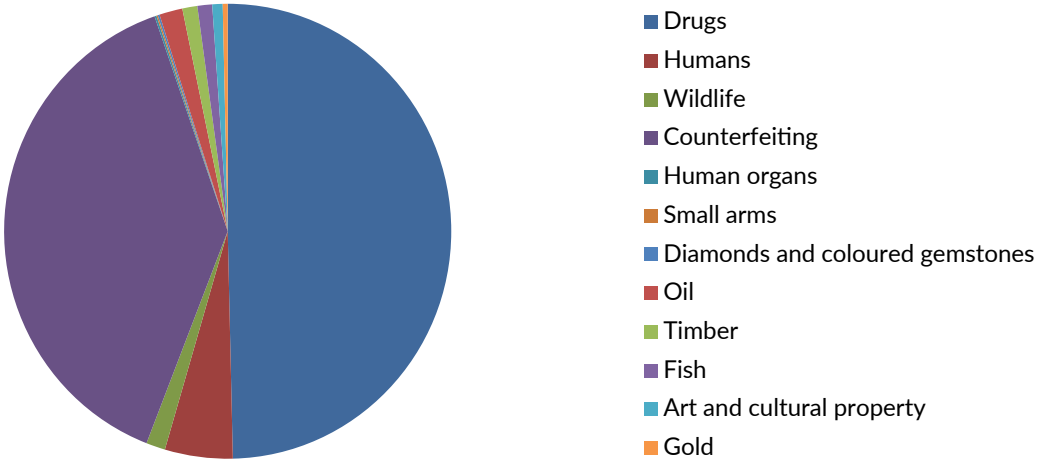
The insufficient control of containers' contents and the complexity of organised underground transnational crime networks, render precise and officially validated data related to numbers of persons and quantities of illegal substances and goods smuggled in the WIO region problematic. However, the available data from both official and unofficial intelligence sources give a glimpse at the enormity of the black market (Figures 4.6 and 4.7).[21] Human trafficking and smuggling of migrants in the WIO region is quite widespread.[22] Smuggling of migrants, combined with movements of regular and irregular economic migrants and forced migrants, such as asylum seekers, also affects the WIO region, a situation exacerbated by the worsening security situation in Yemen.[23]

FIGURE 4.6 Revenues from black market transnational crime in Kenya (2014)



Source: www.havocscope.com/country-profile/[24]

FIGURE 4.7 Values of illicit markets in the world (UNODC 2013)



Source: UNODC (2013)

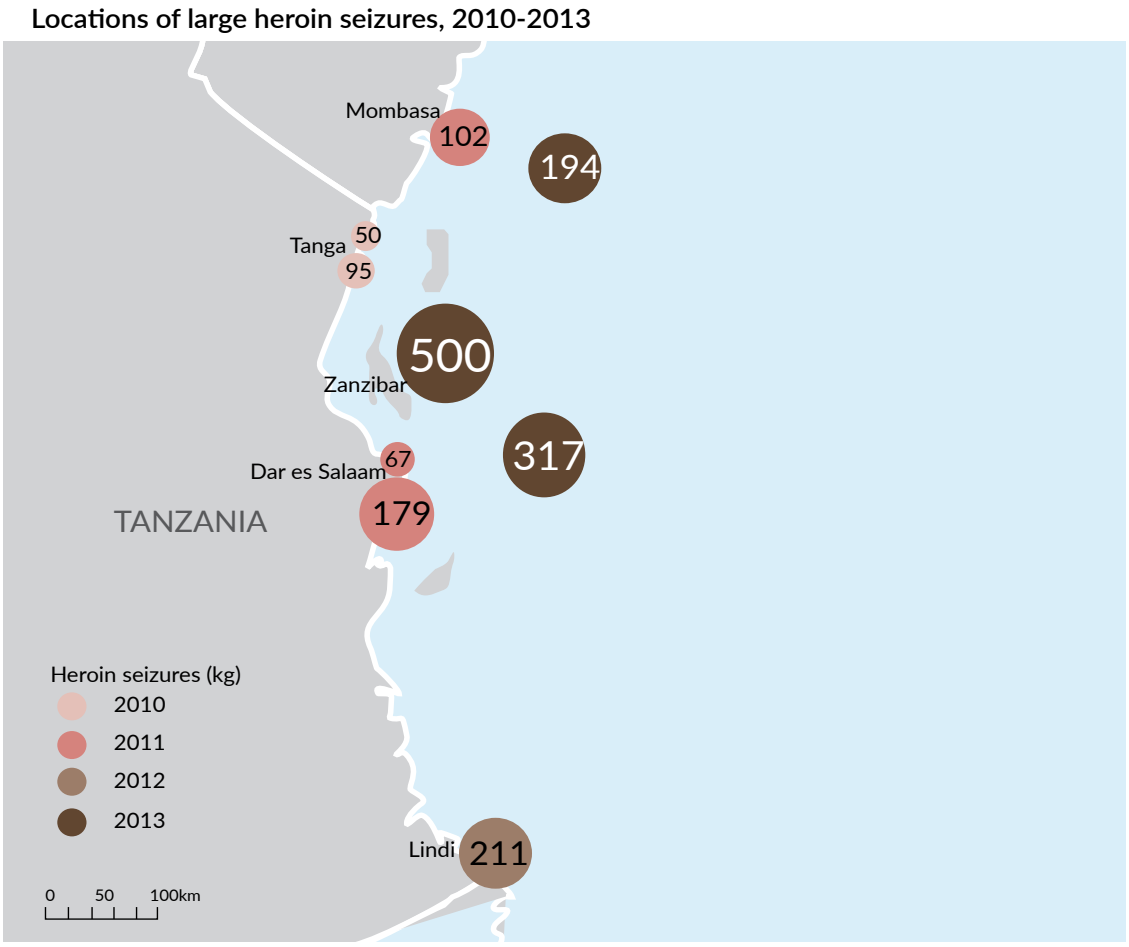
[21] Regional Mixed Migration Secretariat (2013). From 2006 to 2012, a conservative estimate of almost 500,000 Ethiopians and Somalis have crossed the Red Sea or Gulf of Aden as part of mixed migration flows

[22] Regional Mixed Migration Secretariat (May 2013)

[23] www.regionalmms.org

[24] The information about the black market has been collected from government agencies, academic studies, media reports, and reported data from havocscope sources

FIGURE 4.8 Location of heroin seizures (in kg) 2010-2013



Source: UNODC (2013)

Drug Trafficking

Drug trafficking, particularly of heroin, has become a growing concern in the WIO region. The United Nations Office on Drugs and Crime (UNODC) held a special meeting in September 2014 focused on the rise of narcotics trafficking on maritime southern routes, particularly the Indian Ocean, and advocating that drug traffickers caught in international waters be prosecuted.[25] Other sources highlight the importance of the East African coast (Djibouti, Eritrea, Kenya, Somalia and Tanzania) as a trans-shipment hub; some reports suggest that, on average, nearly 24 tonnes of drugs valued at USD 190 million are smuggled annually from the region."[26] The local market is estimated to consume at least 2.5 tonnes of pure heroin per year, worth some USD 160 million in local markets. The volumes trafficked via the region appear to be much larger, as much as 22 tonnes, suggesting substantial trans-shipments. Eastern Africa is a known transit area for heroin destined for South Africa and West Africa (UNODC, 2013). Heroin has been present in Eastern Africa for at least three decades, and dealers from Eastern

[25] http://www.un.org/apps/news/story.asp?NewsID=48675#.VNDXPmJBumQ

[26] http://www.ipcs.org/article/military-and-defence/drug-smuggling-across-the-indian-ocean-impact-of-increasing-interceptions-4654.html

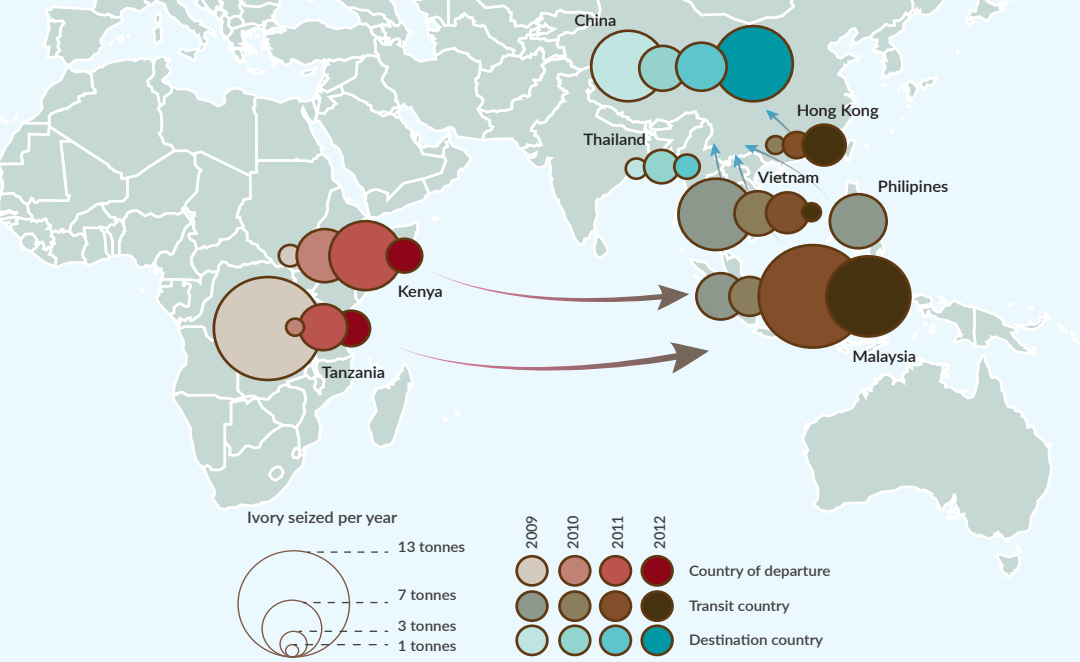
Africa have been associated with the heroin trade in South Africa since the mid-1990s. It has long been suspected that Eastern Africa serves as a transit area, and air couriers have been detected on many occasions. Until recently, however, very little heroin had ever been seized in the region. This began to change in 2010 and between 2010 and 2012 more heroin was seized than in the previous 20 years (UNODC, 2013). Recently there has been a high level of detection of sizable maritime heroin cargos destined for Eastern Africa. The most recent development affecting the use of Eastern Africa as a heroin transit region began around 2005, when West Africa became more heavily involved in the international cocaine trade (UNODC, 2013). Illicit commerce is changing the world by transforming economies, reshaping politics and capturing governments [27]. Such illicit activities are inextricably linked to legitimate commerce and directly affect developments of the Blue Economy because much of it uses maritime transport and is transferred at ports.

Environmental Commodity Trafficking

Animal poaching and the smuggling of natural resources represent another form of increasingly widespread transnational crimes in Eastern Africa. Elephant poaching is at its worst level in a decade and recorded ivory seizures are at their highest since 1989, according to a 2012 report by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Tanzania, Kenya, South Sudan and Uganda are the source of 99% of all illicit ivory harvested in the region. Eastern Africa is thus an important source, but it might be even more important as a transit area (UNODC, 2013). CITES reports that, "Most of the ivory smuggling containers leave the African continent through Indian Ocean seaports in East African countries, primarily Kenya and Tanzania. China and Thailand are the two primary destinations for illegal ivory consignments exported from Africa according to the seizure data"[28] (Figure 4.9). Similar trends apply to the smuggling of rhino horns and horn powder. At this pace, roaming elephant and rhino populations may soon be a thing of the past. CITES estimates that there were at least 20,000 elephants killed worldwide by poachers in 2013 for their ivory tusks. Three Eastern African countries (Kenya, Tanzania, Uganda) accounted for 80% of the major seizures in Africa in 2013. According to the Elephant Action League, the Somali Islamist group Al-Shabaab funds up to 40% of their operations with the proceeds from ivory trafficking.[29]

[27] Naim. M. (2015)
[28] http://www.cites.org/eng/news/pr/2012/20120621_elephant_poaching_ivory_smuggling.php
[29] http://www.havocscope.com/

FIGURE 4.9 Large ivory seizures in Eastern Africa and Asia (2009-2012)



Source: TRAFFIC/ETIS

Note: These figures reflect known large scale ivory trade flows. The same seizures may have passed through or been directed to several of the above countries and is captured accordingly. Thus, these figures do not represent discreet values, but rather reflect the relative importance these countries and territories in the movement of ivory between Africa and Asia. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. The dotted lines represent approximately the line of control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Kashmir has not yet been agreed upon by the parties.

Source: UNODC, 2013

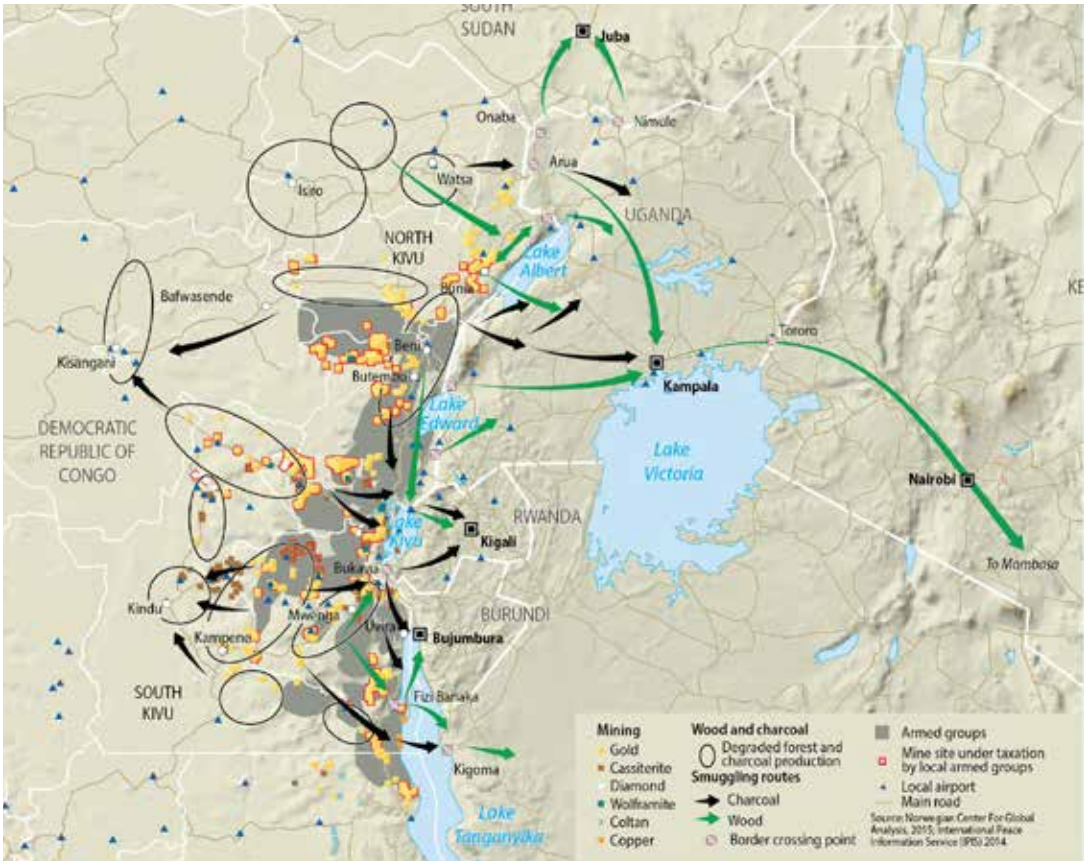
The majority of the recent large seizures of illicit ivory anywhere in the world were exported from either Kenya or Tanzania, largely through container ports in Mombasa and Dar es Salaam. Recent seizures suggest the container port at Zanzibar is also used (UNODC, 2013).

In the Great Lakes Region, according to UNEP-MONUSCO estimates: "illicit natural resources exploitation in eastern DRC is valued at over USD 1.25 billion per year (USD 722-862 million if diamonds sourced outside eastern DRC are excluded). Of these amounts, an estimated 10%-30% (between USD 72 million and USD 426 million per annum) goes to transnational organised criminal groups. Annual net profits to organised crime are conservatively estimated to derive from: i) gold (USD 40-120 million); ii) timber (USD 16-48 million); iii) charcoal (USD 12-35 million); iv) 3T (tin-tungsten-tantalum) minerals (USD 7.5-22.6 million); v) diamonds sourced mainly from outside the conflict zone (USD 16-48 million); and vi) wildlife, including ivory, and fisheries, local taxation schemes, cannabis and other resources (USD 14.3-28 million)."[30] As shown in Figure 4.10 most of the smuggled timber is transported from DRC through neighbouring countries to Mombasa for onward shipment. According to Greenpeace, China is the main importer of wood from DRC [31]. Waterways are the main source of transportation of these illegal goods.

[30] UNEP-MONUSCO (2015). UN Great Lakes Framework of Hope (April 2015). Experts' background report on illegal exploitation and trade in natural resources benefitting organised criminal groups and recommendations on MONUSCO's role in fostering stability and peace in eastern DR Congo

[31] Greenpeace (2013)

FIGURE 4.10 Trade routes in natural resources from DRC



Source: UNEP, MONUSCO (2015)

4.4 Conflict Resolution Mechanisms and Opportunities for Collaborative Frameworks to Advance the Blue Economy Agenda in the WIO Region

4.4.1 Provisions of the Law of the Sea

The United Nations Convention on the Law of the Sea (UNCLOS) establishes principles for demarcating maritime boundaries, thus facilitating the avoidance of conflict and war. [32] UNCLOS divides the ocean space into maritime zones, within which the continuum of rights of States in respect of various uses and activities is balanced by a continuum of obligations. Important to the exercise of those rights and the implementation of those obligations are the provisions of UNCLOS on the delimitation of maritime boundaries and the obligations of deposit with the Secretary-General of the

[32] Garofano, John (2013)

United Nations of charts or the lists of geographical co-ordinates of points in relation to straight baselines and archipelagic baselines as well as the outer limits of the territorial sea, the exclusive economic zone and the continental shelf. The maritime zones under the Convention which would in most cases be subject to boundary delimitation are: the territorial sea, the contiguous zone, the exclusive economic zone (EEZ), and the continental shelf. In some rare cases, States may need to delimit other maritime zones, such as the internal waters.

The principles in UNCLOS are designed to guide States in demarcating maritime boundaries, an important element of the modern law of the sea. The benefits of maritime-boundary demarcation include economic gain – from fishing and the exploitation of mineral and hydrocarbon resources, as well other uses of the sea – and clear and recognised definition of the extension of the maritime zones over which States have sovereignty or where they exercise sovereign political and legal rights or jurisdiction.

BOX 4.2 Extension of continental shelves

The joint submission of the Seychelles and Mauritius in 2008 was the first by African states for an extension to the CLCS and the first to have been prepared collaboratively by two mid-ocean Small Island Developing States (SIDS). The two countries have been granted a Joint Continental Shelf Extension and have set up a committee for management of the area. Some features are: a) a joint fiscal and taxation code; b) the model petroleum agreement; c) the environmental code of practice; d) the offshore petroleum safety code; and e) the Ministerial declaration. Both countries had already agreed to share the resources of the zone equally. This first agreement by two countries to manage economic resources jointly under the UNCLOS could constitute as a model for similar schemes elsewhere.

The principles in UNCLOS are designed to guide States in demarcating maritime boundaries, an important element of the modern law of the sea. The benefits of maritime-boundary demarcation include economic gain – from fishing and the exploitation of mineral and hydrocarbon resources, as well other uses of the sea – and clear and recognised definition of the extension of the maritime zones over which States have sovereignty or where they exercise sovereign political and legal rights or jurisdiction.

UNCLOS is widely considered as a “constitution for the oceans” and enjoys near universal participation. The UN General Assembly has annually reaffirmed its status as the legal framework within which all activities in the oceans and seas must be carried out, including the conservation and sustainable use of the oceans and their resources. The Convention is further complemented by its two Implementing Agreements (Part XI Agreement and UN Fish Stocks Agreement), as well as by a number of other global and regional instruments that have been adopted by various intergovernmental organisations and parts of the United Nations System. If effectively implemented, the

Convention can provide legal certainty for oceans-related investments, in addition to Blue Economy related existing initiatives and legal and policy frameworks that are to be further used, implemented and/or strengthened.

As a result of increased interest in the resource potential of the oceans, a number of countries have requested an extended continental shelf. Under UNCLOS article 76, coastal states have the potential to extend the maritime area under their jurisdiction, beyond the 200 nautical miles that currently constitutes their EEZ. These extensions can be claimed for the continental shelf (on and below the seafloor) bordering their landmass, if certain geological, geomorphological and geophysical criteria are met. The claims are examined by a specialised commission of the United Nations (the Commission on the Limits of the Continental Shelf, or CLCS), and most coastal states were required to submit their claims before the 13th of May 2009. The CLCS had received 77 submissions[33], including Mauritius, Madagascar and Seychelles in the Eastern African region by August 3rd, 2015. More than 40 preliminary information files have been submitted to the Secretary General of the UN, giving coastal states additional time to finalise their submissions.

4.4.2 Sustainable Management of Marine Resources

UNCLOS establishes a comprehensive regime for the conservation and sustainable management of marine living resources, for the development of the resources of the seabed and subsoil beyond the limits of national jurisdiction, for the protection and preservation of the marine environment, as well as for marine scientific research and the transfer of marine technology. The special interests and needs of developing countries, whether coastal or land-locked, are recognised in a number of ways throughout UNCLOS, which also sets out rights for archipelagic States and for land-locked and geographically disadvantaged States.[34] UNCLOS also aims at balancing the respective rights and obligations of coastal States and other States.

For example, while the coastal State has sovereign rights for the economic exploitation and exploration of the EEZ and jurisdiction with regard to, inter alia, the protection and preservation of the marine environment, it must have due regard to the rights and duties of other States, which, in turn must have due regard to the rights and duties of the coastal State and shall comply with the laws and regulations adopted by the coastal State in accordance with the provisions of UNCLOS and other rules of international law (articles 56 and 58).

With respect to activities in the EEZ, necessary measures must be taken to ensure effective protection of human life and of the marine environment from harmful effects which may arise from such activities. Activities in the EEZ must be carried out in

[33] http://www.un.org/depts/los/clcs_new/commission_submissions.htm

[34] The term "geographically disadvantaged States" under UNCLOS means coastal States, including States bordering enclosed or semi-enclosed seas, whose geographical situation makes them dependent upon the exploitation of the living resources of the exclusive economic zones of other States in the sub-region or region for adequate supplies of fish for the nutritional purposes of their populations or parts thereof, and coastal States which can claim no exclusive economic zones of their own

such a manner as to foster healthy development of the world economy and balanced growth of international trade, and to promote international co-operation for the overall development of all countries, especially developing States.

In 2004, the General Assembly established the Ad Hoc Open-ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. The Working Group has identified the following issues to be considered as a package: marine genetic resources, including questions on the sharing of benefits; measures such as area-based management tools, including marine protected areas and environmental impact assessments; and capacity-building and the transfer of marine technology.

BOX 4.3 Underwater Cultural Heritage

Mapping efforts would help in better identifying and protecting submerged cultural treasures. The UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage is still virtually unknown to the public but is the agreement that protects this precious asset. It can be considered as "the best system to protect the underwater cultural heritage, without identifying ownership of the heritage or redefining the maritime zones". There is need for greater awareness of the Convention in the WIO region as well as of the Nairobi International Convention on the removal of Wrecks that entered into force on 14 April 2015. The Nairobi Convention fills a gap in the existing international legal arsenal by providing a "set of uniform rules for the prompt and effective removal of wrecks located in a country's exclusive economic zone or equivalent 200 nautical miles".

In January, 2015, the Working Group recommended an international legally-binding instrument on marine diversity under the Convention. Informal intergovernmental negotiations on a draft resolution have recently been concluded. The draft reflects the recommendations of the Working Group and includes provisions on the modalities of the preparatory committee. The General Assembly is expected to take action on the draft resolution (A/69/L.65) before the end of 2015.[35]

UNCLOS provides the legal framework for addressing maritime security issues, including terrorist acts against ships, offshore installations and other maritime interests. The Convention provides a basis for co-operation, calling on States to co-operate to the fullest possible extent in the repression of acts of piracy and in the suppression of illicit traffic in narcotic drugs and psychotropic substances. The Convention also serves as a unifying framework for a growing number of more detailed international instruments which implement or further develop its provisions.

[35] General Assembly resolution 66/288, Annex. Also see para. 162 of 'The future we want" recognising the need to address on an urgent basis, the issue of the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, including by taking a decision on the development of an international instrument under the UNCLOS

UNCLOS addresses six main sources of pollution: land-based and coastal activities: seabed activities, such as offshore oil and gas drilling and mining the seabed for minerals; ocean dumping; pollution from ships; and pollution from or through the atmosphere. Species from one area of the world that are introduced in another (mostly by ships) can also negatively impact the marine environment because such species can eliminate indigenous varieties. The Convention requires all States to protect and preserve the marine environment. For example, a State must take measures to prevent the effects of pollution on its territory being felt on the territory of another State. UNCLOS requires States to co-operate to establish international rules, standards and recommended practices to prevent, reduce and control pollution of the marine environment from all sources. This is to be done especially through international organisations with the authority to do so or through an international conference held to negotiate a treaty. States are then required to adopt national laws and regulations to ensure compliance.

UNCLOS also covers submarine cables. With more than 95% of electronic communications worldwide transmitted via fibre-optic submarine cables,[36] and in view of the recent exponential growth in submarine cables triggered by the Internet, their significance and associated infrastructure cannot be underestimated. Damage to such cables can cause serious disruptions in global communications and the regime set out in UNCLOS, as supplemented by the 1884 Convention for the Protection of Submarine Telegraph Cables, is of critical importance.

4.4.3 Other Initiatives and Frameworks Addressing Insecurity at Sea

Eastern Africa's transnational organised crime problems are driven by illicit markets and weakness in the rule of law. Each of these dynamics must be addressed. The illicit markets that affect Eastern Africa often originate or terminate on other continents. As a result, purely local interventions are inadequate to resolve the underlying problem. Optimally, a global approach should be taken to combating them, but local law enforcement also needs to be strengthened in Eastern Africa. For example, it appears that most of the heroin entering Eastern Africa is in transit and this traffic is the cause of local addiction. The heroin flow can only be stopped in the production and consumption countries, but Eastern Africa can be made less attractive as a transit route through strengthening the rule of law in the region. While long-term development is a key element in this effort, there are some measures that can be taken more or less immediately. These include providing support to front-line law enforcement, efficient monitoring of container traffic and better border control, and could greatly reduce Eastern Africa's attraction to smugglers. Anti-corruption measures are also essential to creating a genuine deterrent.

Piracy conducted by Somali pirates in the WIO Region has significantly abated since 2008 due to united international efforts including the European naval force

[36] Carter L., et al (2009)

(EUNAVFOR) ATALANTA, the Combined Task Force 151 (CTF-151) on counter-piracy and several North Atlantic Treaty Organisation (NATO)strategic projects and initiatives. The international community has achieved considerable success in its efforts to combat Somali piracy as a result of close co-operation between and among States, regions, organisations, the maritime industry, the private sector, think tanks and civil society. Such co-operation, including through the co-ordination mechanism of the Contact Group on Piracy off the Coast of Somalia (established in 2009), led to practical solutions to the problem of piracy.[37] On-board self-protection measures may also have discouraged pirates from attacking ships. Oceans Beyond Piracy, a non-governmental organisation, estimated in 2013 that USD 3.2 billion had been spent to address piracy amounting to a cost of some USD 139 million to the international community for each attack.[38]

In 2014, international naval missions from the European Union, NATO and the Combined Maritime Forces, in addition to counter-piracy missions from several member States, including China, India, Iran, Japan, the Republic of Korea and the Russian Federation, continued to ensure security at sea and disrupt pirate attacks in the Gulf of Aden, as authorised by UN Security Council Resolution 2125 (2013).

BOX 4.4: EUNAVFOR Operation ATALANTA

EUNAVFOR Operation ATALANTA is a European naval partnership, opened to non-EU States, acting at sea or from the sea, integrating as a key component the prosecution of piracy suspects in partnership with regional States. The naval force was the first coalition deployed off Somalia, with a multifaceted mandate: (a) protection of the vessels of the World Food Programme (WFP) and African Union Mission in Somalia (AMISOM); (b) deterrence and disruption of piracy and armed robbery at sea; (c) monitoring of fishing off the coasts of Somalia; and (d) support to other EU missions and international organisations working to strengthen maritime security and capacity in the WIO Region. EUNAVFOR engages in active partnership with the shipping industry and other military partners or coalitions. Since the launch of the Operation in 2008, EUNAVFOR – Operation ATALANTA has disrupted 134 pirate attacks, had a 100% success rate in providing protection to 126 WFP vessels delivering about one million tons of food to the Somali people and to 307 AMISOM vessels carrying shipments critical to the success of the African Union operation in Somalia. ATALANTA has transferred to competent authorities 154 suspects of piracy for prosecution[39], protected the shipping in the international Recommended Transit Corridor established in the Gulf of Aden, and contributed to the deterrence of acts of piracy and armed robbery at sea off the coast of Somalia in its vast area of operation.

[37] Security Council (16/10/2014). Report of the Secretary General on the situation with respect to piracy and armed robbery at sea off the coast of Somalia. (S/2014/740, paragraph 5)

[38] (S/2014/740, paragraph 6)

[39] http://eunavfor.eu/key-facts-and-figures

There are a number of other initiatives aimed at attacking the plague of piracy. The Combined Maritime Force (CMF)[40] is a multinational naval partnership, which exists to promote security, stability and prosperity across approximately 6.5 million km^2 of international waters, encompassing some of the world's most important shipping lanes. Among NATO's interventions that have contributed to curbing piracy trends, the Dhow project was established in 2011 as part of a concerted effort by naval counter-piracy operations working with the shipping community to understand regional maritime activities. It specifically concerned the Southern Red Sea, Gulf of Aden, Arabian Sea and Northern Indian Ocean as well as Operation Ocean Shield (OOS) (extended until end of 2016) to combat piracy off the Horn of Africa with the support of the NATO Shipping Centre [41]. The *Dhow* project aims to increase local knowledge, reduce hijacking of local vessels and underpin regional co-operation.

The Djibouti Code of Conduct Concerning the Repression of Piracy and Armed Robbery against Ships in the Western Indian Ocean and the Gulf of Aden was sponsored by the International Maritime Organisation (IMO) and adopted by 17 states from the WIO region in January 2009. It aims to facilitate co-operation between States in the repression of piracy by "prosecuting those who are responsible for it" [42]. It includes four thematic areas of information-sharing, training, national legislation and capacity-building that have already produced results. Three information-sharing centres have been established in Sana'a (Yemen), Mombasa (Kenya) and Dar es Salaam (Tanzania) to manage a network of focal points throughout the region, including in Somalia, providing information on piracy activity and dhow movements.[43] INTERPOL also plays an important role as shown by the capacity-building Critical Maritime Routes Law Enforcement Agency (CRIMLEA) Project, implemented by the INTERPOL Maritime Security Sub-Directorate and funded by the European Union under the Instrument contributing to Stability and Peace (IcSP). CRIMLEA aims to enhance the maritime and land security of the beneficiary countries by reinforcing the capacity of their law-enforcement community to effectively investigate and ultimately prosecute acts of piracy (piracy, armed robbery on the high seas and in territorial waters) and other maritime-based organised crime threats.[44]

The Maritime Security Programme (MASE) is part of the EU Strategic Framework for the Horn of Africa that includes the EU Action Plan against Piracy and the Special Representative for the Horn of Africa. MASE aims to foster the sharing of information between member States of the WIO region in order to enable them to address identified threats against maritime security collectively. MASE also tackles maritime pollution. The IOC is currently developing regional agreements and structures to assure the implementation of MASE, which is the only maritime security programme including all the countries in the WIO Region. It plays a critical role in promoting a secure environment for national and regional blue economies to thrive, and supports the African Union's *2050 Africa's Integrated Maritime Strategy*.

---

40 http://combinedmaritimeforces.com/about/

41 www.shipping.nato.int

42 Garofano, J. (2013)

43 (S/2014/740, Para. 27)

44 CRIMLEA covers Comoros, Djibouti, Kenya, Madagascar, Mauritius, Seychelles, Somalia, Tanzania and Yemen

Other Transnational Crimes

The G7 Foreign Minister's Declaration on Maritime Security refers to the need to fight trafficking in human beings and smuggling of migrants through implementation of the United Nations Convention against Transnational Organised Crime and its Protocols, as well as international instruments protecting human rights. The United Nations Office on Drugs and Crime (UNODC) and INTERPOL are actively involved in assisting member States in curbing drugs trafficking in the WIO Region. CITES is a key tool in fighting illegal animal poaching. A wide group of UN Agencies and NGOs including UNEP and the World Wildlife Fund for Nature (WWF) are tackling degradation of natural resources at large, including their smuggling and trafficking.[45]

Illegal, unreported and unregulated (IUU) fishing remains a major threat to marine ecosystems. Therefore, many States are trying to implement the 2009 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA–IUU), while regional fisheries bodies (RFBs) have engaged in vigorous campaigns to combat IUU fishing. The binding 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) has not yet come into force but it has the potential to be a cost-effective and efficient means of combating IUU fishing.

The advanced technology behind the development and laying of submarine communication cables is a major breakthrough which has contributed to soaring ICTs – including provision of Internet and related services – to Africa. E-Government, e-Education and e-Banking are among the biggest benefits. Insecurity could affect undersea cables and disrupt vital operations. Among the most important cables are: the Seacom [46], the EASSy [47] and the TEAMs [48] (Figure 4.11)

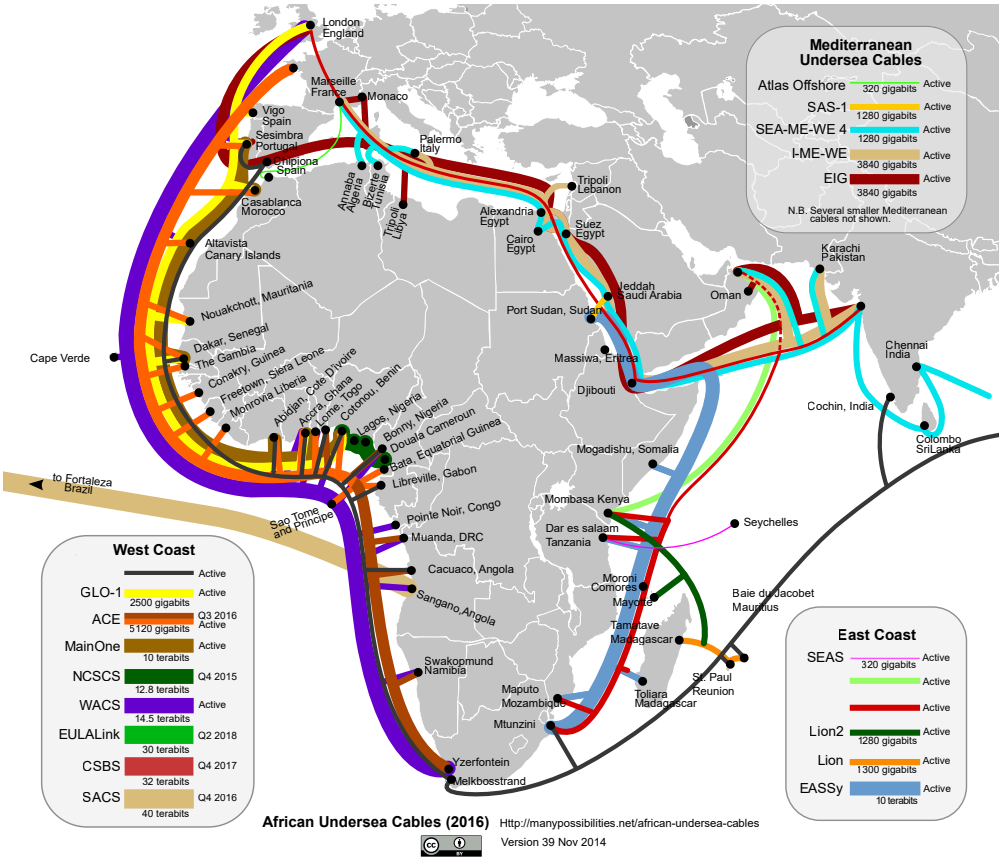
[45] The Office of the Special Envoy of the Secretary General on the Great Lakes Region contributed to the implementation of the Framework of Hope

[46] Owned by Industrial Promotion Services (25%), which is an arm of the Aga Khan Fund for Economic Development (USD 75 million), and other investors (http://www.seacom.mu)

[47] EASSy is 90% African-owned although that ownership is underwritten by a substantial investment by Development Financial Institutions (DFIs) including World Bank/IFC, EIB, AfDB, AFD, and KfW. Total DFI investment is apparently USD 70.7 million (http://www.eassy.org)

[48] 85 per cent of the cable is owned by TEAMs (Kenya) Ltd and the rest by Etisalaat of the United Arab Emirates (UAE)

FIGURE 4.11 Africa Undersea Cables (2016)



Source: https://manypossibilities.net/african-undersea-cables

4.5 Existing Relevant Institutions and Frameworks, Key Players and Co-ordination Mechanisms

Establishing the rule of law and adherence to it, backed up by genuine global, regional and national interest in preserving peace and stability, is the only way to address insecurity in the Eastern African region, to reduce the vulnerability of local communities, to provide local people with secure livelihoods and to allow the Blue Economy to flourish based on a uniquely natural-resource-endowed and potentially rich area. Indeed, "Much can be gained from a co-operative regional approach between states that promotes consultation not confrontation, reassurance not deterrence, transparency not secrecy, prevention not correction, and interdependence not unilateralism. In such circumstances navies can contribute much towards enhancing maritime security, managing disasters, providing humanitarian assistance and limiting environmental security challenges. Regional cooperation can therefore be a force multiplier and is certainly desirable in the vast, relatively poorly policed Indian Ocean."[49]

[49] Institute for Security Studies (2012)

Existing Regional Economic Communities (RECs) and Intergovernmental Organisations (IGOs) such as the East African Community (EAC), the Intergovernmental Authority on Development (IGAD), the Common Market for Eastern and Southern Africa (COMESA), the Indian Ocean Commission (IOC), the International Conference on the Great Lakes Region (ICGLR), the Economic Community for the Great Lakes Countries (CEPGL), the Northern Corridor-Transit and Transport Coordination Agency (NC-TTCA) and the Central Corridor-Transit and Transport Facility Authority (CC-TTFA), as well as member States themselves, all have relevant strategies and programmes for fostering sustainable development in the WIO Region in the most appropriate productive sectors of the Blue Economy for their situations.

The Indian Ocean Commission (IOC) is an intergovernmental organisation created in 1984 with the Comoros, Madagascar, Mauritius, France and the Seychelles as members. Its objectives focus on co-operation and development in diplomatic, economic, commercial, agricultural, aquaculture, cultural, scientific, judicial and educational fields. The IOC is currently working on an Action Plan on the Blue Economy as part of its strategic pillar 2 on a secure regional space for economic growth (specific objective: attain food security through strengthened regional integration rooted into Green and Blue Economy).

Bilateral and multilateral relationships in the region need to be reinforced and there should be enhanced support for the work of RECs and IGOs. Policy dialogue at all levels and appropriate partnerships between actors, dissemination of good practices, collaborative data collection and further research will all contribute to effective co-operation within the region.

This would help to sustain a new reconfiguration of geopolitics with an African perspective: Africa's vision of the world and, in particular Eastern Africa's view of the WIO region. This approach could be further fostered through the Sub-Regional Coordination Mechanism (SRCM) for the UN System-wide Support to the AU, its New Partnership for Africa's Development (NEPAD) Programme and RECs in Eastern and Southern Africa (established in November 2010 as a result of the work of the Regional Coordination Mechanism (RCM)).[50] The SRCM would provide an ideal vehicle and a unique network of partners [51] for the development and implementation of projects in all key productive sectors and areas of relevance to sustainable natural resource management.

Among existing other strategically important bodies and frameworks, the Regional Organisation for the Conservation of the Environment of the Red Sea and the Gulf of Aden (PERSGA) [52] is an intergovernmental body dedicated to the conservation of the

---

[50] The SRCM Business Plan for Eastern and Southern Africa 2013-2017 was adopted in November 2012, during t he 14th RCM

[51] SRCM beneficiaries and partners are the African Union Commission (AUC), the NEPAD Planning and Coordinating Agency (NPCA), the AfDB, COMESA, EAC, the Southern African Development Community (SADC), the IGAD, CC-TTFA, NC-TTCA, CEPGL, ICGLR, the East African Sub-regional Support Initiative for the Advancement of Women (EASSI), the Nile Basin Initiative (NBI), UNECA, FAO, UNESCO, UNICEF, ILO, the International Telecommunication Union (ITU), UNEP, the United Nations Population Fund (UNFPA), UNIDO, UN-Women, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and UNDP

[52] www.persga.org

coastal and marine environments found in the Red Sea, Gulf of Aqaba, Gulf of Suez, Suez Canal, and Gulf of Aden surrounding the Socotra Archipelago and nearby waters. The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region [53] offers a regional legal framework and co-ordinates the efforts of the member States to plan and develop programmes that strengthen their capacity to protect, manage and develop their coastal and marine environment sustainably. The Strategic Action Programme [54] for the WIO Large Marine Ecosystem (LME) will contribute to the conservation of ecosystems and associated resources through focused action on governance and awareness, as well as on climate-change adaptation and mitigation. Countries also recognise the advantages of co-operation and communication at the Trans-LME level with bordering LMEs and their own SAPs (e.g. Benguela Current LME; Bay of Bengal LME; Red Sea LME)."[55]

The AU has reached a very important milestone in adopting *2050 Africa's Integrated Maritime Strategy*. The two main strategic actions of this strategy in relation to geopolitics in the region are:

i. maritime boundaries/delineation; and
ii. maritime governance.

Through the AU Border Programme, in accordance with UNCLOS, the AU shall make an assertive call to solve existing maritime boundary issues peacefully between member States including within bays, estuaries, and inland waters (lakes and rivers). The AU will also encourage member States to claim their respective maritime limits, including their extended continental shelf, where applicable, and will urge them to accept and fulfil all those responsibilities emanating from the establishment of maritime zones as foreseen by UNCLOS and the IMO International Convention for the Safety of Life at Sea (SOLAS). The AU will encourage member States to develop legal frameworks for co-ordinated State intervention at sea and on inland waterways and subsequent actions. Furthermore, there will be a need for further harmonisation of national maritime laws and enhanced bi-lateral and regional strategic synergies, including signing and ratification and accession by member States to the relevant international maritime instruments.

---

53 www.unep.org/nairobiconvention

54 www.unep.org/NairobiConvention/docs/Strategic_Action_Programme_WIO_Region.pdfLarge Marine Ecosystems (LMEs) are regions of the world's oceans, encompassing coastal areas from river basins and estuaries to the seaward boundaries of continental shelves and the outer margins of the major ocean current systems. The SAP serves as a formal agreement by the countries on the actions to address LME issues

55 There is also need to rekindle existing frameworks such as the Indian Ocean Rim Association for Regional Cooperation (IOR-ARC) launched in 1997, in Mauritius

4.6 Conclusions and Recommendations

The globalisation of maritime routes and the forging of new and powerful alliances in the maritime industry highlight the growing significance of the WIO region as a result of increased volumes of freight transported (natural resources, oil, containers) and the use of East-West routes via the Cape of Good Hope (instead of the Suez Canal). In July 2014, Maersk Line announced a 10-year vessel sharing agreement (VSA) with the Mediterranean Shipping Company S. A. on the Asia-Europe, Transatlantic and Transpacific routes. [56] The Group CMA CGM, ranking third worldwide in terms of maritime transport by container has signed three major agreements with China Shipping Container Lines (CSCL) and the United Arab Shipping Company (UASC) under the name of OCEAN THREE in relation to most international maritime routes (Asia-Europe, Asia-Mediterranean, Transpacific, Asia-East Coast of the United States). [57] It is in this context that WIO Island ports could be further upgraded and optimised to tap into the emerging opportunities arising from the development of new maritime routes. The success story of the Ehoala Port in Madagascar, that opened in 2009 under a public-private partnership and led to significant job creation in a context of international crisis, could be emulated in the WIO region (see chapter 5).[58] At the same time, it is important to increase Eastern African ownership of maritime fleets so that Eastern African countries have greater influence over maritime trade and transport in their region. This will require the development of tailor-made tools and mechanisms as well as research and development.

Piracy and the lack of maritime security continue to increase transport and trade costs, while driving insurance premiums upwards. This ultimately affects the regional integration process by undermining efforts to integrate the region into the global economy (90% of Eastern and Southern Africa-Indian Ocean regional trade by volume was carried by maritime transport in 2008). Furthermore, piracy increases the risks of terrorism and smuggling of weapons and drugs.

Since the adoption of the Djibouti Code of Conduct in 2009, mainly through efforts of regional countries such as Kenya and Seychelles and implementing organisations such as UNODC, the fight against piracy has become an important area of joint and multilateral co-operation in the region and at the international level. The lessons learned from developments in the region are:

- Maritime security and law enforcement require the involvement of a wide variety of stakeholders across the region and the support of the UN and the AU;
- Piracy and armed robbery at sea is an international problem which requires a comprehensive, multilateral solution with integrated short, medium and long-term strategies, including support for a functioning Somali government;

[56] http://www.maersk.com/en/the-maersk-group/press-room/press-release-archive/2014/10/vessel-sharing-agreement-to-be-implemented-as-planned

[57] http://www.cma-cgm.fr/detail-news/565/cma-cgm-signe-trois-accords-sur-les-plus-grandes-routes-maritimes-mondiales-avec-china-shipping-container-lines-cscl-et-united-arab-shipping-company-uasc-

[58] Murcia (2015)

- Notwithstanding the need for a functioning government in Somalia, other regional governments need to take a role in controlling pirate activity in the Indian Ocean.
- Partnerships need to be used to ensure all stakeholders work closely together. Co-ordination with the Contact Group on Piracy off the Cost of Somalia (CGPCS) and its working groups can ensure that piracy is addressed both on land and at sea.

Security is essential to enable the development of the various sectors of the Blue Economy in the WIO region, as well as to address challenges such as dealing with the impact of climate change, increased natural disasters, pollution and environmental degradation. The region faces many daunting security challenges, which have a negative impact on community livelihoods and economically important sectors such as tourism and maritime transport. In addition to security challenges such as piracy, terrorism and trafficking activities, conflicts over maritime boundaries in the region also threaten to exacerbate international and regional tensions.

To address the intricacies of security challenges in the WIO Region, there is a need for innovative geostrategic solutions, in which African diplomacy plays a central role. An Eastern African perspective within a comprehensive approach to overcoming insecurity will be required to ensure that the benefits of the Blue Economy reach the most vulnerable populations. This can only be achieved through innovative and equally beneficial partnerships – including public-private partnerships – and building on existing regional groupings such as the IOC, co-ordination mechanisms like the SRCM and initiatives at all levels including those of the African Union.

Box 4.5: The United Nations Convention on the Law of the Sea (UNCLOS) and summary of some key provisions on maritime spaces

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) was opened for signature on 10 December 1982 and entered into force on 16 November 1994. The regime for oceans and seas established by UNCLOS deals with a wide range of ocean issues and recognises that the problems of ocean space are closely interrelated and need to be considered as a whole. It is not, however, a static instrument, but rather a dynamic and evolving body of law that must be vigorously safeguarded and its implementation aggressively advanced. UNCLOS recognises the desirability of establishing, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication, and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilisation of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment. To that end, it establishes a delicate balance between the need for economic and social development through the use of the oceans and their resources and the need to conserve and manage those resources in a sustainable manner and to protect and preserve the marine environment. Both

the Agreement relating to the implementation of Part XI of UNCLOS ("Part XI Agreement") and the Agreement for the implementation of the provisions of UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks ("United Nations Fish Stocks Agreement"), which are implementing agreements to UNCLOS, also reflect that balance.

UNCLOS and its implementing agreements embody the three pillars of sustainable development – social, economic and environmental – and set forth the legal framework for the sustainable development of the oceans and seas. The introduction to Chapter 17 of Agenda 21 adopted at the 1992 United Nations Conference on Environment and Development, entitled "Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources", specifically confirms that UNCLOS sets forth the rights and obligations of States and provides the international basis upon which to pursue the protection and sustainable development of the marine and coastal environment and its resources. The Programme for the Further Implementation of Agenda 21 recognised that international law, as reflected in the provisions of UNCLOS provides the overall legal framework for global decision-making on the marine environment. The Johannesburg Plan of Implementation, adopted at the 2002 World Summit on Sustainable Development, invited States to ratify or accede to and implement both UNCLOS and the United Nations Fish Stocks Agreement, while recognising the former's role as the overall legal framework for all ocean activities. The outcome document of the 2012 United Conference on Sustainable Development (Rio +20), *The Future We Want*, stresses the importance of the conservation and sustainable use of the oceans and seas and of their resources for their sustainable development.

UNCLOS sets out the legal regime for different maritime zones as well as the rights and obligations of ships and States therein. Many of the provisions of UNCLOS are recognised as constituting customary international law.

UNCLOS provides for a 12 nautical mile limit of the territorial sea, in which a coastal State enjoys full sovereignty which means that it can make laws governing the use of the sea and can take action to enforce its laws in the territorial sea up to the 12 mile limit. Of course in doing so, the State must act in accordance with international law. In particular, the coastal State has for example the duty to give publicity to the dangers to navigation in its territorial waters. The sovereignty of the coastal State in the territorial sea is balanced by the requirement for it to provide innocent passage of foreign ships through the territorial sea, which may include stopping and anchoring. Additionally, States may proclaim a 24 nautical mile contiguous zone where it may exercise certain enforcement rights including to prevent and punish the infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea.

States may also claim a 200 - nautical mile Exclusive Economic Zone (EEZ) beyond and adjacent to the territorial sea, within which it may exercise certain rights, limited jurisdiction and observe specific duties. The coastal State has, inter alia, sovereign rights for the purpose of exploring and exploiting, conserving and managing the living and non-living natural resources of the waters superjacent to the seabed and of the seabed and subsoil. Other States may exercise freedoms such as of navigation and overflight with due regard to the rights and duties of the coastal State and in conformity with the laws and regulations adopted by the coastal State in accordance with the Convention and other rules of international law.

Thus under UNCLOS, the coastal State has full sovereignty over its land territory and internal waters subject to the right of ships of all States to exercise innocent passage as provided for in the Convention in certain exceptional cases. This applies for example, where the establishment of a straight baseline in accordance with the method set forth in article 7 of the Convention has the effect of closing off as internal waters areas which had not previously been considered as much.

In the other zones the sovereign rights and jurisdiction of the coastal State are tempered by rights and freedoms granted to other States (See Articles 2, 3, 4, 5, 6, 7, 8, 33, 46, 47, 48, 55, 56, 57, and 58).

“Since coastal nations now can claim sovereignty over resources within an EEZ that extends 200 nautical miles (230 statute miles, or 370 km) from their coasts, it has become possible for small countries to increase national income by selling fishing rights in their zones to the major fishing nations that have the capital and technology to exploit pelagic resources.”[59]

Further, under the Convention a coastal State exercises sovereign rights over its continental shelf for the purpose of exploring and exploiting its mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species. These rights are inherent and do not depend on occupation, effective or notional, or on any express proclamation. The Convention also gives coastal States jurisdiction over their continental shelf with regard to the establishment and use of artificial islands, installations and structures; drilling of the continental shelf; cables and pipelines constructed or used in connection with exploration of the continental shelf and exploitation of its natural resources or to the operations of artificial islands, installations and structures; marine scientific research; and the prevention, reduction and control of pollution of the marine environment arising from or in connection with seabed activities. [60]

[59] http://www.britannica.com/EBchecked/topic/285876/Indian-Ocean

[60] Articles 77 to 81 and 246 of UNCLOS

Part VII of UNCLOS focuses on the high seas, which are defined as follow: "all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State. The high seas are open to all States, whether coastal or land-locked, where they benefit from freedom of navigation, overflight, to lay submarine cables and pipelines, to construct artificial islands and other installations permitted under international law, fishing and of scientific research. These freedoms must be exercised with due regard for the interests of other States in their exercise of the freedom of the high seas. The high seas are reserved for peaceful purposes.[61] No State may validly subject any part of the high seas to its sovereignty." [62]

Pursuant to the Convention, the continental shelf comprises the seabed and subsoil of the submarine areas that extend beyond the territorial sea of coastal States up to 200 nautical miles from the baselines. In the cases in which the continental shelf extends beyond 200 nautical miles from the baselines, coastal States are required by the Convention to submit information on the outer limits of the continental shelf beyond 200 nautical miles to the Commission on the Limits of the Continental Shelf for its consideration. The Commission makes recommendations to coastal States on matters related to the establishment of the outer limits of their continental shelf. The limits of the continental shelf established by a coastal State on the basis of the recommendations adopted by the Commission are final and binding. The Secretary-General of the United Nations gives due publicity to the summary of the recommendations which does not include any confidential or proprietary information contained in the submission. [63]

The establishment of the outer limits of the continental shelf is important for a number of reasons. Among them: (i) the delineation of the extent of sovereign rights and jurisdiction over the resources of the continental shelf is important for their exploration and exploitation. Large areas of sea-bed and subsoil thereof are involved; (ii) the area of sea-bed and subsoil beyond the limits of national jurisdiction is considered to be the "common heritage of mankind" (the Area). Thus, the delineation by coastal States of the outer limits of the continental shelf is of interest to all States in view of the need to define the limits of the Area and to allow for exploration and exploitation of its resources administered by the International Seabed Authority.[64]

Certain depository and due publicity functions are entrusted to the Secretary-General under the Convention. The objective of the Convention is clear: the international community and the users of the seas and oceans need to know the

[61] Articles 86-87-88 of UNCLOS
[62] Articles 86, 87, 88 0r 86-88 and 89 of UNCLOS
[63] Articles 76 to 85
[64] UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center, GRID Arendal, 2012, Green Economy in a Blue World

limits of the maritime zones in which a coastal State exercises its sovereignty or sovereign rights and jurisdiction, in view of the different legal regimes applicable.

"The seabed and ocean floor beyond national jurisdiction (i.e. beyond the outer limit of the continental shelf) is known as the 'Area'. A special legal regime applies to the Area, which is considered to be the common heritage of mankind. No State can claim or exercise sovereignty or sovereign rights over any part of the Area or its resources, nor can any State or natural or juridical person appropriate any part thereof. The Convention provides that the Area can only be used for peaceful purposes. The resources of the Area are to be used for the benefit of mankind as a whole. In this context, the Convention defines "resources" as "all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the seabed, including polymetallic nodules. UNCLOS also established an international Organisation – the International Seabed Authority – to manage and control mineral prospecting, exploration and exploitation in the Area. These activities (exploration and exploitation) may only be carried out under a contract with the Authority."

References

African Union (2012), 2050 *Africa's Integrated Maritime Strategy (2050 AIM Strategy®)*, Addis Ababa: AU. Also available at http://pages.au.int/sites/default/files/2050%20AIM%20Strategy%20%28Eng%29_0.pdf, accessed 13 September 2015

Alpers, E. A. (2013), *The Indian Ocean in World History*, New Oxford World History Series, Oxford: Oxford University Press, (Kindle Edition)

Black, J. (2009), Geopolitics, London: *The Social Affairs Unit*

Carter L., D. Burnett, S. Drew, G. Marle, L. Hagadorn, D. Bartlett-McNeil, and N. Irvine (2009), *Submarine Cables and the Oceans – Connecting the World*, Cambridge: UNEP-WCMC Biodiversity Series No. 31. ICPC/UNEP/UNEP-WCMC

Combating Terrorism Centre, US Military Academy (2009), *Al Qua'ida's (Mis) adventures in the Horn of Africa Kenya, Eritrea, Sudan, Ethiopia, Somalia, Djibouti, Al-Ittihad al-Islami (AIAI), Eritrean Islamic Jihad (EJIM)*, Washington DC: US Department of Defence/Diane Publishing (Paper), Progressive Management: (Kindle Edition)

Garofano, John (2013), *Deep Currents and Rising Tides*, Washington DC: Georgetown University Press, Kindle Edition

Greenpeace (2013), *Cut it out: Illegal Logging in the Democratic Republic of Congo (DRC)*, Kinshasa: Greenpeace Africa

Institute for Economics and Peace (2014), *Global Terrorism Index*, Sydney: IEP

Kaplan, R.D. 2009, "*Centre Stage for the 21st Century: Power Plays in the Indian Ocean,*" Foreign Affairs, March-April

Mair, S. ed., (2011), *Piracy and Maritime Security, regional characteristics and political, military, legal and economic implications*, Berlin: German Institute for International and Security Affairs (SWP-)

Murcia, P., (2015), *Madagascar à nouveau dans la course* (« Madagascar Is Back on Track »), Antananarivo: No Comment (http://www.nocomment.mg/philippe-murcia-madagascar-a-nouveau-dans-la-course/)

Potgieter, T. (2012), *Maritime security in the Indian Ocean: strategic setting and features, Paper #236*, Pretoria: Institute of Security Studies Africa

Regional Mixed Migration Secretariat, (2013), "*Migrant Smuggling in the Horn of Africa and Yemen: the Political Economy and Protection Risks"*, Mixed Migration Research Series: Explaining People on the Move, Nairobi: RMMS

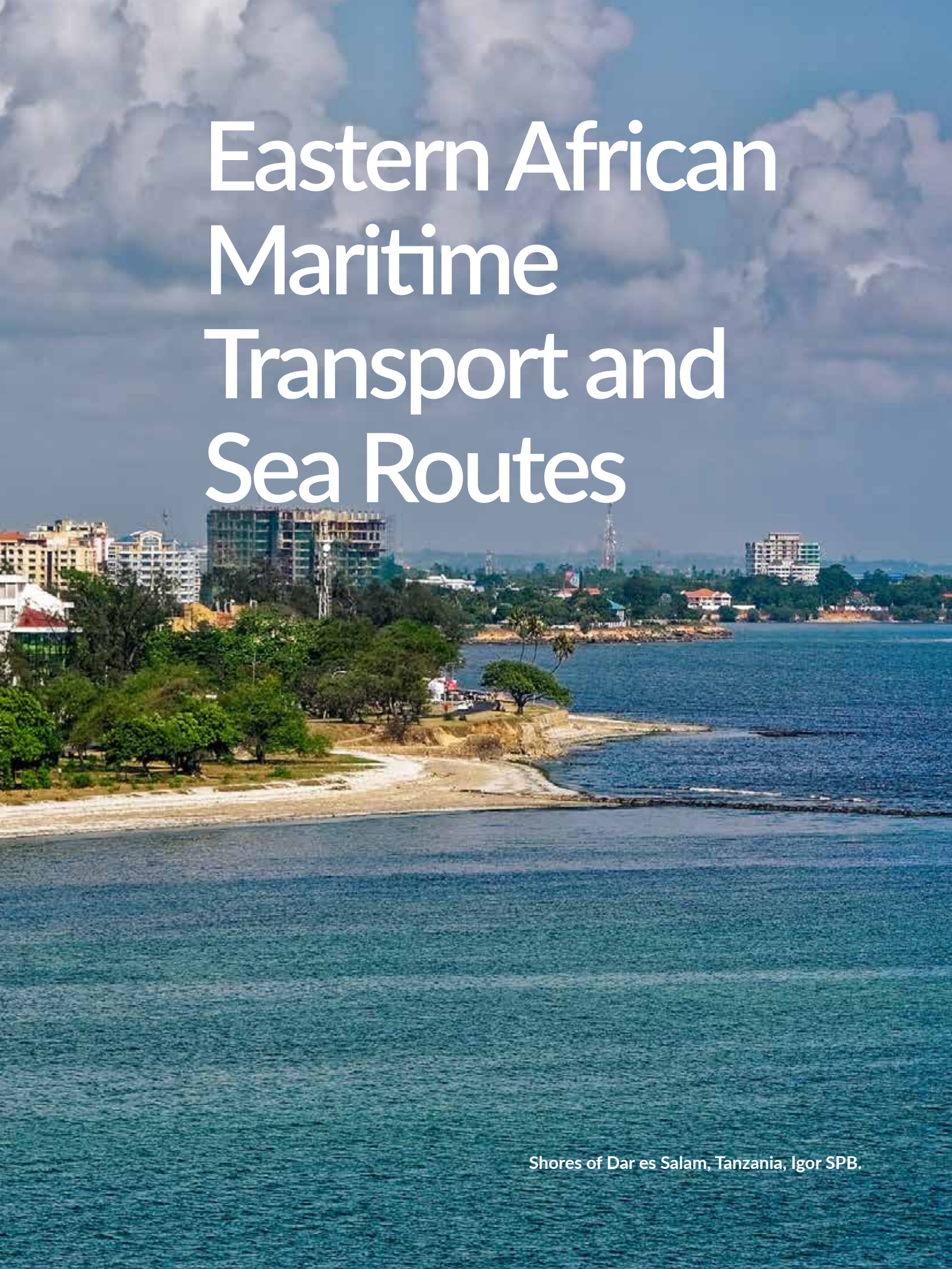
United Nations Environment Programme - United Nations Organisation Stabilisation Mission in the Democratic Republic of the Congo (2015), *UN Great Lakes Framework of Hope: Experts' background report on illegal exploitation and trade in natural resources benefitting organised criminal groups and recommendations on MONUSCO's role in fostering stability and peace in eastern DR Congo*, Nairobi: UNEP

United Nations Environment Programme-Nairobi Convention and the Western Indian Ocean Maritime Science Association (2015) *The Regional State of the Coast Report: Western Indian Ocean*, Nairobi: UNEP and WIOMSA

United Nations Office on Drugs and Crime, (2013), *Transnational Organised Crime in Eastern Africa: A Threat Assessment*, Vienna UNODC

United Nations Office on Drugs and Crime (2009), *Organised Crime and Trafficking in Eastern Africa*, Vienna: UNODC

Eastern African Maritime Transport and Sea Routes



Shores of Dar es Salam, Tanzania, Igor SPB.

5.1. Introduction

Maritime transport is the most efficient mode of international trade; it is the cheapest, most convenient and environmentally-friendly; over 95% of world exports are transported by sea. Maritime transport is also growing in significance globally. With discoveries and the anticipated exploitation of oil and gas in a number of African countries, the volumes of cargo throughput are bound to grow and put pressure on the development of port and auxiliary infrastructures, as well as maritime-security institutions. Recent studies have projected that throughput in African ports will rise from 265 million tons in 2009 to more than 2 billion tons in 2040. African nations will have to put development plans in place to cope with this expected cargo increase. Trade is a vehicle of growth and maritime transport is instrumental in linking markets. Development plans for ports and shipping should not only focus on national ports but also on regional hubs. The Blue Economy is a concept with much broader development significance for the Eastern Africa sub-region than merely the maritime sphere. Coastal and island States are interconnected with land-locked countries and through infrastructure networks, trade linkages, resource interdependence and strategic partnerships; the benefits of a robust Blue Economy can contribute positively to regional development. In this perspective the transport sector has an increasing role in creating long-term, skilled employment, reducing the cost of attaining food security, and addressing issues relating to mitigation and adaption to climate change.

Poverty reduction is more likely to occur when communities have ready access to essential services and to markets. The African Union, maritime authorities, operators and ports will need to identify opportunities to develop a sustainable, integrated maritime sector, which will create jobs – both directly and indirectly – in areas such as logistics and other transport-related sectors. The port sector is, of course, an essential component of the transport system and cannot be treated separately from shipping.

5.2 The Transport Sector

The transport-cost element of the shelf price of most consumer goods is marginal because of the low cost of maritime transportation. For example, the transport cost of a television set is about USD 10 (typical value of USD 700), that of a kilo of coffee (typical value of USD 15) is USD 0.15, transporting crude oil from the Middle East to the United States is less than a cent a litre at the pump. Similarly, transporting a ton of iron ore from Australia to Europe through the Indian Ocean is about USD 10, and that of a typical 20 foot container from Asia to Europe carrying over 20 tons of cargo is about the same as economy airfare for a single passenger on the same journey. Therefore, maritime commerce offers tremendous economic advantages for international trade in the era of globalisation and increased economic interdependence. By 2008, global goods loaded for maritime commerce amounted to 8.2 billion tons and a post-recession level of 8.4 billion tons in 2010, of which 60% is accounted for by developing countries.[1] Oil cargoes increased from 1.4 billion tons in 1970 to 2.75 billion tons by 2010.

[1] UNCTAD Review of Maritime Transport, 2011.

The Indian Ocean maritime area off Eastern Africa is among the most important globally. It includes major trade routes from Australia, much of Asia and the Middle East, connecting Atlantic and Mozambique Channel traffic, as well as linking to European markets. It is also a major oil shipment sea highway, which the US Energy Information Administration identifies as a global strategic chokepoint. The Bab el Mendeb, on the northern edge of the Indian Ocean, carrying 3.4 million barrels per day (bbl/d) in 2011, is the third largest maritime route for crude oil transportation, after the Strait of Hormuz (17 million bbl/d) and the Suez Canal and SUMED (Suez-Mediterranean Pipeline) (3.8 million bbl/d).

The Indian Ocean maritime trade, beyond its global role, is also a strategic asset for promoting trade and development in Eastern Africa. The 2013 UNECA Sub-Regional Office for Eastern Africa report, *Tracking Social and Economic Progress*, estimates that between 2007 and 2011, the exports of Comoros, Djibouti, Kenya, Madagascar, Seychelles and Tanzania, for example, grew by 82%, 64%, 41%, 28%, 33% and 113%, respectively, showing the increased importance of maritime trade in the Indian Ocean, although some of the trade increase was intra-regional. The report further highlights that in the Common Market for Eastern and Southern Africa (COMESA) region, imports grew by 345% between 2000 and 2012, while exports increased by 452%. Maritime transportation is, thus, vital for the sub-region's economy, which is dependent on imports of overseas manufactured goods and exports of primary products. Exports are, as elsewhere, typically Free on Board (FOB)[2], while imports are on cost, insurance and freight (CIF)[3] terms.

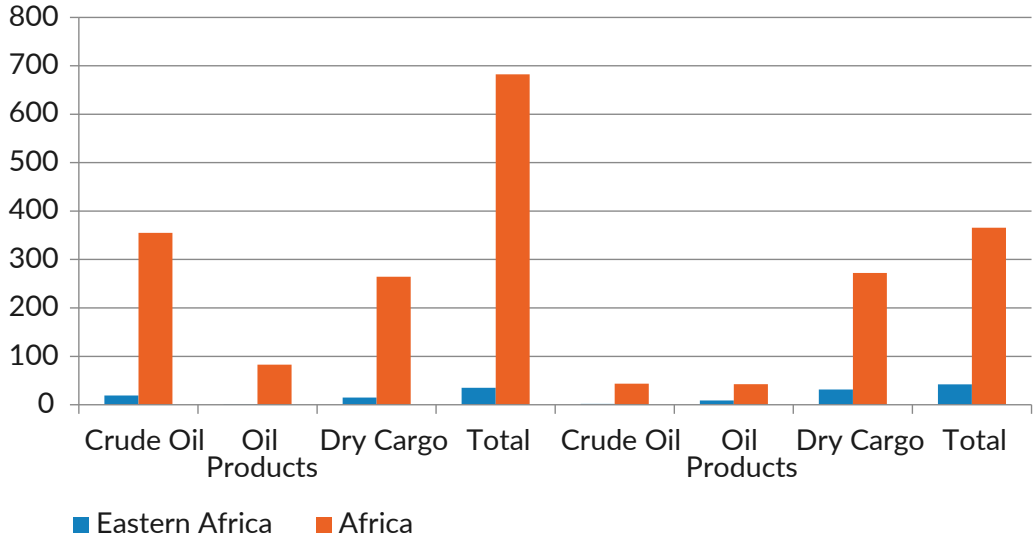
According to the *UNCTAD Review of Maritime Transport 2013*, the sub-region coastal and island States' seaborne trade totalled 76.1m tons composed of 35m tons loaded and 31.4m tons unloaded of crude oil, oil products and dry cargo; about 7% of Africa's total. Of these, crude oil and oil products represented 57% and dry cargo 43% of loaded cargo, while the unloaded proportions were 26% and 75%, respectively (Figures 5.1 and 5.2)[4]. Compared to UNCTAD's 2009-2012 report, there has been an average annual increase of 10%.

[2] Free on Board is more expensive to the exporter who not only loses out on earnings from shipping services but also ends up paying for them in hard foreign currency

[3] CIF is the reverse of the FOB but is more expensive and the importer loses out even more

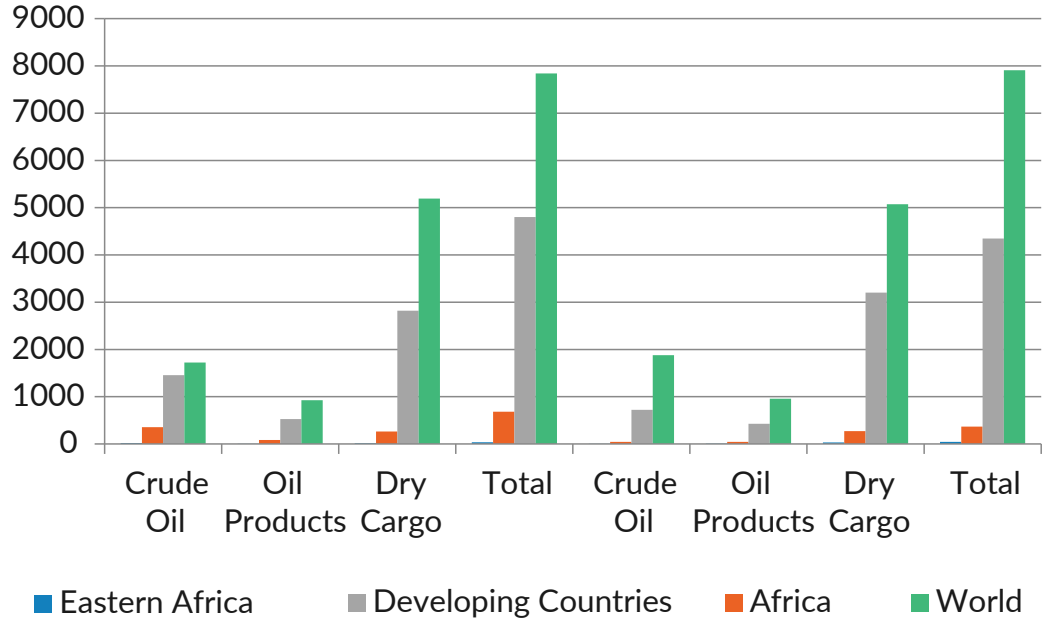
[4] No statistical data is available for landlocked countries

FIGURE 5.1 Comparison of ocean-borne trade of Eastern African and African countries in millions of tons of goods loaded (left graph) and unloaded



Source: Extracted from Statistical Annexes of UNCTAD Review of Maritime Transport 2013

FIGURE 5.2 Comparison of ocean-borne trade of Eastern African, African and developing countries and the world in millions of tons of goods loaded (left graph) and unloaded



Source: Extracted from Statistical Annexes of UNCTAD *Review of Maritime Transport 2013*

Registered tonnage in the sub-region for the same period was 1,480 billion tons of oil tankers, bulk carriers, general cargo and other vessels. This is 21%, 0.7% and 0.07% of African, developing countries' and global totals, respectively. Economic trends for the sub-region are likely to be positive, as the discovery of oil and gas in Kenya, South Sudan, Tanzania and Uganda and overall improvement in economic growth prospects have propelled the region to one of the fastest growing economies in the world, attracting investment. This has already resulted in an early 50% increase in imports especially of machinery and construction equipment destined for roads, rail, ports and other infrastructure developments to service the oil and gas industry.

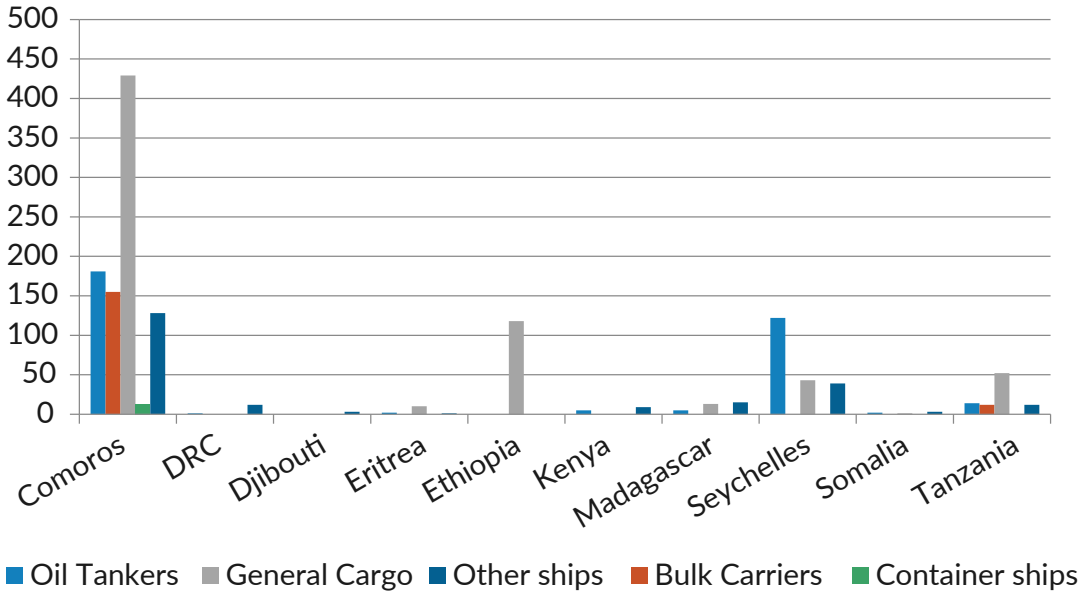
TABLE 5.1 Merchant Fleets of Eastern African countries by type in millions of deadweight tons, 2012

Country	Total	Oil Tankers	Bulk Carriers	General Cargo	Container Ships	Other Ships
Comoros	905	181	155	429	13	128
DRC	14	1	0	0	0	12
Djibouti	3	0	0	0	0	3
Eritrea	13	2	0	10	0	1
Ethiopia	118	0	0	118	0	0
Kenya	14	5	0	0	0	9
Madagascar	33	5	0	13	0	15
Seychelles	203	122	0	43	0	39
Somalia	5	2	0	1	0	3
Tanzania	89	14	12	52	0	12
Eastern Africa Total	1,397	332	167	666	13	132
Africa's Total	7,087	1,871	801	1,681	167	2,567
Developing Countries Total	215,420	59,476	693,465	31,834	28,306	25,459
World	882,635	250,999	253,191	107,591	145,544	125,310

Source: Extracted from Statistical Tables of UNCTAD *Review of Maritime Transport 2013*

Figure 5.3 shows that the Comoros, in particular, has a large fleet in comparison to other Eastern African countries.

FIGURE 5.3 Merchant fleets of Eastern African countries (000s of deadweight tons), 2009



Source: Extracted from Statistical Tables of UNCTAD *Review of Maritime Transport 2010*

BOX 5.1 Port d'Ehoala

Rio Tinto and the Malagasy State have financed the construction of the Port d'Ehoala up to USD 240 million and USD 35 million, respectively, through the Anosy Integrated Growth Pole (IGP), a World Bank-funded project. The strategic position of the port will open Madagascar to the world: on the regional level, it will integrate and facilitate traffic servicing the Indian Ocean region, and its position between Africa and Asia will promote increased maritime traffic in both directions. The new Port d'Ehoala is used by Rio Tinto QMM to export the product of mining operations. This new port has also improved accessibility to the Anosy Region, opening up economic development opportunities.

The region, however, also faces challenges, particularly fleet ownership and the low level of container traffic and connectivity. The Liner Shipping Connectivity Indices (LSCIs) for the sub-region in 2015 were 6.78 for Comoros, 4.33 for the Democratic Republic of Congo (DRC), 20.76 for Djibouti, 3.49 for Eritrea, 11.37 for Madagascar, 8.01 for Seychelles, and 5.43 for Somalia[5]. In the region, Djibouti has the best shipping traffic connectivity. However, in comparison to other countries in close proximity, such as Mauritius with 24.72, Mozambique's 10.23 and South Africa's 43.02, traffic connectivity in the region is still low and needs to be improved to benefit from the opportunities offered by the Blue Economy development strategy. The Eastern African sub-region is also subject to the International Chamber of Commerce's international

[5] UNCTAD (2015), http://stats.unctad.org/lsci

trade and shipping terms (INCOTERMS) that can result in punitive freight costs partly associated with the lack of regional fleet ownership. There are also challenges related to market concentration.

5.3. Coastal States' Ports and Sea Routes

The Eastern African sub-region includes six coastal countries (Djibouti, Eritrea, Kenya, Somalia, Tanzania and the DRC). The United Nations Convention on the Law of the Sea (UNCLOS) bestows rights of participation in and regulation of shipping and exploitation of the exclusive economic zone (EEZ) on coastal countries in Articles 2-33. The six States obviously house all the major seaports in the sub-region. According to the Convention, they have obligations to allow transit passage for imports and exports from their landlocked neighbours through their ports and to permit the latter to fly flags on the vessels and base them in those ports without discrimination. They also owe a duty to conserve the coastal and marine environment. Although they are, in theory, obligated to facilitate maritime traffic without any hindrance, in practice, political differences and territorial disputes such as those between South Sudan and Sudan, Ethiopia and Eritrea and Ethiopia and Somalia have led to interruptions to transit trade. The Convention is ratified by all the sub-region's 14 States.

For the sub-region's East African Community (EAC) partner States, maritime transport and ports are covered by Article 93 of the EAC Treaty. In addition, the sub-region's coastal States host the major seaports of Massawa and Assab (Eritrea), Djibouti (Djibouti), Mogadishu (Somalia), Lamu and Mombasa (Kenya), Matadi (DR Congo) and Dar es Salaam (Tanzania). These ports are crucial for the sub-region's exports and imports. Smaller ports include Mtwara, Tanga and Zanzibar (Tanzania) and Ber Bera, Juba and Kismayu (Somalia). The sub-region also has access to Port Sudan (Sudan), Pointe Noire (Congo Republic), Benguela (Angola) and Beira and Maputo (Mozambique). However, except for Djibouti, Mombasa and Dar es Salaam, the major seaports in the sub-region suffer from aging infrastructure, are congested and inefficiently run and, therefore, costly, compared to those in Mauritius and, recently, Madagascar, with modern and efficient facilities.

The Economic Commission for Africa's *Transport Situation in Africa Report*, 2009 puts Mombasa and Dar es Salaam at 12 and 15 days of dwell time, respectively.

The Mombasa port has a network of road, rail and pipeline connections. The main road network runs from Mombasa port through Kenya to Uganda, Rwanda and Burundi, with onward routes to Bukavu, Goma and Kisangani in the DRC. South Sudan is also connected to this network. Currently, about 95% of the goods from the Port of Mombasa tranship by road.[6] The oil pipeline infrastructure connects the Port of Mombasa with Eldoret and Kisumu (Figure 5.4).

[6] Based on information from the Northern Corridor Transit and Transport Coordination Authority, 2015

FIGURE 5.4 Port of Mombasa and regional multi-modal networks

Source: Northern Corridor Transit and Transport Coordination Authority, 2015

Dar es Salaam handled 15 million tons of freight in 2013, with the majority destined for Tanzania and less than 10% for Burundi, the DRC, Rwanda and Uganda. According to the Central Corridor Transit Transport Facilitation Agency (TTFA-CC), Dar es Salaam port in 2013/14 handled 14.6 million tons, compared with 12.7 million tons in 2012/13, which amounts to a 15.6% increase. Container traffic also grew by 12.2% over the same period.

The other major port in Eastern Africa, Djibouti, handled 10 million tons, of which 70% was transit traffic to Ethiopia (UNCTAD (2013). The port handles 95% of Ethiopian trade. However, the sub-region's ports enjoyed little cruise-ship trade because of the lack of good facilities. The proposed development of the new Lamu Port for trade from South Sudan and Ethiopia and the creation of the largest port on the West Indian Ocean (WIO) at Bagamoyo in Tanzania with links to the TAZARA and central railway lines, as well as road links to the central corridor will greatly enhance the potential for tourism in Eastern Africa, while facilitating maritime trade. However, most of this maritime traffic will take place in foreign-owned vessels, since national fleets are extremely small, consisting in Somalia's case, for example, of only one ship. Tanzania has the largest fleet (94 vessels), while the DRC emulates Somali, with only one vessel.

The sub-region is strategically placed astride one of the world's most important and strategic sea-routes through the West Indian Ocean. This is the shorter Mediterranean-Suez Canal-Red Sea Route passing to the north of the sub-region's waters and connecting the industrialised economies of Japan, Taiwan Province of China, China, East Asia, and the major European and North American markets. This route carries petroleum from the Gulf to Europe and the Americas, as well as to Japan, China, India, Taiwan Province of China and the rest of the Asian markets. It also handles break-bulk

cargoes (boxes, drums, bags, etc.) from Japan and Asia, bulk cargo (dry and liquids) including oil tankers and liquefied natural gas (LNG) and liquefied petroleum gas (LPG) carriers from the Gulf, and containerised and general cargo between East and West. Locally, this route also serves the sub-region's Red Sea ports of Berbera – for Ethiopia and Somalia – Djibouti – for Ethiopia and Djibouti – Assab and Massawa – for Eritrea and, intermittently, South Sudan through Port Sudan. The Gulf carried 17 million barrels of crude oil per day in 2011 while the Suez Canal and the Suez-Mediterranean pipeline accounted for 3.8m barrels per day and, in the north of the sub-region, the Bab el Mendeb conveyed 3.4m, down from 4.5m in 2008 (the decline probably attributed to piracy). This complex of sea routes is the largest for crude oil in the world.

The route around the Cape of Good Hope travels along the sub-region's coastline on its way from the Gulf and Asia to Europe and the Americas. It predated the Suez Canal route and remains the only viable alternative to it in emergencies. It is used by all vessel types carrying most cargo classes but is especially used by crude oil carriers. Prior to the upswing in Somali piracy, part of this route passed through the sub-region's waters including the Mozambique channel and served East, Southern and West African ports, before joining the Atlantic Ocean to Europe and the Americas. However, piracy forced the route to divert as far east as 600-1,000 miles from the sub-region's coastline. However, there has been a sharp decline in the number of piracy attacks in the region (Figure 5.5).

FIGURE 5.5 Actual and attempts of piracy attacks in 2010 and 2014

Source: The Economist. 29th of November 2014 [7] "The ungoverned seas"

[7] http://www.economist.com/news/middle-east-and-africa/21635049-waters-around-somalia-are-calmer-piracy-west-africa-rising

The Gulf- Eastern, Southern and West African -Atlantic route, vital for the important Dubai free processing zone and for Saudi and Gulf energy sources, serves as the sub-region's alternative access to Beira and Maputo (Zimbabwe and Zambia) and Lobito (Angola) for mineral exports and imports to Katanga and Matadi and Pointe Noire, as well as for other exports/imports from Kinshasa and western DRC. Less attention is paid to the impact of piracy on coastal trade *(cabotage)* within the sub-region, especially between its coastal and island States. However, these sea routes are vital for intra-regional and inter-island trade.

Ports

Ports are the most important Blue Economic infrastructures because they provide the essential connection with the international economy and 80% of world merchandise trade is transported by ship (AfDB, 2010). At the same time, roads and railroads connecting to ports are also essential for the Blue Economy, if it is to maintain trade links with the hinterland and landlocked countries. Blue Economy infrastructure is also important for many aspects of the tourism sector. This section provides a brief overview of some of the main Blue Economy infrastructures in the region, focusing on ports:

Burundi

Infrastructure related to the Blue Economy is limited because of the land-locked nature of Burundi and consists of tourism infrastructures on the shores of Lake Tanganyika, the second largest freshwater lake in the world by volume. Limited transport is provided on the lake to destinations in Tanzania and Zambia. Burundi's link to the sea is either through Tanzania, or the "Northern Corridor" transport route that links Rwanda, Uganda and Kenya.

Comoros

The Union of Comoros suffers from under-developed port infrastructure facilities that preclude the country from fully exploiting its notable fisheries resources and its maritime-based tourism attractions. Ngazidja (Grande Comore) is serviced by the country's main port, Moroni. The World Bank, however, finds that Moroni is hampered by a lack of adequate marking and insufficient draft. The Port of Mutsamudu, in contrast, is a deep-water port. However, it is often afflicted by silting caused by a river emptying into the harbour basin. There is also a maritime access dock in Mwali but it lacks offloading and lifting equipment, which necessitates the use of canoes (World Bank, 2010; World Bank, 2014).

Djibouti

The Port of Djibouti is of considerable economic and strategic importance to the Republic of Djibouti, as well as to its much larger neighbour, Ethiopia. During 2011, 17,800 ships passed through the Suez Canal and roughly 1,500 - 2,000 of them stopped in Djibouti. Direct revenues generated by Djibouti port are estimated to be between USD 65 million and USD 90 million per year, equivalent to about one quarter of state revenue (World Bank, 2013a). To ensure that Djibouti remains

competitive and to facilitate further growth, there are some very large capital works programmes underway. The USD 330 million second-stage expansion of the Doraleh Container Terminal would double the port's capacity by 2015. It builds on productivity gains generated by a 2013 investment in two dockside cranes and eight yard cranes. At the same time, the construction of a port at Tadjoura is continuing, as is the construction of a new railway line from Ethiopia.

DRC

The DRC has a maritime outlet and border but poor transport infrastructure and the vast hinterland means that most of the country remains far from the sea. Price Waterhouse Coopers recently described the country as having the "most challenging transport infrastructure environment in Africa," due to these factors (PWC, 2013, p. 34). The two main ports of the country, Boma and Matadi, have low draught and cannot receive conventional cargo liners.

Eritrea

Assab and Massawa are the two main ports in Eritrea. Both have quay lengths of slightly more than one kilometre.[8] In Assab Port, the deepest berth is 10.97 metres. In Massawa, the deepest berth is 12 metres. Trade volumes through the ports have been limited by a number of factors, including variable relations between Eritrea and its neighbours.

Ethiopia

Ethiopia is landlocked and relies heavily on cross-border trade with Djibouti to access international markets. Indeed, 70% of the trade going through Djibouti Port concerns Ethiopia. The road between Ethiopia and Djibouti has been upgraded since 2000 but more needs to be done. Some portions of the road have not been resurfaced in nearly a decade. A railway between Ethiopia and Djibouti is also under construction. According to the Ethiopian Transport Minister, two-thirds of the railway project had been completed by October 2014. The remaining work should be completed by early 2016. The Minister expects that the railway will reduce travel time from Ethiopia to Djibouti by half (Government of Ethiopia, 2014).

Kenya

Mombasa is the largest port in the region, with the largest number of berths (29) and the shortest dwell time (5 days) (AfDB, 2010). In terms of tonnage and containers handled, it is the third-largest port in Africa, behind Durban and Port Said. However, the port is struggling with capacity constraints. Investment in enhancing berths and terminals is required if the port is to maintain its position. Institutional reforms, such as facilitating greater private-sector involvement in the running of the port, may also be necessary to achieve efficiency improvements (Briceno-Garmendia & Shkaratan, 2011). A USD 478.9 million-port is being constructed in Lamu by a Chinese company. The port would have 32 berths. It is part of a USD 24 billion transport corridor project, that would link Ethiopia and South Sudan to the sea (Mwangi, 2014).

[8] Assab's quay length is 1,025 metres and Massawa's quay length is 1,007 metres (Ministry of Information, 2014)

Madagascar

Toamasina (Tamatavae) is Madagascar's principal port. It handles 90% of the country's container traffic and slightly more than 80%of all transit traffic. It is connected by rail to the capital city, Antananarivo. A lack of investment for many years led to low rates of productivity, but in 2005 a concession to operate the port was awarded to Philippines-based International Container Terminal Services. Since that time, a number of improvements have been achieved. Handling capacity has increased from 60 tons per day to 2,500. Container movement speeds have also tripled. Nonetheless, further investment is required. Between 2010 and 2017, International Container Terminal Services expects to invest USD 166 million in the port (IFC, 2013).[9]

Rwanda

Rwanda is reliant on neighbouring countries for access to international shipping and is taking steps to improve its connections to regional ports. In particular, the Northern Corridor Initiative brings together Rwanda, Uganda, Kenya and South Sudan. The corridor involves 13 development projects, including a 2,000-kilometre railway project between Rwanda and the port of Mombasa in Kenya. The railway is budgeted to cost USD 13.4 billion, 90% of which is expected to be financed by China following a 2014 visit from Premier Li Keqiang (Agutamba, 2014). Some progress along the corridor has been achieved and the clearance of cargo from Mombasa to Kigali has been reduced from 14.1 days in 2006 to 5 days by 2013.[10]

Seychelles

Tourism is a major contributor to economic growth and employment in the Seychelles. The primary attraction of the country is its pristine maritime environment, including its beaches. Tourist infrastructure is advanced, relative to the rest of Africa and the Eastern African sub-region. The main port, Victoria, is small, compared to other major ports in the region, but it remains productive. Indeed, Victoria is one of the busiest tuna-fishing ports in the world: some 200,000 metric tonnes are landed and shipped from there annually (Meriton-Jean & Amla, 2014). Nonetheless, infrastructure weaknesses are limiting the capacity to move up the value chain in the fisheries industry and allow more of the fish caught in Seychelles waters to be processed on-shore (AfDB, 2015).

Somalia

There are four main ports in Somalia. Mogadishu is the largest and busiest, serving southern central Somalia and handling 30 to 40 ships per month as at June 2013 (Business Daily, 2013).[11] Berbera serves Somaliland with a 650-metre berth and a

---

[9] http://www.ifc.org/wps/wcm/connect/de45eb004983911d83acd3336b93d75f/PPPImpactStories_Madagascar_PortofToamasina.pdf?MOD=AJPERES

[10] Information based on the presentation of Mr. John Omingo, Head of Commercial Shipping, Kenya Maritime Authority as part of the 19th ICE meeting in Madagascar: "Key Challenges and Strategies Required to Strengthen Trade Facilitation in Eastern Africa", March 3, 2015

[11] In early 2013, the number of ships docking in the port more than doubled (Gatehouse, 2013). In total, in 2012, 222 vessels and 248 dhows docked at the port with a combined total of 1.2 million metric tonnes of goods (Business Daily, 2013)

depth of 12 metres (Tran, 2012).[12] It is estimated that 2.5 million cattle were exported from the port in 2010, with 80% going to Saudi Arabia and the rest to Yemen, Egypt and Oman (Tran, 2012). Bosasso serves Puntland and is a key entry point for north-central Somalia.[13] Kismayo is in the lower Jubba region. The port was built in 1964 and refurbished in 1984 (MHD, 2012). It is of strategic importance in the offensive against Al Shabaab, not least because it had been the largest economic hub for the organisation before African Union troops and their allies recaptured the port in October, 2012 (Cleophus, 2013). Prior to recapture, the port charged USD 1.5 per unit ton and it is estimated to have generated revenues of about USD 240 million per year for Al Shabaab. The wharf has a total length of 630 metres containing four berths. The main goods that are imported and exported are charcoal and qat (MHD, 2012). In August 2013, the Federal Government of Somalia signed an agreement establishing the Interim Jubba Administration that was to govern the semi-autonomous region that includes the port city of Kismayu. Unfortunately, since then, the city has become increasingly insecure with assassinations of local businessmen, politicians and traditional elders occurring (EIU, 2014).

South Sudan

There is little infrastructure related to the Blue Economy in South Sudan. The country's connection with the sea is largely influenced by progress on the Northern Corridor project (discussed above under Rwanda) and the construction of the Kenyan port in Lamu (discussed above under Kenya).

Tanzania

Dar es Salaam is the main port in Tanzania. It has a low container dwell time, fast truck processing performance and high crane productivity, compared to other ports in the region. This is due, in part, to the large size of the terminal operations and its specialised handling equipment. A further recent improvement has been the establishment of a one-stop centre which brings together all service providers to reduce time and the cost of doing business (Guardian Reporter, 2013; Shkaratan, 2012). However, Dar es Salaam is facing capacity constraints. Its demand to capacity ratio is 140% in the container sector and 93% in the general cargo sector. These ratios are the highest in Africa after Mombasa. Once a port's capacity ratio goes above 80% there is a risk that its efficiency will become seriously compromised (Shkaratan, 2012). The cost of delays at the port, relative to Mombasa, is the equivalent of a 22% tariff on container imports and a 5% surcharge on bulk imports. Reform is difficult, however, since the beneficiaries are scattered, while those who benefit from the status quo are concentrated in a small group and have a strong incentive to resist change (World Bank, 2013b).

Construction began in October 2015 on the USD 10 billion port in Bagamoyo, 75 kilometres north of Dar es Salaam. This would be the largest port in the region,

[12] Most livestock are shipped in small ships or dhows that can carry between 3,000 to 6,000 animals (Tran, 2012)

[13] The World Food Programme dredged 160,000 cubic metres of silt out of the port in early 2012. This meant that ships could now dock at low tide, which increased the number of berthing ships by one third and increased the average tonnage of imports by 50 per cent (Sabahi, 2013)

with the capacity to handle 20 million containers per year. At the time of the announcement in 2013, this was nearly three times the installed capacity in Mombasa (600,000 containers per year) and four times the capacity of Dar es Salaam Port (500,000 containers per year) (Thiong'o, Kamau, Asiimwe, & Esiara, 2013). An infrastructure development agreement was signed in 2013 between the Tanzania government and China Merchant Holding International as the developer. Financial arrangements have also been agreed with State General Reserve Fund, Oman's largest Sovereign Wealth Fund (Ng'wanakilala, 2014).

Uganda

Land-locked Uganda has considerable water resources. Indeed, nearly one fifth of the country is open water or swampland. It is also home to Nile River. Trade routes with Kenya are the principal means of connection with international shipping and the Northern Corridor Initiative will play an important role. There are a number of water-based tourism attractions – such as the Nile and Lakes Edward and Albert – that require infrastructure for their exploitation. In some areas, the tourist infrastructure is relatively well developed, particularly in clusters such as Jinja. However, in other areas, poor road access from the main international airport in Entebbe, and limited hotel provision, are constraining optimal use of Uganda's water-based tourism potential.

5.4. Island and Archipelagic States Ports and Sea Routes

The sub-region is home to a number of important Archipelagic and Island States in the Western Indian Ocean region (WIO) with special status under Articles 46-54 of UNCLOS as geographically disadvantaged and/or least developed countries (LDCs) under international law. The Blue Economy Summit 2014 emphasised the plight of Small Island Developing States (SIDS) in this respect. The Seychelles, for example, is 1,500 km (810 nautical miles) from the East African coast, with some of its islands also 810 nautical miles apart.

Relatively small in area and population, including a number of (LDCs) and geographically remote, with minimal agricultural land, surrounded by the WIO and isolated from their coastal neighbours, the Blue Economy is more critical to SIDS than to their coastal and land-locked counterparts. Archipelagic and Island States also depend on trading in goods and services, so inter-island, deep and short-sea transport is important for their commercial relationships with mainland-coastal countries in the sub-region. Also important are cruise shipping and fishing, especially to the fish-rich Seychelles. The main ports in Archipelagic and Islands States are Toamasina (Madagascar), Victoria (the Seychelles) and Moroni (Comoros).

The open shipping registry means that Indian Ocean Island States can be used for ship registration. As a result, of the 1.480 billion tons registered tonnage of the region,

1.141 billion (77%) are in these island States. Of these, 149 vessels are registered in the Comoros, making the country 39th in the world.[14] Nearly half of these ships (73) are foreign-owned mainly by Russian, Ukrainian, Turkish, UAE, Pakistani, Syrian, and Bulgarian entities. The Seychelles has a total of 9 vessels and a world ranking of 118th [15]; with these ships having Hong Kong SAR (3), Nigerian (3) and South African (3) owners. Madagascar has only 1 cargo vessel in the shipping registry and is ranked 156th in the world.

5.5. Transit Access to Sea Routes for Land-locked Countries

The sub-region's four land-locked States have maritime transport rights under international law. These include the rights of access to sea ports for their exports/imports under Articles 124-132 of UNCLOS, to sail ships flying their flags on the high seas (Article 90) and to participate in international maritime transport. In turn, transit States have similar rights and obligations under UNCLOS. Transit is obviously essential for land-locked countries,[16] but, because they are remote, mostly LDCs and not easily accessible to vital foreign markets, transport costs for land-locked countries can be up to 77% of export costs[17]. Of the 4 land-locked countries, only Ethiopia has a national fleet consisting of 8 cargo vessels.

Existing routes for land-locked countries include:

- The narrow gauge railway from Mombasa to Uganda;
- Dar es Salaam to Uganda via Lake Victoria ferry;
- Dar es Salaam to Kigoma then by ferry and road to DRC, Rwanda and Burundi;
- Dar es Salaam to the DRC via the TAZARA Railway and Zambia;
- Lobito to the DRC;
- Maputo and Beira to the DRC via Zambia and Zimbabwe railways;
- South Sudan to Port Sudan; and
- Djibouti to Addis Ababa.

Plans are under way to replace the Mombasa to Uganda route with a standard gauge railway and extending it to Burundi, Rwanda and the DRC. Road co-operation schemes include the Transit Transport Coordination Authority of the Northern Corridor (TTCA-NC) from Mombasa to Uganda and the Great Lakes; and the Transit Transport Facilitation Authority of the Central Corridor (TTFA-CA) from Dar es Salaam which runs along the rail routes and ferries as above to Uganda, DRC and the Great Lakes; Berbera to Addis Ababa; and Djibouti to Addis Ababa. Proposed roads include the Mombasa and

[14] Types: bulk carrier 16, cargo 83, carrier 5, chemical tanker 5, container 2, passenger 2, passenger/cargo 1, petroleum tanker 17, refrigerated cargo 10, roll on/roll off 8 registered in Moroni and Mutsamudu ports

[15] The fleet consists of 1 cargo, 1 carrier, 6 chemical tankers, and 1 petroleum tanker

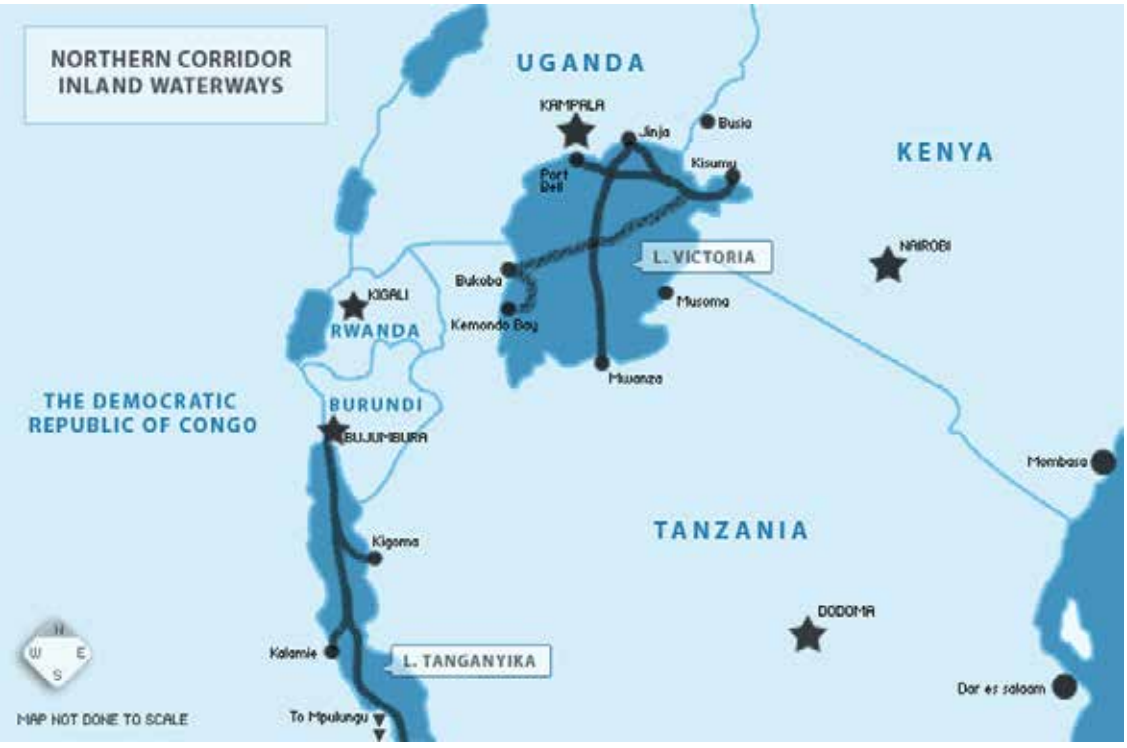
[16] Article 124 of UNCLOS and Article 91 of the EAC Treaty cover rail transit. Road transit is covered by Article 124 of UNCLOS and, for member States, Article 90 of the EAC Treaty

[17] ECA: Africa Trade Centre Briefing Paper No.10: Development of Transit Corridors in Africa's Landlocked Countries, p1

Lamu to South Sudan and Addis Ababa route. The rails and roads are linked by ferries on Lakes Victoria, Albert, George and Tanganyika.

Inland waterways are essential for the land-locked countries (Figure 5.6). As well as the Great Lakes, the sub-region is endowed with several of the continent's and the world's major rivers and bodies of water. The significant inland ports are Port Bell and Jinja on Lake Victoria in Uganda and Kisumu in Kenya, Tanzania's Kigoma, on Lake Tanganyika, and Mwanza and Bukoba on Lake Victoria; and Kalemi and Matadion Lake Tanganyika in the DRC. The northern tip of Lake Malawi is located in the sub-region although Malawi itself is not. The inland ports are greatly underutilised. The Kisumu to Jinja and Port Bell Lake Victoria crossing is no longer operational while the Mwanza Port is not used to full capacity for lack of rolling stock (Figure 5.6).

FIGURE 5.6 Inland waterways



Source: Northern Corridor Transit and Transport Coordination Authority

Greater use of inland waterways would facilitate both intra-regional trade and export-trade transit to coastal ports. The DRC would greatly benefit from the development and greater utilisation of the Congo River. There is a plan for an inland container port at Malaba in Tororo (Uganda). However, like their sea counterparts, the ports and ferries' infrastructures are inefficient due to lack of investments, poor maintenance and under-utilisation. Greater use should be made especially of Lake Victoria and the Nile and Congo rivers. Despite a significant increase in cargo and passenger traffic across Lake Albert as a direct result of oil discovery in the north and south Albert oil fields, there is hardly any traffic on the navigable parts of the Nile and very little

on Lakes Albert, George, Kivu and Kyoga. If fully developed and utilised, the inland waterways could be more useful for all forms of transport, including of goods and people. The prospects of further oil discoveries in the DRC will be a further boost to regional waterways transport.

Pipelines are an essential part of oil and gas transport infrastructures. However, apart from the Juba-Port Sudan crude oil pipeline and Mombasa-Eldoret-Kisumu products pipeline, there is no other existing pipeline facility in the sub-region. However, plans have been approved to extend the Mombasa-Eldoret line to Kampala and eventually to Kigali, Bujumbura and the DRC. There are also plans to construct crude oil and product lines from (a) the three (Uganda, South Sudan and Kenya) oil fields to Mombasa and the proposed Lamu ports, (b) Dar es Saalam line north and north-west to Burundi, DRC, Rwanda and Uganda, and (c) a gas pipeline from southern Tanzanian gas fields to Dar es Salaam. When completed, these developments will facilitate crude oil, oil products and gas transportation, while reducing current transit transport costs and environmental damage caused by road and rail transports. Although they involve other risks inherent in the transportation of such cargoes, the pipelines will generally reduce most risks by taking out about 80% road and rail trucks from surface transport (Figure 5.7).

FIGURE 5.7 Pipeline infrastructure plans

Source: Northern Corridor Transit and Transport Coordination Authority

5.6. Environmental Challenges: Shipping and Sustainable Development

Shipping is the most environmentally sound mode of mass transport, both in energy efficiency and pollution reduction. However, there are several environmental aspects of port development and shipping that require attention; noise pollution; discharge of ballast water (e.g. potential invasive species); potential for leaks, spillage and direct and indirect emissions; impacts on water quality, soils and sediments; and infrastructural developments which can affect marine ecosystems. The dumping of harmful and toxic wastes in the region's waters is also raised as a concern. The Rio+20 summit and the Abu Dhabi/Samoa Summit's 2014 Declarations emphasised transition to a "Green Economy" and "Blue Economy" respectively on their *Communiqués on Sustainable Development*. The Blue Economy model emphasises conservation and sustainable management based on the premise that healthy ocean ecosystems are more productive and preserve sustainable ocean-based economies. It also aims to ensure that Small Island Developing States and developing coastal States equitably benefit from their marine resources. For maritime transport, this should revolve around the three, equally important, dimensions of sustainable development: economic, social and environmental. All the sub-region's maritime countries subscribe to UNCLOS and the IMO conventions and UNEP's "Regional Seas" programmes.

5.7. Piracy and Regional Maritime Security

One of the most disruptive forms of modern piracy began off the coast of Somalia in the mid-2000s and grew into one of the most serious threats to international maritime trade since the Second World War. It not only endangered key sea routes traversing the sub-region's ocean but impacted on commerce, fisheries and the maritime transport on which the sub-region greatly depends. The piracy also disrupted emergency World Food Programme shipments to refugees and the substantial numbers of internally displaced persons in Eastern Africa. The hijacking, detention of vessels and hostage taking of crews led to higher insurance costs and to losses due to the damage and detention of ships and higher freight rates because ships took longer routes to avoid the area. Accurate statistics are not available but the Oceans Beyond Piracy estimated the cost of the piracy to international shipping at USD 10 billion per year in eight years from 2005 (OBP, 2014).

Apart from piracy, the sub-region has been beleaguered by regional insecurity resulting from the Somali, South Sudanese and the Great Lakes' conflicts. These have not only impacted on political and regional security, especially on the Kenyan-Somali border, but have extended to transit corridors and consequently, access to the sub-region's sea routes and international trade. Guidelines to deal with this include the International Maritime Organisation's International Ship and Port Facility Security Code (ISPS Code), a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. Pirates and their sponsors, as

well as fundamentalist movements, have not only caused havoc in the sub-region but have also developed as a threat to oil and gas platforms in the coastal states' EEZ. Somalia and Kenya have borne the brunt of this resulting from Al Shabaab-related bombings in Mogadishu, Mombasa, Malindi and Nairobi and, to limited extent, Uganda (bombings in Kampala) and Tanzania (bombings in Dar es Salaam). There have also been attempted assaults on off-shore oil and gas platforms. With virtually no naval defence capabilities, the sub-region's countries have had to rely heavily on foreign forces and the international community to handle arrests, prosecution, imprisonment and/or repatriation of convicted pirates. This is a real set back to a sub-region that experienced independence and a military-free WIO.

5.8. Key Regional Maritime Institutions and Training Facilities

The sub-region boasts many maritime organisations and institutions. The Port Management Association of Eastern and Southern Africa (PMAESA) is a regional organisation that seeks to promote and support best practices among member ports by facilitating capacity building and the exchange of information. To aid efficient maritime transport and safety, and in line with IMO requirements, most of the sub-region's countries have established viable national maritime administrations, either within ministries of transport or as independent maritime authorities. Established under respective merchant shipping legislations, these IMO-sponsored agencies regulate shipping and assist with the prevention of marine pollution. However, they are restricted to maritime safety, rather than the active economic and commercial promotion of maritime transport and, therefore, the Blue Economy.

The principal shipping organisation in the sub-region is the Intergovernmental Standing Committee on Shipping (ISCOS) that determines shipping policy. The African Union's *2050 AIM Strategy* and the African Maritime Transport Charter, if properly employed, have the capacity to transform Africa's ports and shipping for the development of the region.

The main political and economic organisation is the East African Community (EAC), whose Treaty Articles 95-105 are dedicated to maritime transport. Half of the region's countries are EAC members. Training facilities are vital for the operation of viable and safe maritime transport and for the prevention of marine pollution. To that end, the sub-region has trained over 150 high-level maritime administrators at the IMO-World Maritime University (WMU), maritime lawyers at the IMO International Maritime Law Institute (IMLI), and security and environmental personnel at International Maritime Safety, Security and Environmental Academy (IMSSEA). IMLI/WMU graduates now occupy important positions in the sub-region's state and private maritime sector and representations overseas. Some limited training of seamen also takes place overseas. Others have received technical training in South Africa. National and regional training institutions for seafarers include Bandari College (Mombasa) and the Dar es Salaam Maritime Training Institute (DMIT).

5.9. Conclusions and Recommendations

The role and requirements of the sub-region's maritime transport and international trade are appreciable only in the context of transit access to seaports and sea-routes. The sub-region's coastline, ports and ocean are strategically placed on the key international trade and sea routes of the WIO maritime highway. With the discovery of oil and gas, and its abundant agricultural and mineral resources, the sub-region is well-placed for economic and social transformation. Its road and railway systems and infrastructure, while rudimentary, have the merit of being already in place and only need investments, regional co-operation and structural integration to be developed. Investments in pipelines would reduce transport costs, port congestion and improve safety, while the reduction in surface traffic would benefit the environment. The development of newer, bigger and modernised ports in Lamu and Bagamoyo will greatly aid the sub-region's maritime transport and international trade by reducing congestion and delays at Mombasa and Dar es Salaam ports.

The Blue Economy approach in Eastern Africa promotes port development and maritime shipping that is socially inclusive and provides jobs and builds capacity among local people. The successful port developments in Madagascar can be taken as an example. At the same time, new Blue Economy initiatives should ensure environmental sustainability and avoid conflicts through inclusive approaches. Regional harmonisation and combating piracy in the region will continue to be crucial to ensure improved shipping and port services-sector development.

The sub-region has been plagued by piracy, maritime terrorism, regional political instability and insecurity that have adversely affected its shipping and trade and consequent ability to harness the benefits of the Blue Economy. The low levels of vessel ownership in the sub-region limit its countries' capacity to benefit to any great degree from the potential boom in regional trade arising from the discovery of oil and gas, as well as ancillary services. The delays in the sub-region's main ports need to be remedied and the costs of the sub-region's international maritime trade kept down. The suboptimal state of inland ports and inland waterways limits the extent to which the benefits of the Blue Economy can be realised.

In view of these and other challenges discussed in this chapter, the following recommendations and observations emerge:

- The eradication of piracy through continued regional and international collaboration with improvement in regional security will relieve pressure on maritime transport, trade, tourism and fisheries for economic development;
- Import and export costs, as well as environmental damage, can be reduced by accelerating investment in and implementation of alternative forms of transport to road and rail;
- More political and economic integration and collaboration with the Southern Africa sub-region, in accordance with the objectives of the *Revised African Maritime Transport* Charter 2010, offer a greater space to leverage Blue Economy opportunities;

- The strengthening of maritime administrations, training of seamen and onshore administrators, together with the promotion of the study of maritime subjects and technology in African colleges and universities, will contribute to capacity building and efficiency in the maritime sector;
- National legislation to ratify and implement maritime transport conventions is a priority;
- The improvement and integration of road and rail intermodal transport and the revival of the Trans-Africa Highway (TAH), and the former East African Harbours and Railways Corporation (EAH&RC), could help to reduce cost, waste and pollution damage;
- Accelerated implementation of the proposed standard gauge railway along the Northern Corridor to Uganda, South Sudan and the Great Lakes, and the introduction of through trains would reduce costs and benefit the environment;
- Harmonisation of maritime transport, transit and customs clearances at border crossings, would minimise port congestion, improve efficiency and speed up container turn around;
- Encouragement of foreign investment and private-sector participation in the transit, ports, roads, rail, pipelines and shipping sectors to improve the quality of infrastructure;
- Mechanisation of the sub-region's major sea and inland ports, inland waterways and the development of inland container depots at border crossings will increase cargo-handling efficiency, reduce costs and, especially, container turn-around;
- Increased participation in international maritime-transport and maritime services will assist in the promotion of intra-regional and cross-regional trade;
- Co-ordination with the ship-owning countries, such as Ethiopia and South Africa, could result in developing indigenous national fleets to carry expected boom in trade in accordance with Article 2(4) the *UN Code of Conduct for Liner Conferences 1974* and Articles 5-15 of the *UN Convention on Conditions for Registration of Ships 1986* that provide for developing-country participation in international shipping;
- Collaboration, information sharing and co-operation with the adjacent Southern African sub-region's institutions will lead to learning from their experience and taking advantage of their developed maritime transport policies;
- Promotion of national and regional Shippers' Councils and Freight Forwarders Associations would improve technical and cargo-handling skills;
- Ensuring all new port and shipping developments are socially inclusive (e.g. by means of capacity building activities and job creation at the local level) and environmentally sustainable will align with Blue Economy principles;
- Coastal States should be encouraged to develop national maritime business plans as well as national and regional maritime security strategies;
- Maritime transport would be facilitated by removing trade barriers and reviewing national maritime and criminal legislation and its implementation;
- Inland waterways (including navigable rivers) should be integrated into national transportation plans;
- More investment needs to be attracted into African maritime transport and infrastructures.

References

AfDB. (2010). *African Development Report 2010: Ports, logistics and trade in Africa*. Oxford University Press

AfDB. (2015). *Seychelles Country Strategy Paper 2011-2015*

AfDB, AU & ECA. (2014). *African Statistical Yearbook 2014*. AfDB, AU & ECA

AfDB, OECD & UNDP. (2014). *African Economic Outlook 2014*

Agutamba, K. (2014, December 24). 2015: The test that awaits Northern Corridor projects. *The New Times*

APP. (2014). *Grain Fish Money*. APP

Briceno-Garmendia, C., & Shkaratan, M. (2011). *Kenya's Infrastructure: A Continental Perspective*. World Bank

Business Daily. (2013, June 20). Business Daily: Somalia bets big on port and airport to resurrect war-wrecked economy. *Hiiran Online*

CIA. (2014). *CIA World Factbook*. Retrieved October 8, 2014, from CIA: https://www.cia.gov/library/publications/the-world-factbook

EIU. (2014). *Economist Intelligence Unit - Country Reports (multiple)*. The Economist

Government of Ethiopia. (2014, October 14). *Ethiopia: The Ethiopian Railway Corporation Says the Ethio-Djibouti Railway Project Is Making Good Progress*. Retrieved January 29, 2015, from AllAfrica: http://allafrica.com/stories/201410100298.html

Guardian Reporter. (2013, September 16). Government: We're improving the business environment. *IPP Media.com*

Hategeka, E. (2014, October 10). Start small but think big - Supporting SMEs to grow and export (Part II). *The New Times* - Print Version

IFC. (2013). *Public-private partnership impact stories - Madagascar: Port of Toamasina*. IFC

IMF. (2014). *Sub-saharan Regional Economic Outlook April*. IMF

IMF. (2014a). *Primary Commodity Prices*. Retrieved December 2014, from http://www.imf.org/external/np/res/commod/index.aspx

IMF. (2015). *Commodity Market Monthly* - January 2015. IMF

Martins, P. (Forthcoming). *Structural Change in Ethiopia*: An Update

Meriton-Jean, S., & Amla, H. (2014, November 3). From dried fish to a booming business - Seychellois entrepreneur says fish is the future. *Seychelles News Agency*

MHD. (2012, November 6). The importance of Kismayo. *Somalia Report*

Mwangi, G. (2014, August 3). Chinese firm signs $478.9 million Kenya Lamu Port Deal. *The Wall Street Journal - Frontiers*

Ng'wanakilala, F. (2014, October 27). Tanzania says construction of China-funded port to start in 2015. *Reuters*

PWC. (2013). *Africa gearing up*

Shkaratan, M. (2012). *Tanzania's Infrastructure - A Continental Perspective, World Bank Policy Research Working Paper*. Washington DC: World Bank

SID. (2013). *The State of East Africa 2013*. Nairobi: SID Regional Office for Eastern Africa

Stiglitz, J., & Rashid, H. (2013, June 26). Sub-Saharan Africa's Eurobond borrowing Spree gathers pace - Why are an increasing number of developing countries resorting to expensive sovereign-bond issues? *The Guardian Business - Project Syndicate Economists*

Thiong'o, P., Kamau, S., Asiimwe, D., & Esiara, K. (2013, May 11). With $11bn Bagamoyo port, Tanzania prepares to take on EA hub Mombasa. *The East African*

Tran, M. (2012, July 27). Berbera port and pastoralism prove livestock's worth in Somaliland. *The Guardian UK*

UNCTAD. (2014). *UNCTAD Stat.* Retrieved January 2015, from UNCTAD: http://unctadstat.unctad.org/

World Bank. (2010). *Union of the Comoros Joint IDA-IMF Staff Advisory Note on the Poverty Reduction and Growth Strategy Paper*

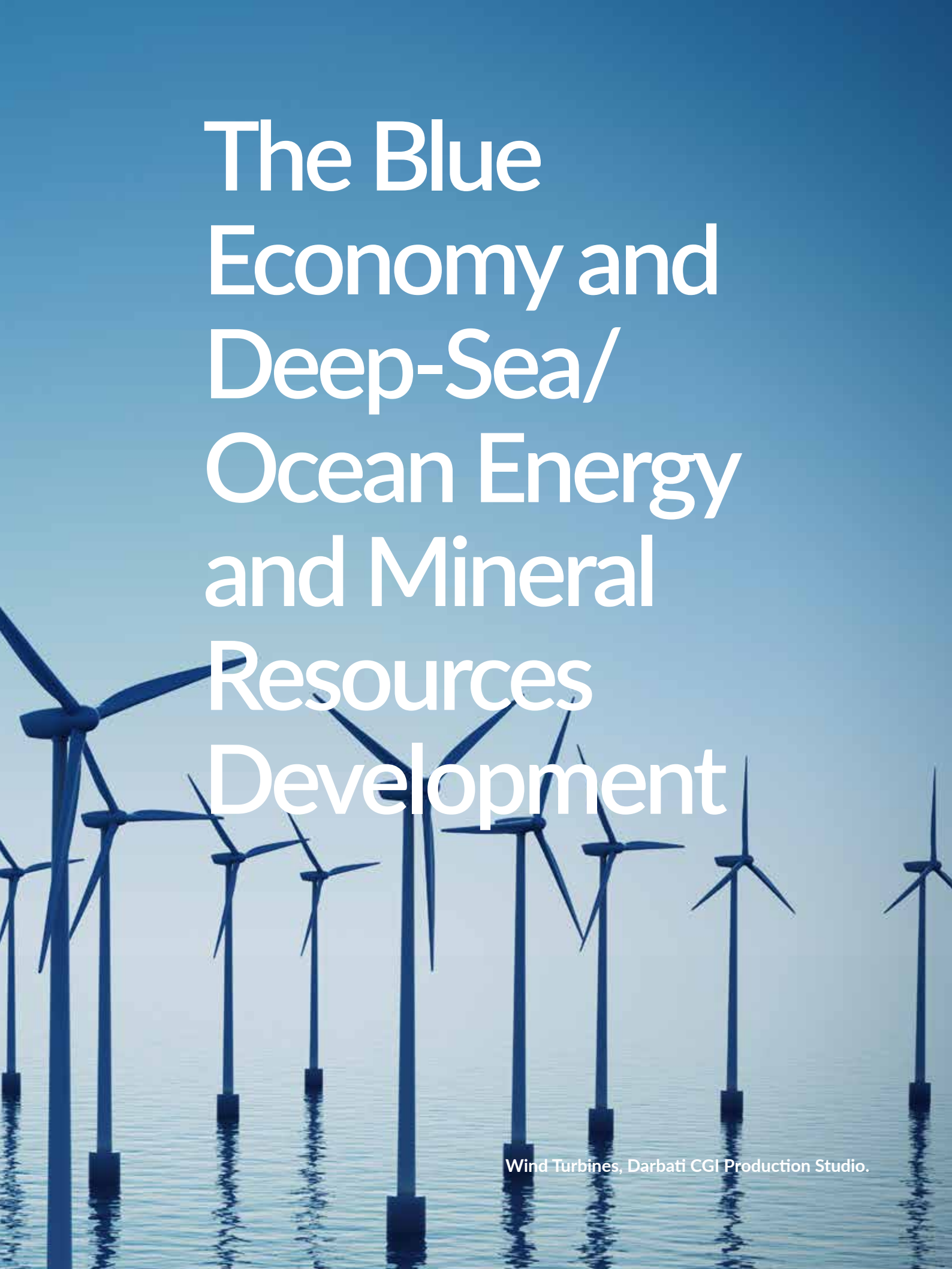
World Bank. (2013a). *Transport and logistics in Djibouti: contribution to job creation and economic diversification.* World Bank

World Bank. (2013b). *Tanzania Economic Update Opening the Gates - How the port of Dar es Salaam can transform Tanzania.* Washington: WB

World Bank. (2014). *International Development Association and International Finance Corporation Country Partnership Strategy for the Union of Comoros for the period FY14 - FY17*

World Bank. (2014a). *GEM Commodities.* Retrieved December 2014, from http://data.worldbank.org/data-catalog/commodity-price-data

The Blue Economy and Deep-Sea/ Ocean Energy and Mineral Resources Development

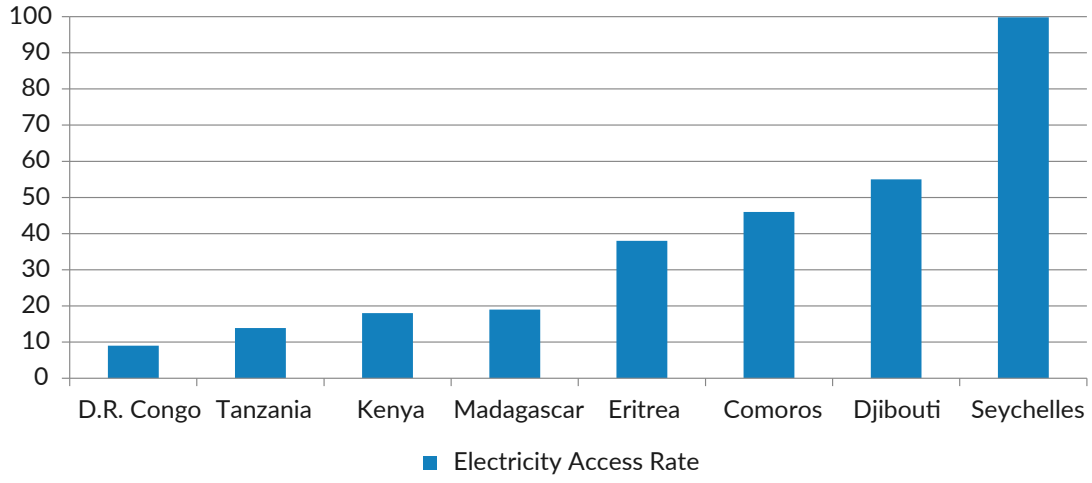


Wind Turbines, Darbati CGI Production Studio.

6.1. Introduction

In the coastal and island States of Eastern Africa (Comoros, Djibouti, the Democratic Republic of Congo (DRC), Eritrea, Kenya, Madagascar, Seychelles, Somalia and Tanzania), the demand for energy is growing rapidly. The level of energy access (the proportion of the population able to obtain energy from the national grid) in these countries is limited, from below 20% in the DRC, Kenya, Madagascar and Tanzania, to 30-55% in Comoros, Djibouti and Eritrea (Figure 6.1). Satisfying rapid growth in energy demand and raising levels of access will need a strategy that includes exploiting traditional energy resources but also available and maturing technologies for extracting energy from deep-sea and ocean sources. While hydropower may be the most promising energy source in many areas in the Western Indian Ocean (WIO), its potential is reduced in coastal lowlands and islands (Hammer, et al. 2012). Therefore, access to renewable ocean energy (offshore wind, wave power, tidal power, ocean current power, ocean thermal energy conversion (OTEC), oceanic bioconversion, and salinity gradient energy) needs to be developed where feasible and appropriate.

FIGURE 6.1 Electricity access in Coastal and Island States in Eastern Africa



Source: UNECA, 2014

The Blue Economy approach to development focuses on the opportunities that marine and deep sea-based natural resources offer to achieve economic transformation. Two of these resources are off-shore energy – both renewables and non-renewables – and commercial deposits of valuable minerals. Neither of these resources has been well explored nor developed in the coastal and island States of Eastern Africa. There is, thus, great potential for their contribution to economic and social development.

Maturing marine and deep-sea energy technologies are lowering energy costs from renewable marine resources that offer immense untapped potential for the future energy capacity and security of coastal and island States in the region. Exploration of offshore oil and gas resources is underway, and Tanzania has already started to tap its appreciable oceanic gas resources. Oil exploration from Eritrea to Madagascar has been on-going at different times, though no commercially significant and large-scale

development has yet materialised. The degree of investor interest in the waters around Eastern Africa suggests potential that could contribute to economic transformation based on hydrocarbons.

Deep-sea mineral exploitation globally may be in its infancy, but it represents robust potential for the future. Advances in mining technology in deep-sea environments, along with extensive mapping of the ocean and sea beds for precious metals and other mineral resources, could contribute to greater discovery and development of these resources.

Though the opportunities inherent in the Blue Economy for resource development are relatively obvious for coastal and island States, they are also of interest to land-locked countries in Eastern Africa. The discovery and development of oil and gas resources in the region can have significant energy-security benefits for the whole area if properly structured with the regional market in mind. Marine energy resources can be included in regional energy-development plans because they could contribute to energy capacity. Land-locked countries are also linked to coastal States through trade and participate in the development of infrastructure and port facilities (Chapter 5).

The assessment of opportunities and the outlining of policy recommendations for the development of ocean and deep-sea energy and mineral resources contribute to the increasingly important debate surrounding resource-based structural transformation. This chapter, therefore, focuses on two Blue Economy relevant resources: offshore energy (renewable and non-renewable) and deep-sea mining. The opportunities and key constraints will be mapped, along with key recommendations to speed-up development of these resources to contribute to structural transformation.

6.2. Ocean and Deep Sea Energy Resources Development

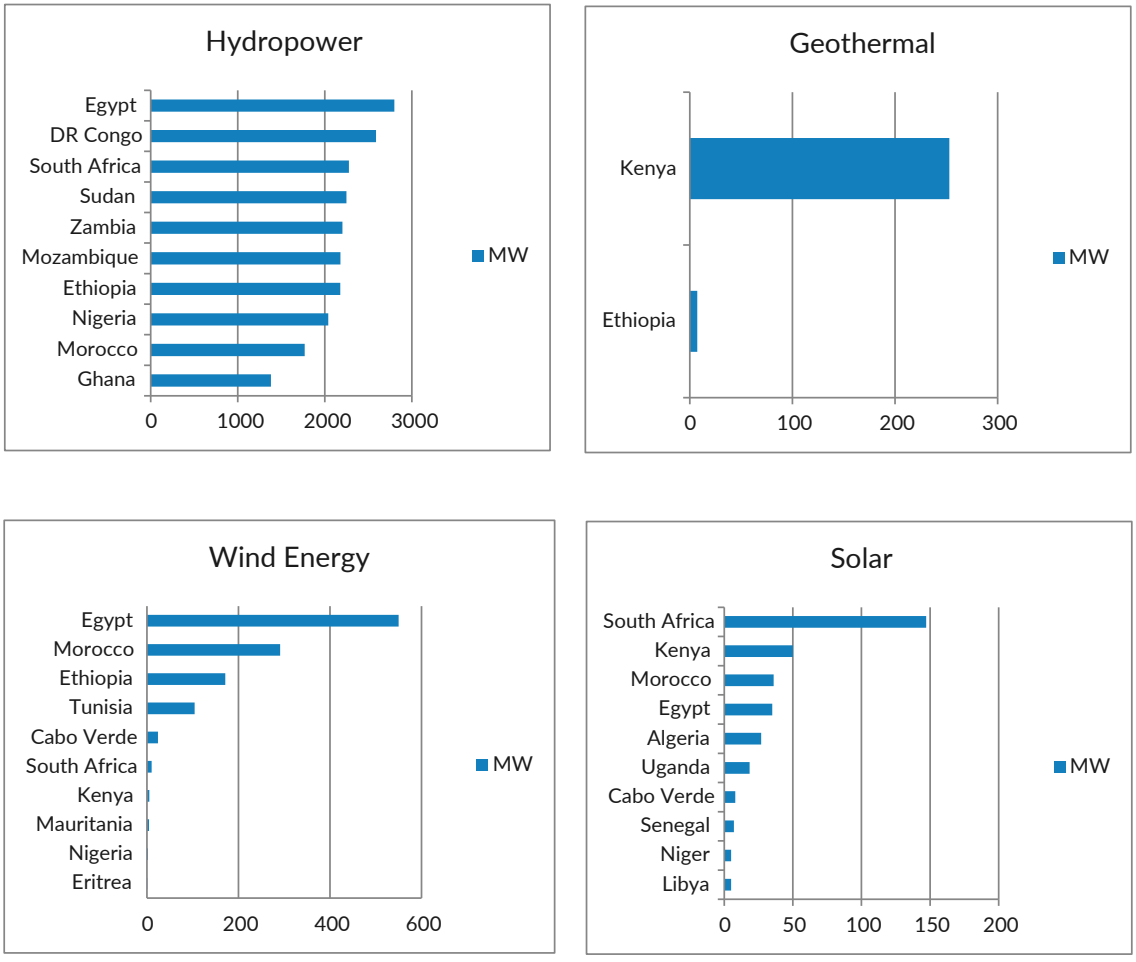
6.2.1. Renewable Ocean Energy

6.2.1.1. Renewable Energy Development and the Status of Ocean Energy in Eastern Africa

Eastern Africa is a region endowed with diverse renewable energy resources and over 75% of its electricity comes from renewable sources, particularly hydropower. In fact, in the DRC, Ethiopia and Burundi, hydropower accounts for almost all the power distributed through the national grid. Biomass, geothermal sources, solar and wind also play roles; some Eastern African states are in the top 10 African countries in terms of renewable-energy development (Figure 6.2). Ethiopia, Kenya and Eritrea are in this category for wind-power development. The African Development Bank (AfDB) has shown that the highest potential for the development of wind-driven electricity generation in Africa is found in the coastal regions of the continent: in the North (Algeria, Egypt, Morocco Tunisia and Mauritania), the East (Djibouti, Eritrea, Seychelles and Somalia), West (Cabo Verde) and South (South Africa and Lesotho). The DRC and Ethiopia

have the best resources for producing hydro power, while Kenya and Uganda show great potential for both solar power generation and geothermal capacity (AfDB 2014).

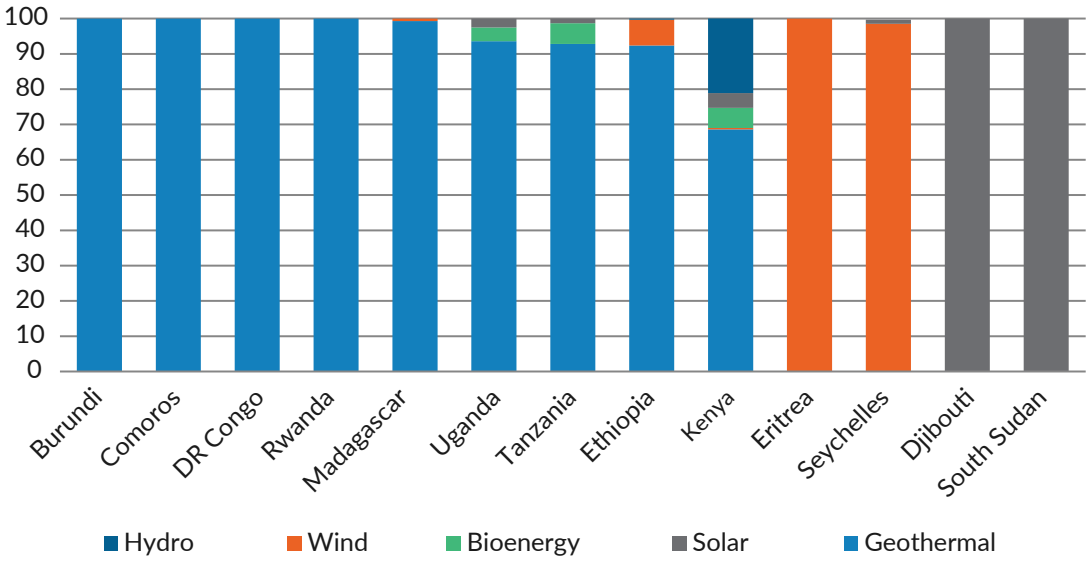
FIGURE 6.2 Leading African countries in terms of installed renewable energy capacity by source (2013)



Source: Based on renewable energy resources data from IRENA, 2014

In reality, however, and on closer inspection, with the exception of Kenya, most countries in Eastern Africa rely on a small range of technologies for power generation. Burundi, Comoros, the DRC, Rwanda, Madagascar, Uganda, Tanzania and Ethiopia rely almost exclusively on hydropower, with minimal integration of wind, solar and bio-energy in Uganda, Tanzania and Ethiopia. In Eritrea and Seychelles, wind energy is the main renewable energy source, while solar is the main renewable energy source for South Sudan. Kenya, besides hydropower, has strong geothermal integration, along with some solar, wind and bio-energy sources (Figure 6.3).

FIGURE 6.3 Distribution of sources in national Renewable Energy (RE) portfolios (2013)



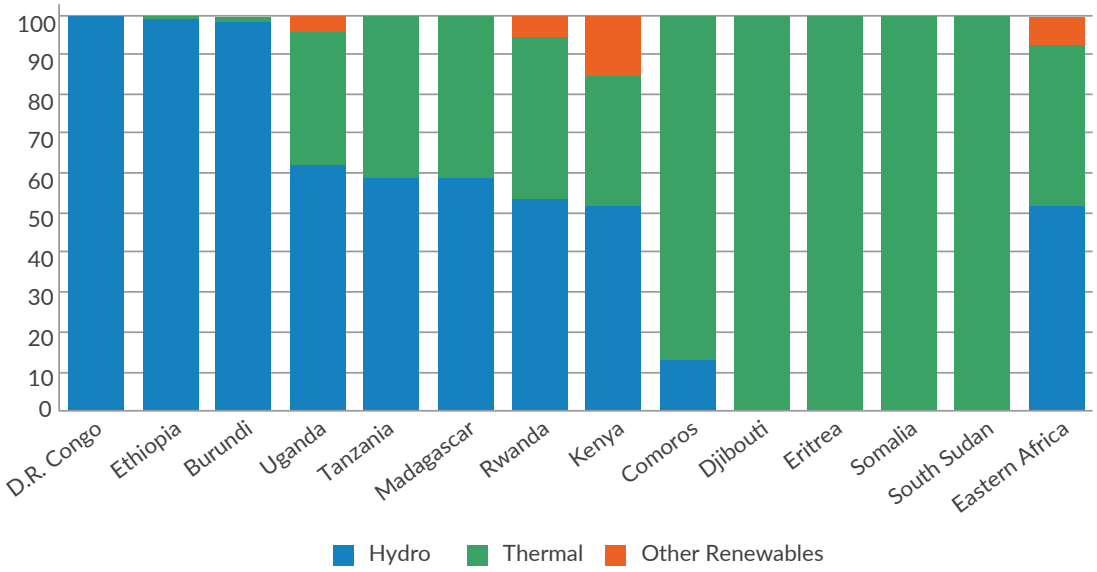
Source: Based on IRENA renewable energy capacity data, 2013. Data was not available on Somalia

BOX 6.1 Renewable energy commitments of SIDS

Some countries in the region showed their commitment to increasing their share of renewable energy at the 2012 Barbados conference on Achieving Sustainable Energy for All in Small Island Developing States. At this conference Mauritius committed to increasing the share of renewable energy – including solar power, wind energy, hydroelectric power, and biogas– to 35% or more by 2025; and Seychelles committed to produce 15% of energy from renewable sources by 2030.

Seychelles is taking steps the meet their target, by producing 2.2% of their energy from wind power. Mauritius is developing a renewable energy master plan focused on biogas; hydropower; solar power; wind power; and other technologies.

FIGURE 6.4 The share of renewable energy in national electricity generation (2010)



Source: UNECA, 2014; based on data from the US Energy Information Administration (EIA)

The coastal and island States - Comoros, Djibouti, the DRC, Eritrea, Kenya, Madagascar, Seychelles and Tanzania – are not currently exploiting their ocean and sea energy sources. Despite favourable assessments of ocean-energy potential for the Indian and Atlantic Ocean coasts, these energy resources – wave, tidal, tidal range, ocean current, salinity gradient, ocean thermal energy and offshore wind energy – are so far not within reach of these countries. The reasons include: the immaturity of existing ocean-energy technologies (Magagna and Uihlein, 2015); the unit cost of ocean energy compared to other forms; lack of detailed ocean-energy resource-potential mapping; lack or inadequate development of coastal energy infrastructures; limited awareness about the potential and state of development of ocean-energy technologies; and the seasonal nature of some of the resources.

There are, however, better prospects on the horizon. Global assessment of the potential of ocean energy indicates that, by 2050, 10% of global electricity production will come from ocean-energy sources (Esteban and Leary 2012). This should stimulate interest in the long-term potential of deep-sea and ocean energy. In addition, ocean-energy technologies are improving and being added to (Khan and Bhuyan, 2009), while interest in ocean energy on the back of technology advances is growing (Challaghan, 2006). Apart from ocean-energy development itself, opportunities based on it include irrigation, desalination and cooling (Wang, et al. 2011).

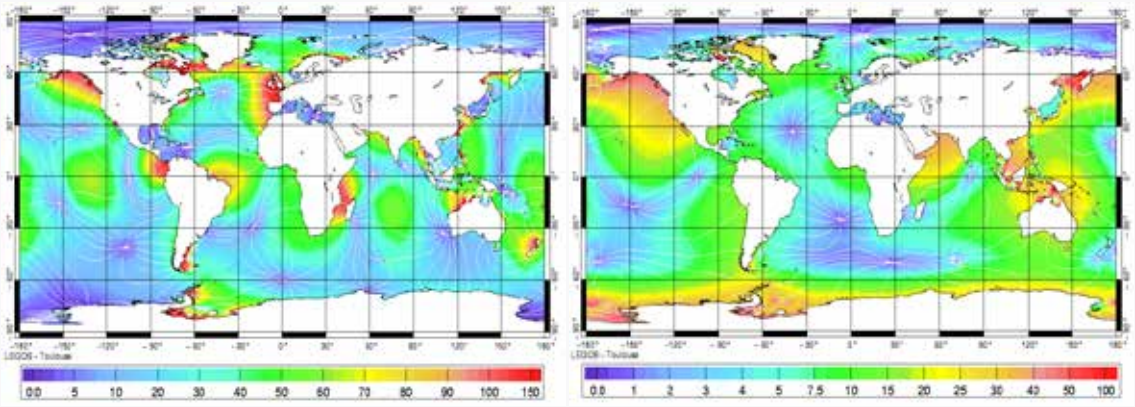
6.2.1.2. Ocean Renewable Energy Sources and their Potential in Coastal and Island States

The International Energy Agency (IEA) estimates that ocean renewable energy has sufficient power output potential to provide 100-400% of global current energy demand.

Tidal Range And Stream Energy

Tidal energy is released through tidal range and tidal streams. Solar and lunar gravitational forces generate tides, the intensity of which can be measured through tidal height changes, and the force of horizontal tidal currents. Figure 6.5 demonstrates that there is modest to high potential of tidal energy in Eastern Africa. The intensity of tidal currents increases when the colour in Figure 6.5 shifts from purple, to green to yellow and then red. The concentration of yellow to red ocean current areas from Kenya to Madagascar is an indication of current potential.

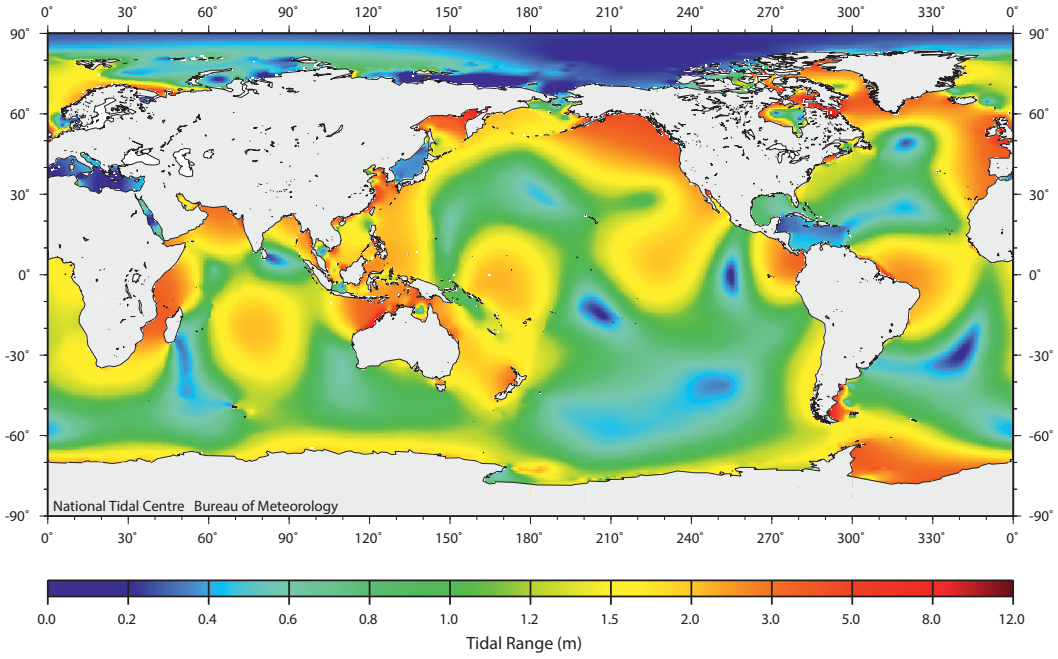
FIGURE 6.5 Tidal characteristics



Source: Amplitude of tidal constituents (in centimetres) derived from the FES99 model. Cotidal lines indicating phase every 30 degrees originate at amphidromic points where the tidal range is zero. (Credits Legos)

Assessments of the global energy output potential of tidal energy (Figure 6.6) reveal that the Indian Ocean coastal regions extending from Djibouti to Madagascar have high tidal energy potential. Tidal energy is the most mature form of ocean energy technologies (IRENA, 2014) and, therefore, offers the best resource characteristics-technology nexus for Indian Ocean coastal States. A tidal range of 5 metres and above is regarded as economically viable for tidal barrages (Hammons 1993), while lower ranges can also have feasible applications (Khan, et al. 2009). For tidal current, a speed of 2-2.5 meters per second is regarded as economically feasible (Khan and Bhuyan, 2009). Figure 6.7 shows a tidal station in South Korea.

FIGURE 6.6 Global tidal energy resource potential



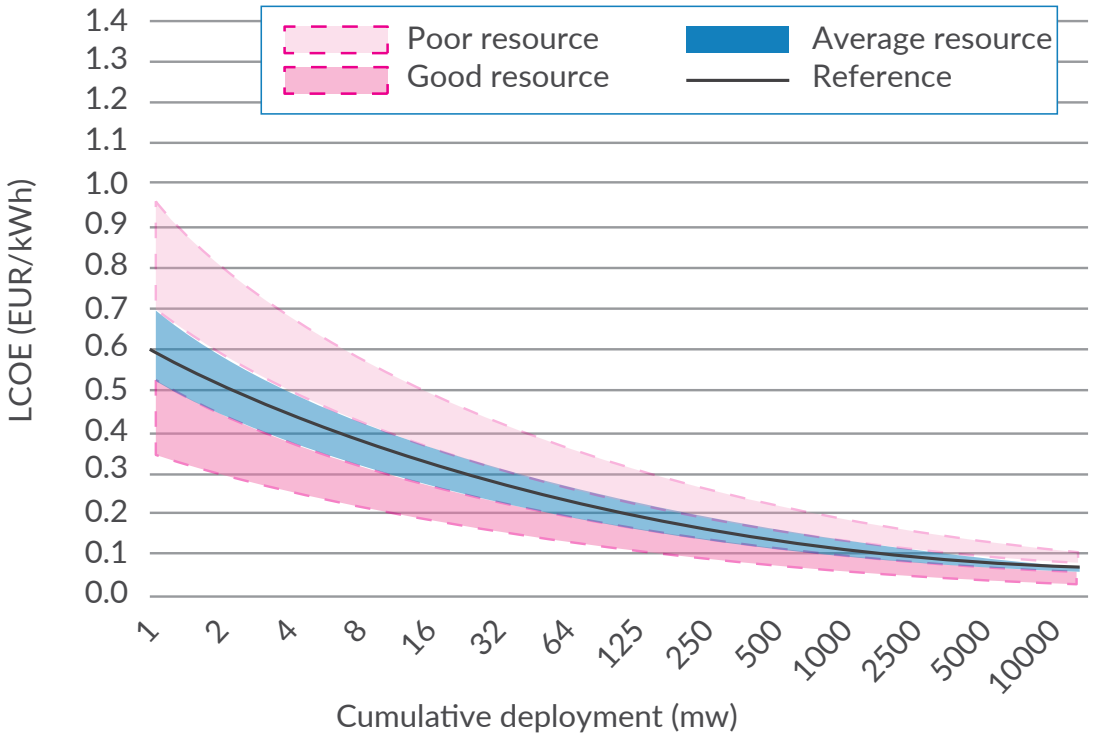
Source: Ocean Energy: Technology Readiness, Patents, Deployment Status and Outlook. IRENA. 2014

FIGURE 6.7 Shiwa tidal station in South Korea

Source: http://pemsea.org

Tidal-wave energy technologies have diverse cost profiles, depending on the quality of the resource and the scale of its deployment. For average resource quality, Magagna and Uihlein (2015) estimate that costs can range between 0.50 - 0.70 Euros per kWh at the 1 Megawatt deployment level, to under 0.10 Euros/kWh for deployments of 10,000 MW, indicating significant economies of scale.

FIGURE 6.8: Economies of scale and cost profile for tidal wave resources

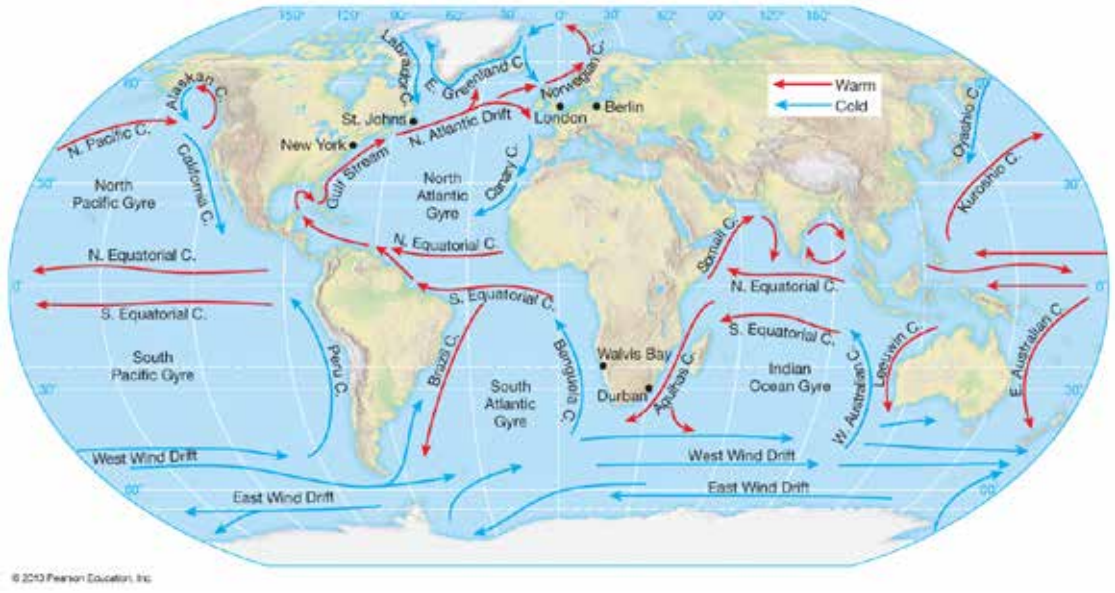


Source: D. Magagna and A. Uihlein. 2015

Ocean Currents

Ocean currents generate kinetic forces that can be transformed into useful energy through ocean-current conversion technologies. The state of the technology is not yet at maturity, and costs tend to be high. The Indian and Atlantic Ocean coasts are, however, part of major global ocean current systems, and offer resource potential when the technologies mature in efficiency, conversion capacity and cost competitiveness. Ocean current energy is consistent, and varies on seasonal bases; it often provides suitable potential at speed of 0.5 metre per second (Hammar, et al. 2012).

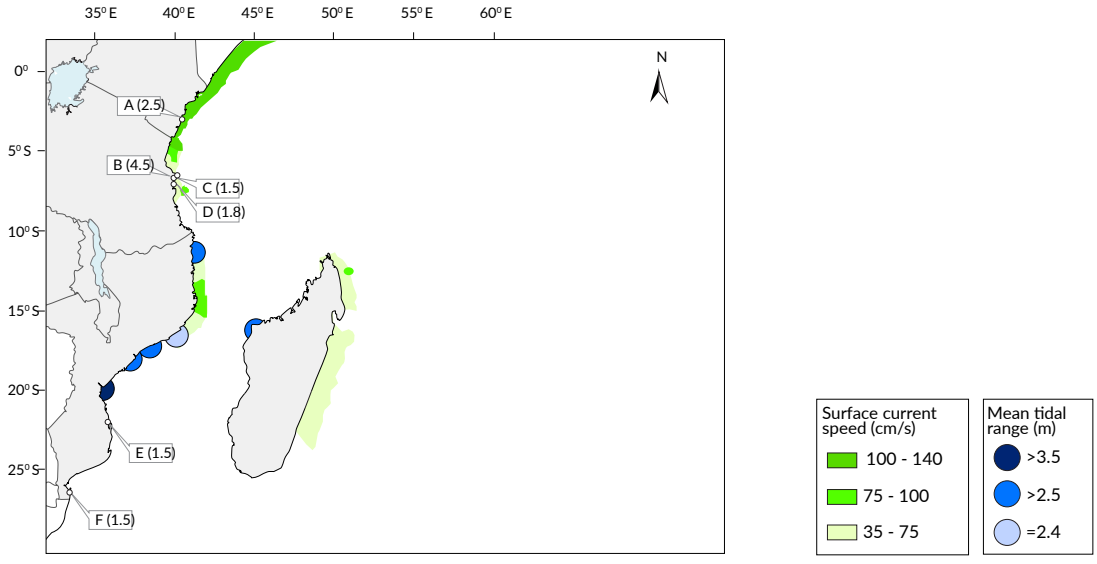
FIGURE 6.9 Global ocean currents



Source: www.geography.hunter.cuny.edu

Tidal and ocean current resources have high potential[1] in the Western Indian Ocean. Hammar, et al. (2012) demonstrate that tidal and ocean current energy has high potential in the coastal and island States of the Indian Ocean (Figure 6.10).

Figure 6.10 Tidal and ocean current energy potential in Western Indian Ocean



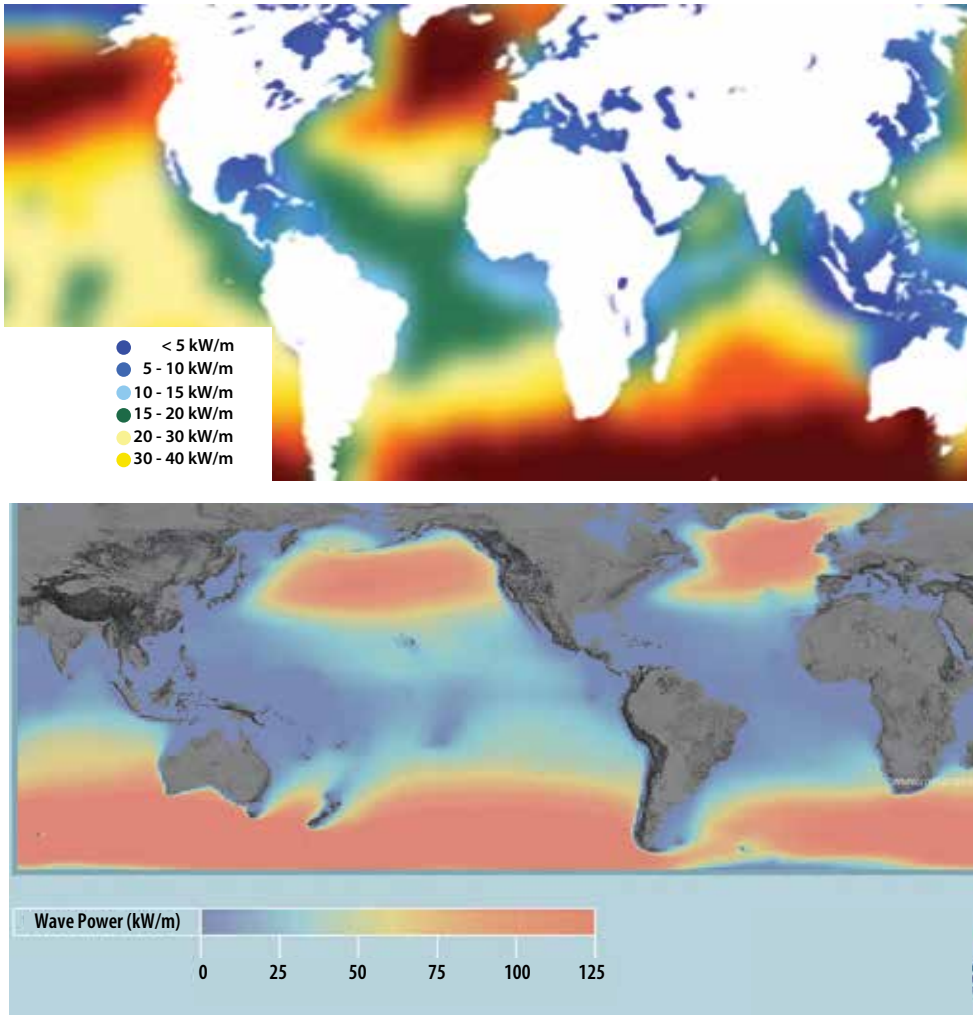
Source: Wave and OTEC energy assessment in the Western Indian Ocean, Hammar, et al. (2012)

[1] High potential refers to tidal range of at least 2.4 m and current speed of at least 1.5 ms-1

Wave Energy

Wind blowing over the ocean's surface creates waves with kinetic energy that can be leveraged for power generation through wave-energy converter technologies. Wave-energy resources are largely concentrated in latitudes between 30-60 degrees (IRENA, 2014). From the distribution of wave energy resources, the potential is greatest for Madagascar, Seychelles and Comoros, less so for other coastal countries, particularly in the Red Sea littoral. However, detailed resource mapping is required to determine the feasibility of wave energy in coastal and island States. Wave energy is more predictable and has a higher potential than wind energy (Charlier and Justus 1993). Small-scale applications, such as that developed by Euro Wave Energy in Cabo Verde, offer options that can work for remote communities and in niche applications; however, current technologies only harvest about one-fifth of the available resources (Hammar, et al. 2012), ideally under suitable conditions of 15-35 kW ms-1 (Angelis-Dimakis, et al. 2011).

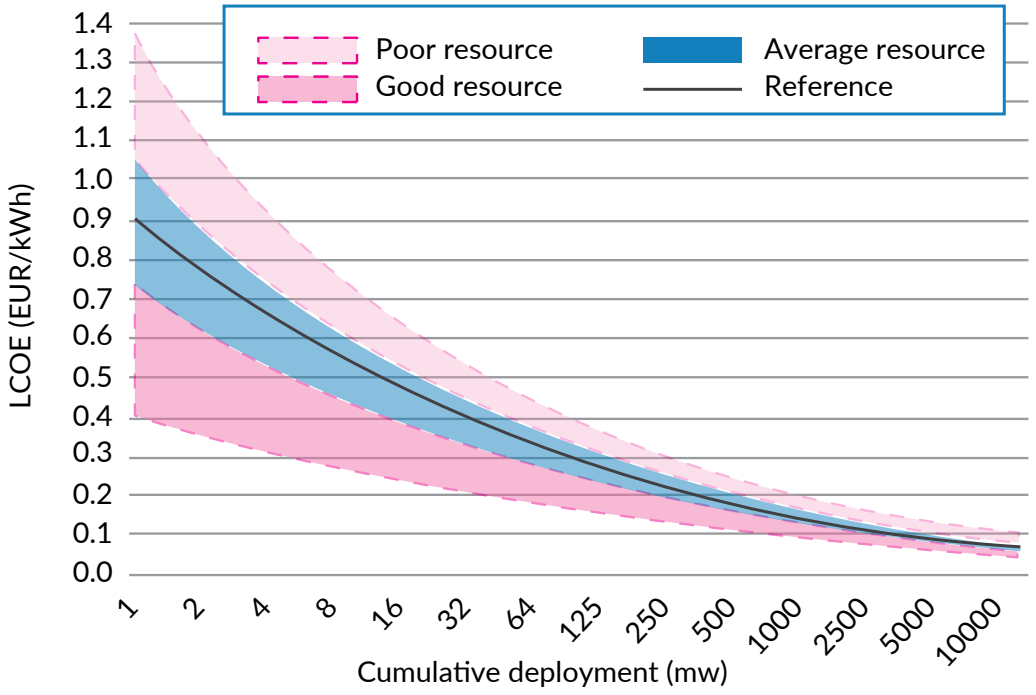
FIGURE 6.11 Global wave-energy resource potential



Sources: www.horvathresearch.com (panel 1) and IRENA (2014) (panel 2)

Wave-energy technologies also have significant economies of scale, depending on the quality of the resource and the scale of its deployment. For average resource quality, Magagna and Uihlein (2015) assess that costs can range between 0.70 - 1.05 Euros/kWh at the 1 MW deployment level to about 0.10 Euros/kWh for deployments of 10,000 MW. High-class resource-quality locations have significantly lower costs, especially at lower deployment levels.

FIGURE 6.12 Economies of scale and cost profile for wave energy resources



Source: D. Magagna and A. Uihlein. 2015. 2014 JRC Ocean Energy Status Report: technology, market and economic aspects of ocean energy in Europe. European Commission

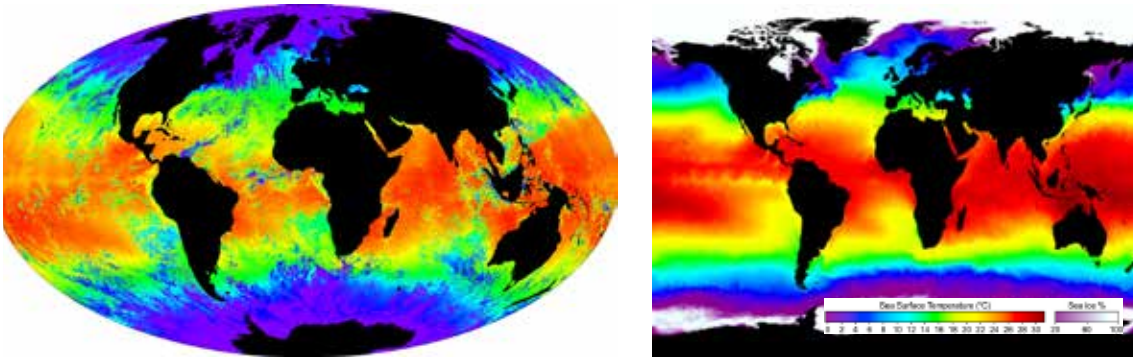
The Mauritius Research Council estimates that some 37.5 MW of energy output could be obtained using Pelamis wave technology, which is about 90% of power requirements for the south of the country (MRC 2012). Similar assessments, using appropriate technologies are required for energy planners to evaluate wave-energy potential in different areas.

Ocean Thermal Energy

The surface of the ocean retains heat, or thermal energy. With ocean depth, the temperature drops. This temperature difference is what ocean thermal energy technologies attempt to harness. The distribution of thermal ocean energy in Figure 6.13 suggests that the Indian Ocean coastal and island States, the Red Sea coastal States, as well as the DRC on the Atlantic Ocean coast have among the most suitable thermal ocean energy resources. The state of the technology, however, needs time to mature. Ocean thermal energy is generally suitable for the tropics where adequate

temperature change exists. Commercial-scale plants have 10-100 MW capacity; while suitable conditions require temperature range of 20 0C and above (Hammar, et al. 2012). Environmental impacts from climate change affecting the temperature of these waters will also warrant careful consideration.

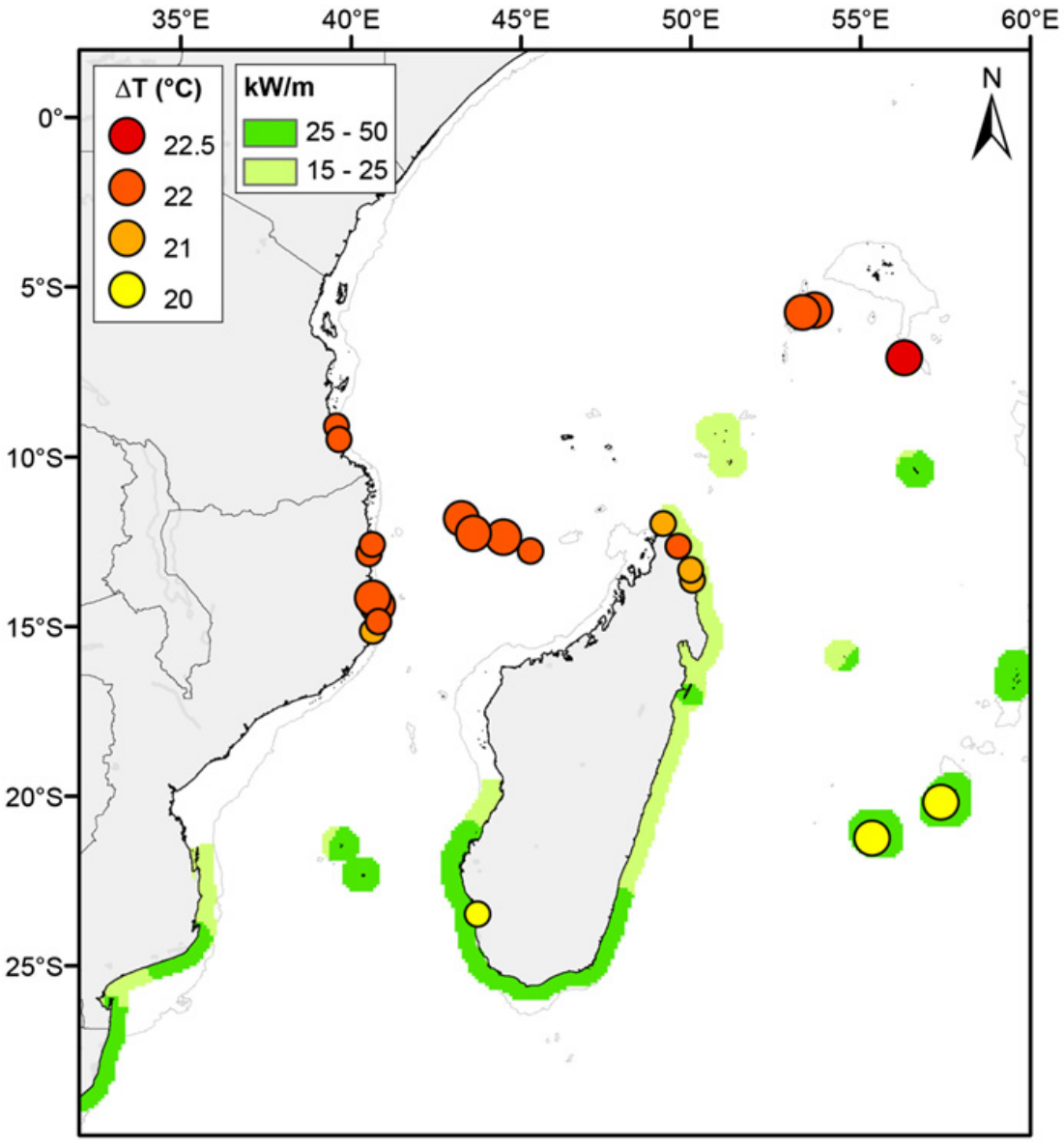
FIGURE 6.13 Global ocean thermal energy potential



Source: http://www.explainthatstuff.com/how-otec-works.html (panel 1); www.euroargo-edu.org (panel 2)

Assessment of wave and ocean thermal energy potential by Hammar, et al. (2012) indicates that there are areas along the coast of Tanzania and around the island States (Figure 6.14) with high potential for this type of energy generation. One of the earliest studies of thermal energy in Eastern Africa, UNECA (1985), found that off coastal Kenya, Madagascar, Somalia and Tanzania, between the depths of 0-1,000m, temperature variations were 20-21, 18-21, 18-20 and 20-22 degrees Celsius, respectively, suggesting viable temperature variation profiles. UNECA (1985) further finds that such technology offers numerous advantages, including continuous heat generation; desalination and fresh water supply opportunities; and air conditioning applications. However, the impact of climate change on ocean temperature since 1985 may result in different ocean-thermal resource potential characteristics.

FIGURE 6.14 Wave and OTEC energy potential in the Western Indian Ocean

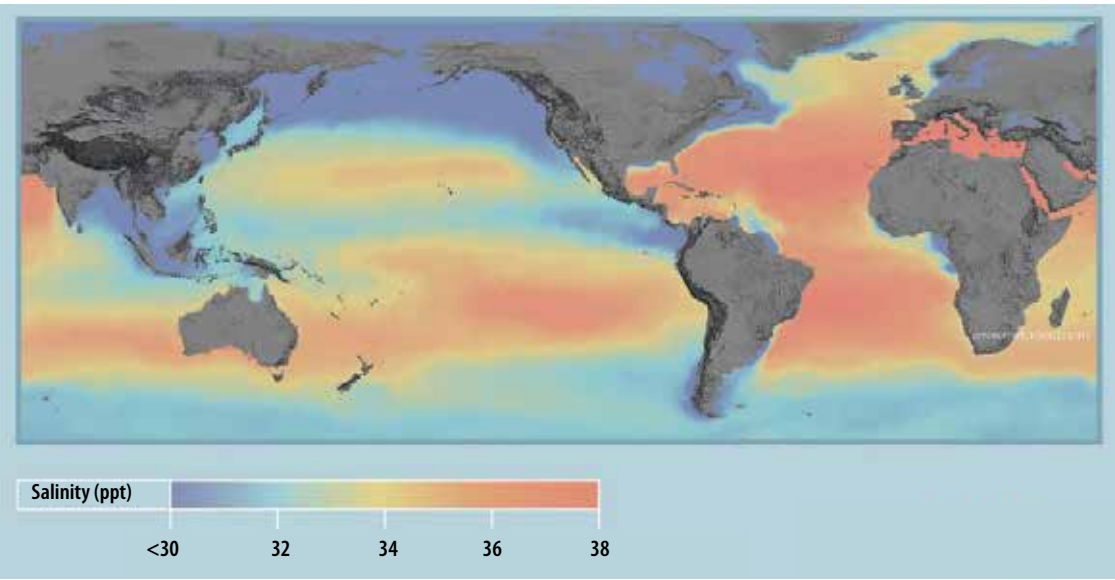


Source: Wave and OTEC energy assessment in the Western Indian Ocean, Hammar, et al. (2012)

Salinity Gradients

The interaction of fresh water with saline seawater through a porous membrane releases energy by the process of osmosis. The relationship between the concentrations of salt in the relative samples produces the salinity gradient, which can be used to calculate the potential amount of useful energy that can be produced. The Red Sea has among the highest saline waters globally, and as Figure 6.15, shows, has among the potentially highest salinity gradients. Such potential is also moderately-to-favourably concentrated in the Indian and Atlantic Oceans. As with other ocean-energy resources, development of this potential is dependent on the state and maturity of the technology.

FIGURE 6.15 Global salinity gradient potential

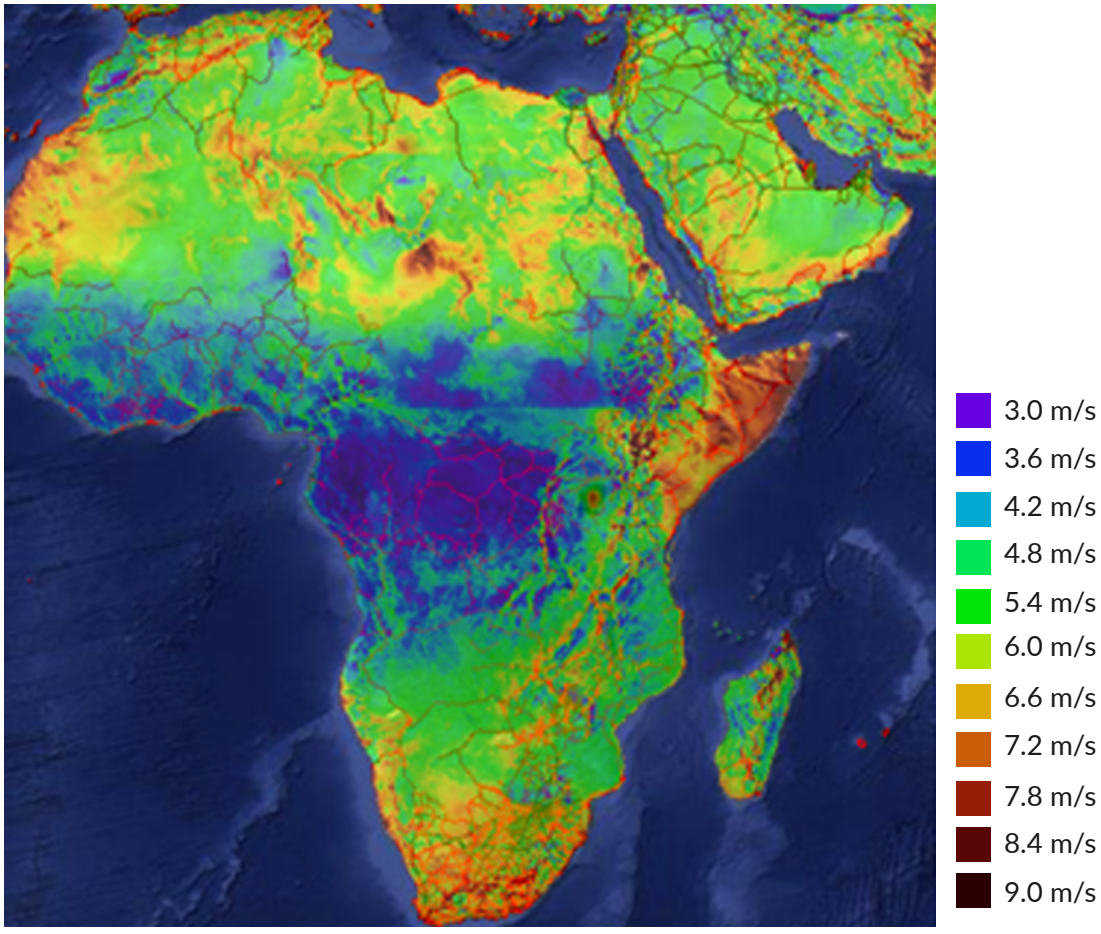


Source: Ocean Energy: Technology Readiness, Patents, Deployment Status and Outlook. IRENA. 2014

Offshore Wind

Offshore wind represents one of the great potential energy sources for coastal and island States in Eastern Africa, particularly in the context of technology that is among the most advanced of application to ocean-energy sources. Todd, Chen and Clogston (2013) indicated that offshore wind costs range between USD 0.13 - 0.159/kWh, making it competitive in the class of ocean-energy technologies. The wind energy atlas of Africa (Figure 6.16) shows significant potential in corridors, including the Horn of Africa. While limited offshore wind energy assessment is conducted in the region, similarly high potential can be expected for coastal and island States.

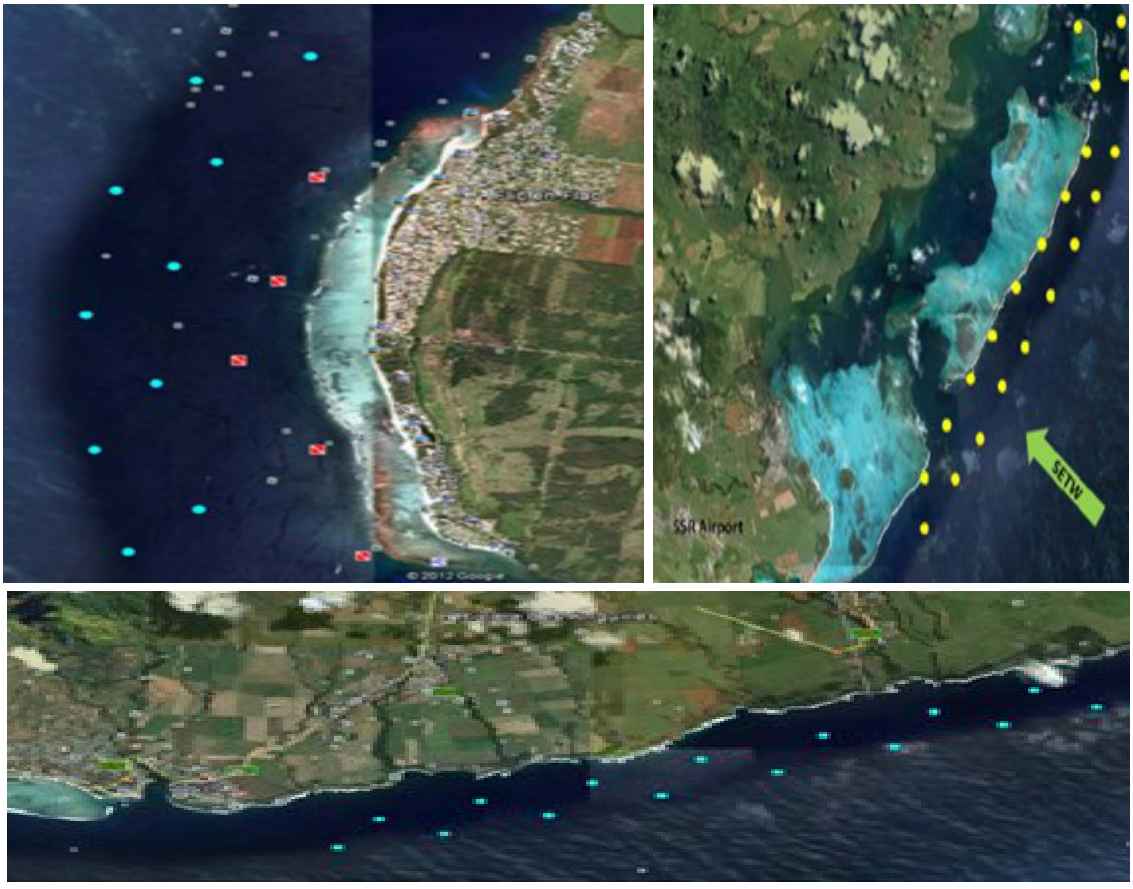
FIGURE 6.16 Wind energy potential atlas of Africa



Source: IRENA global atlas for renewable energy

The Mauritius Research Council (2012), calculated offshore wind potential at 30% of power needs for Black River, 71% for East of Mauritius and 32% for the South of the country. The Council further estimated that by 2020 ocean-based energy could be supplying 80% of the country's power requirements. Similar analysis will be useful in all coastal and island States to enable energy planners to anticipate and integrate viable offshore wind corridors as part of national energy-development strategies.

FIGURE 6.17 Simulation sites for offshore wind potential assessment of Mauritius



Source: Mauritius Research Council, 2012. Marine Based Renewable Energy for Small Island States - the Case of Mauritius

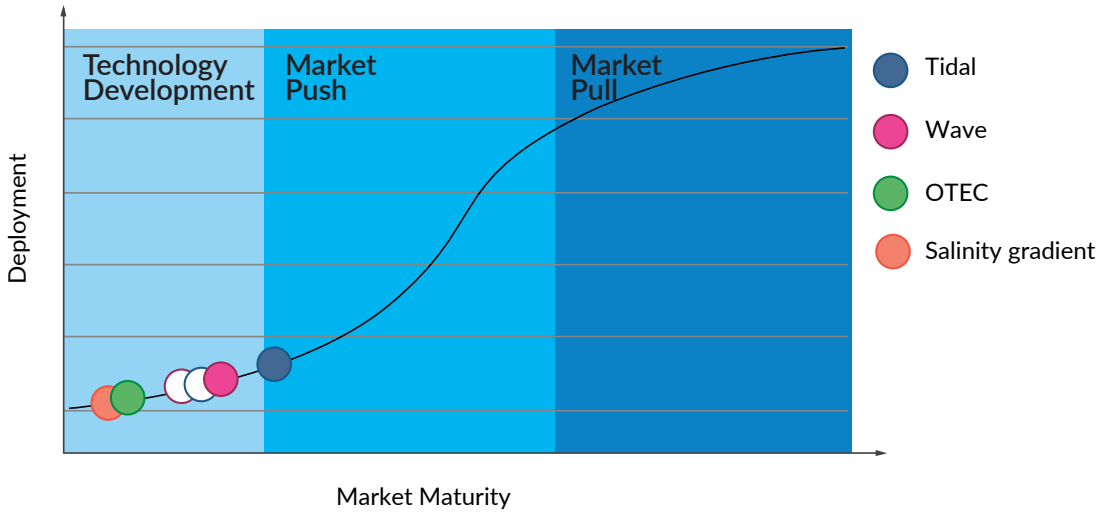
Barriers to Ocean Renewable Energy Development and Policy Opportunities

The potential of various forms of ocean-based renewable energy in the region is significant, but none of these resources is developed in the region. This is because of:

- limited ocean-energy resource mapping and potential power-output assessment;
- the infancy stage of most ocean-energy technologies (although there is much progress in wave and tidal energy technologies);
- current high costs of energy from ocean-energy technologies;
- limited awareness about ocean energy and the potential for commercial viability; and
- limited experience with ocean-energy development in the region.

From a technology point of view, ocean-energy technologies are largely at the development stage (see Figure 6.18), although some are entering the market-push stage where they are actively seeking investors and expansion.

FIGURE 6.18 Stage of development of ocean energy technologies



Source: Magagna, D. and A. Uihlein, 2015

Despite the constraints, policy opportunities can be devised to make better use of ocean-energy resources potential including:

- linking the development of ocean energy with high-value marine economic activities, such as mining and fish and processing and packaging;
- conducting ocean-energy resource-potential assessment and the development of ocean-energy integration into strategic planning;
- improving awareness about the maturity of ocean-energy technologies and scaling up knowledge sharing across coastal and island Eastern African states;
- providing incentives schemes, such as preferential tariffs, to encourage ocean-energy development; and
- promoting private and private-public initiatives in ocean-energy development investment.

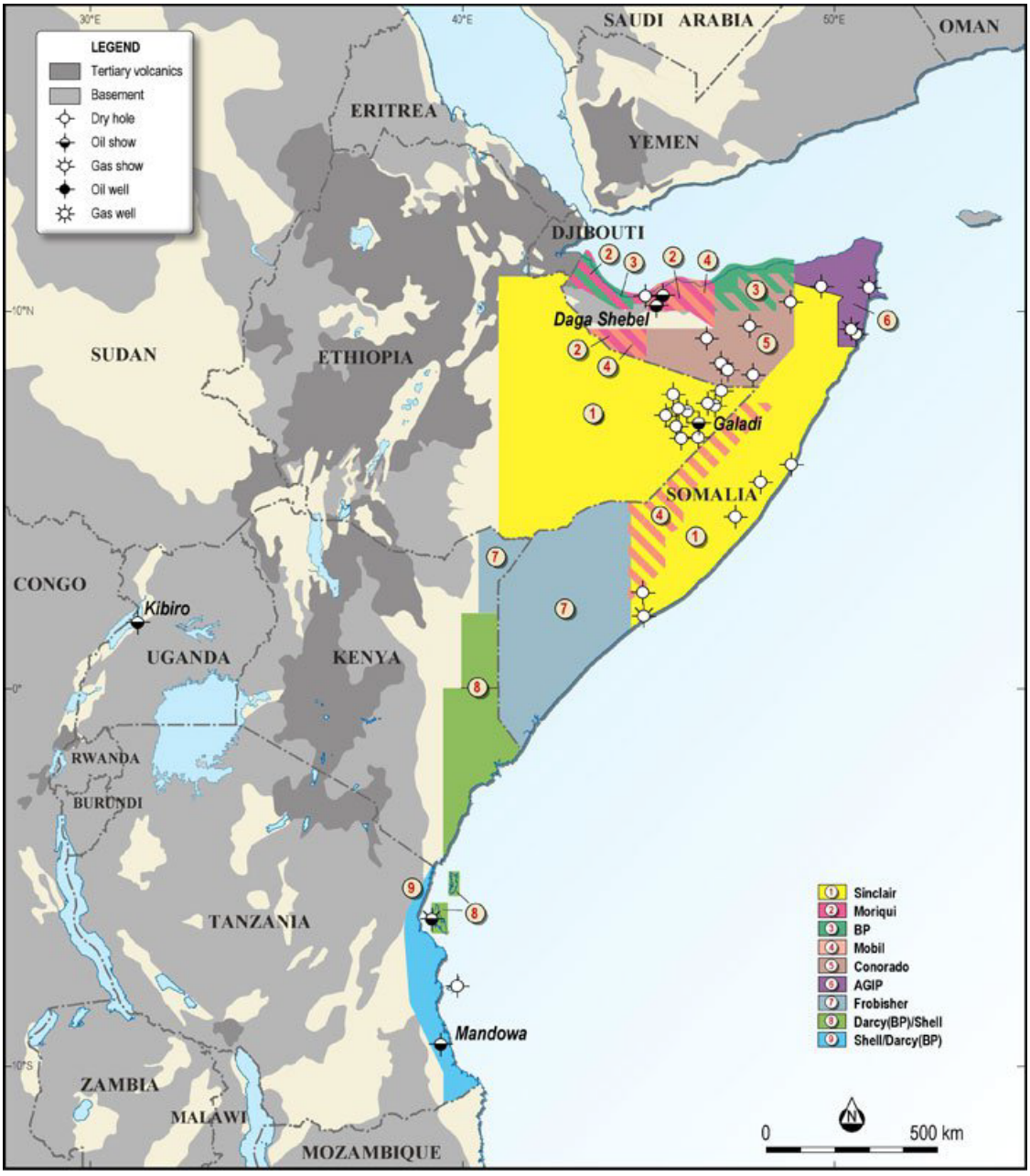
6.2.2. Non-renewable Ocean Energy Resources - Offshore Oil and Gas

6.2.2.1. Offshore Oil and Gas Resources and Development Status in Eastern Africa

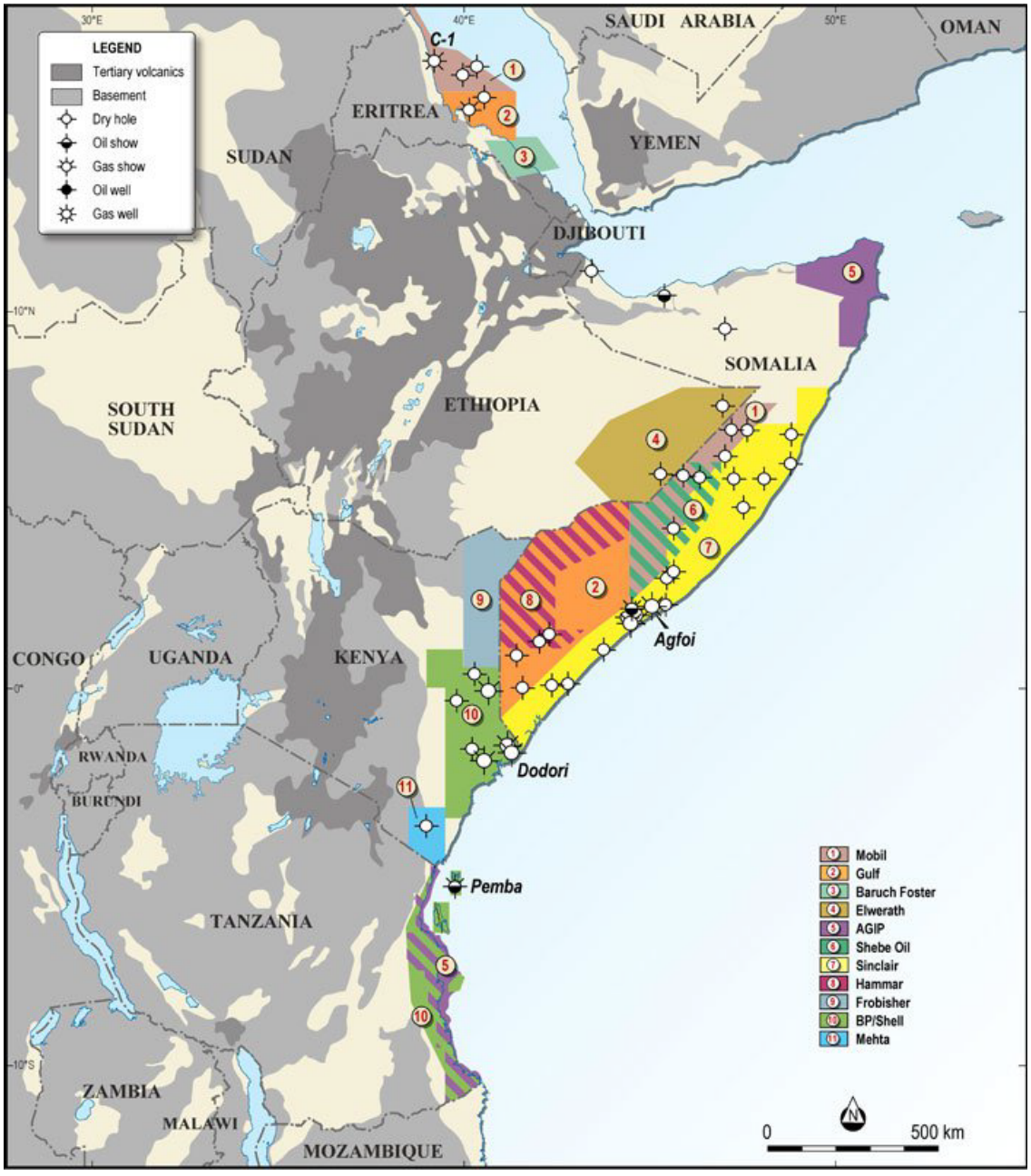
Exploration for oil and gas has been carried out in Eastern Africa since World War II, but the region has largely remained at the margins of global investments in hydrocarbons until recently. The discovery of commercially viable and significant gas resources offshore from Tanzania and Mozambique, together with oil resources in South Sudan and Uganda have attracted interest in the region, despite the 2013-2015 declines in world prices for petroleum products. The region could even be the next promising energy-development corridor.

Exploration for oil and gas since the 1950s (Figure 6.19) was concentrated in Ethiopia, Somalia and Kenya. Since the 1980s exploration and development activity has shifted south, primarily to Kenya and Tanzania.

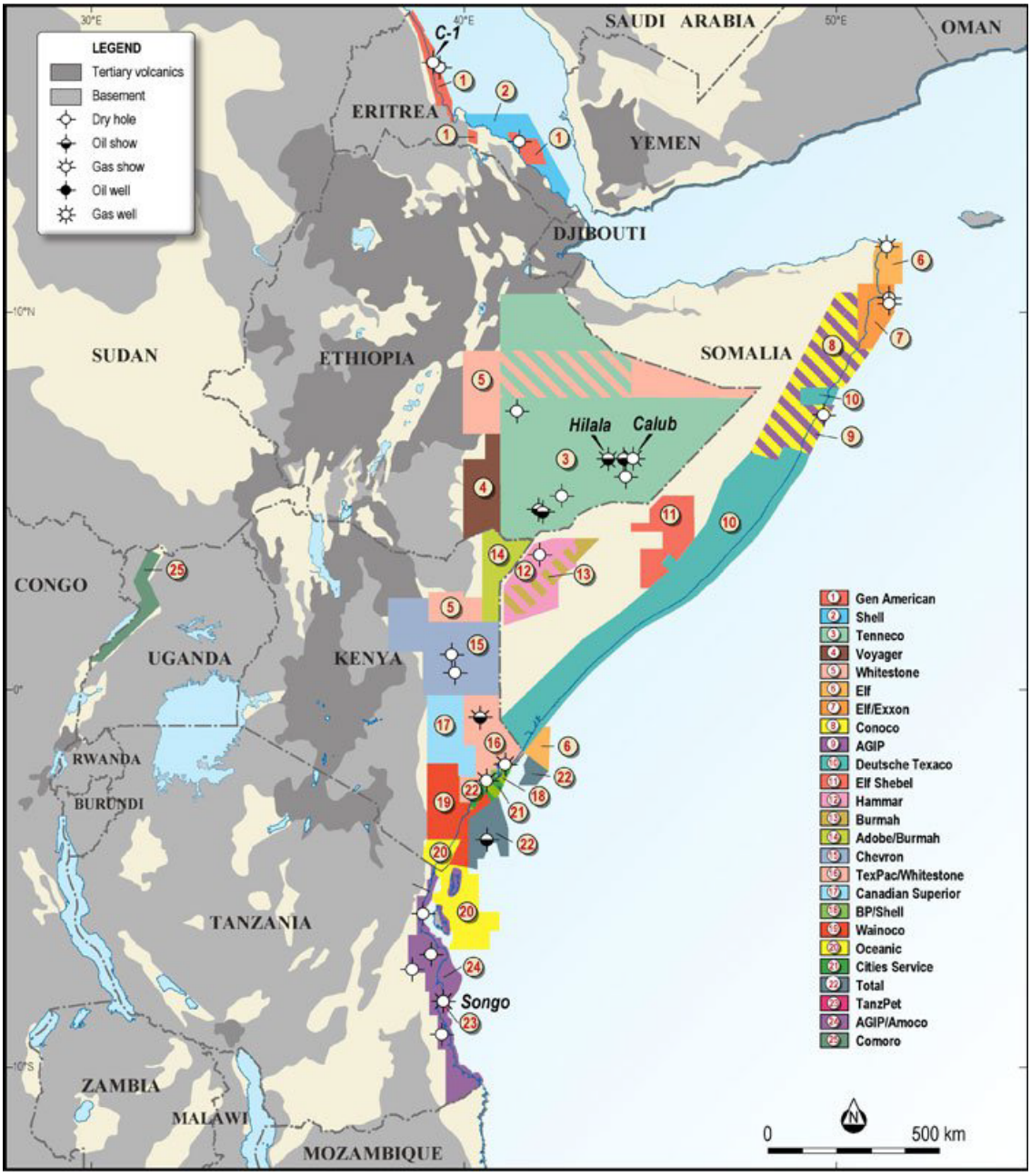
FIGURE 6.19 Oil and gas exploration pattern in Eastern Africa by decade - 1950s - 2010s



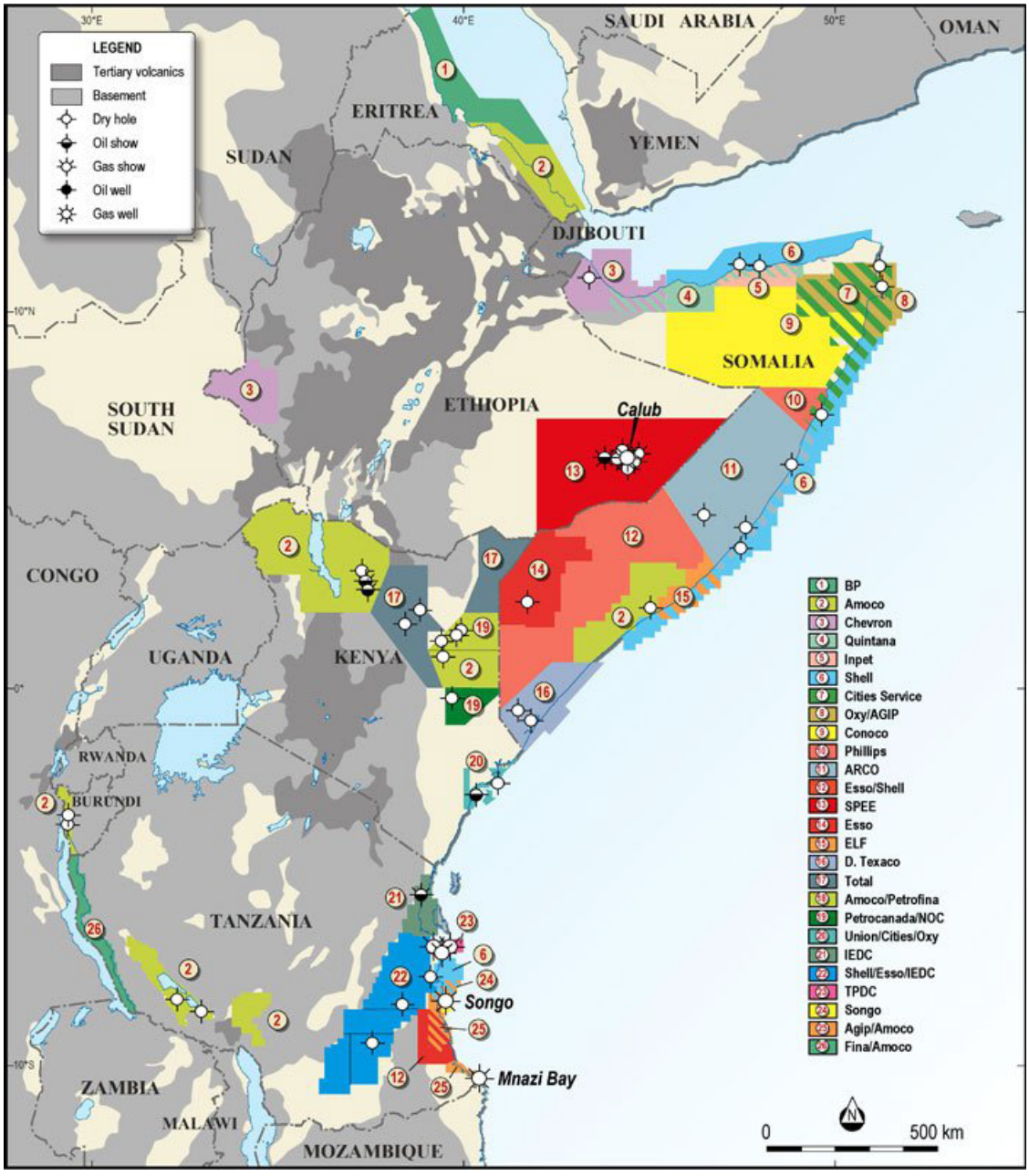
Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014



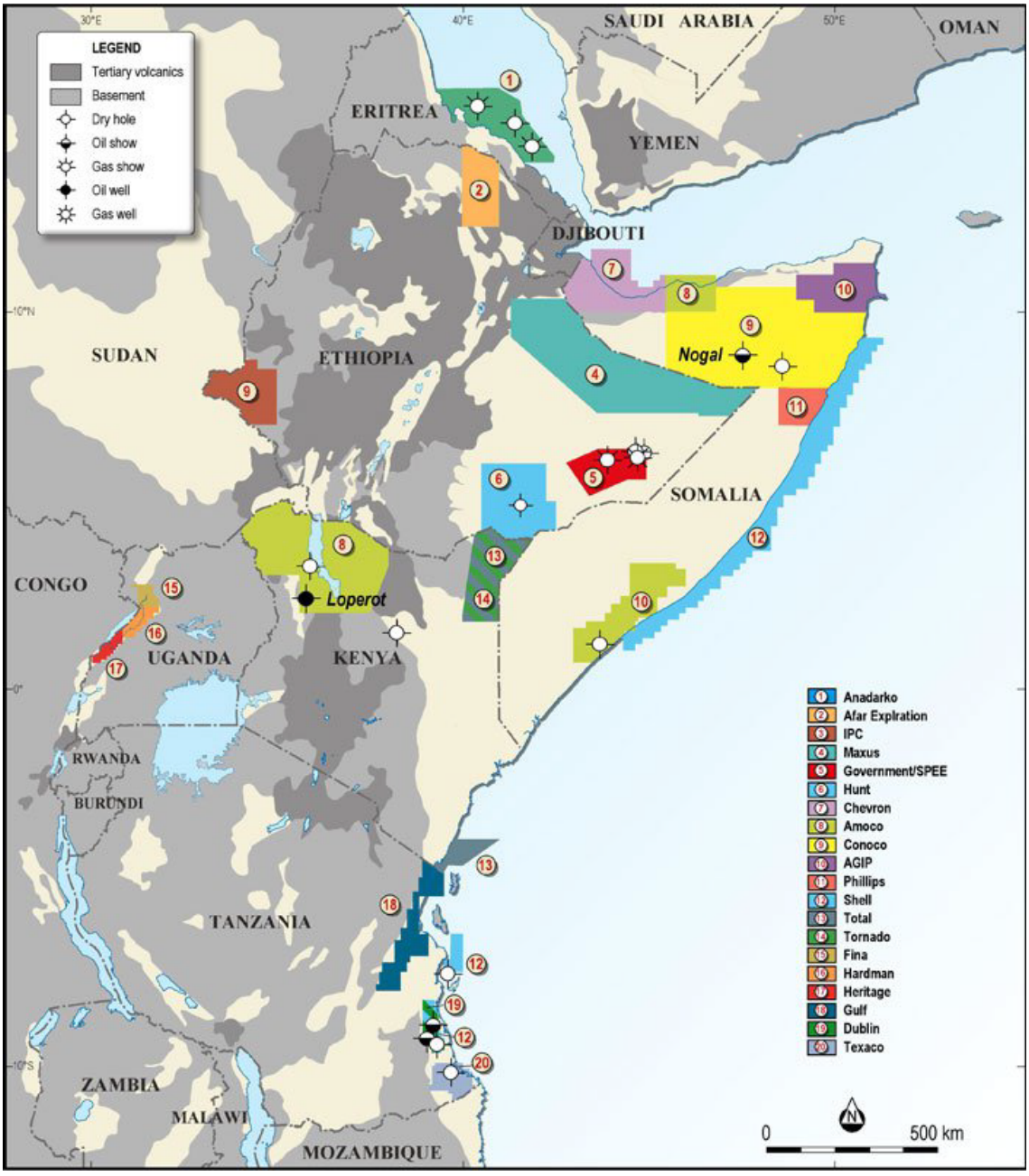
Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014



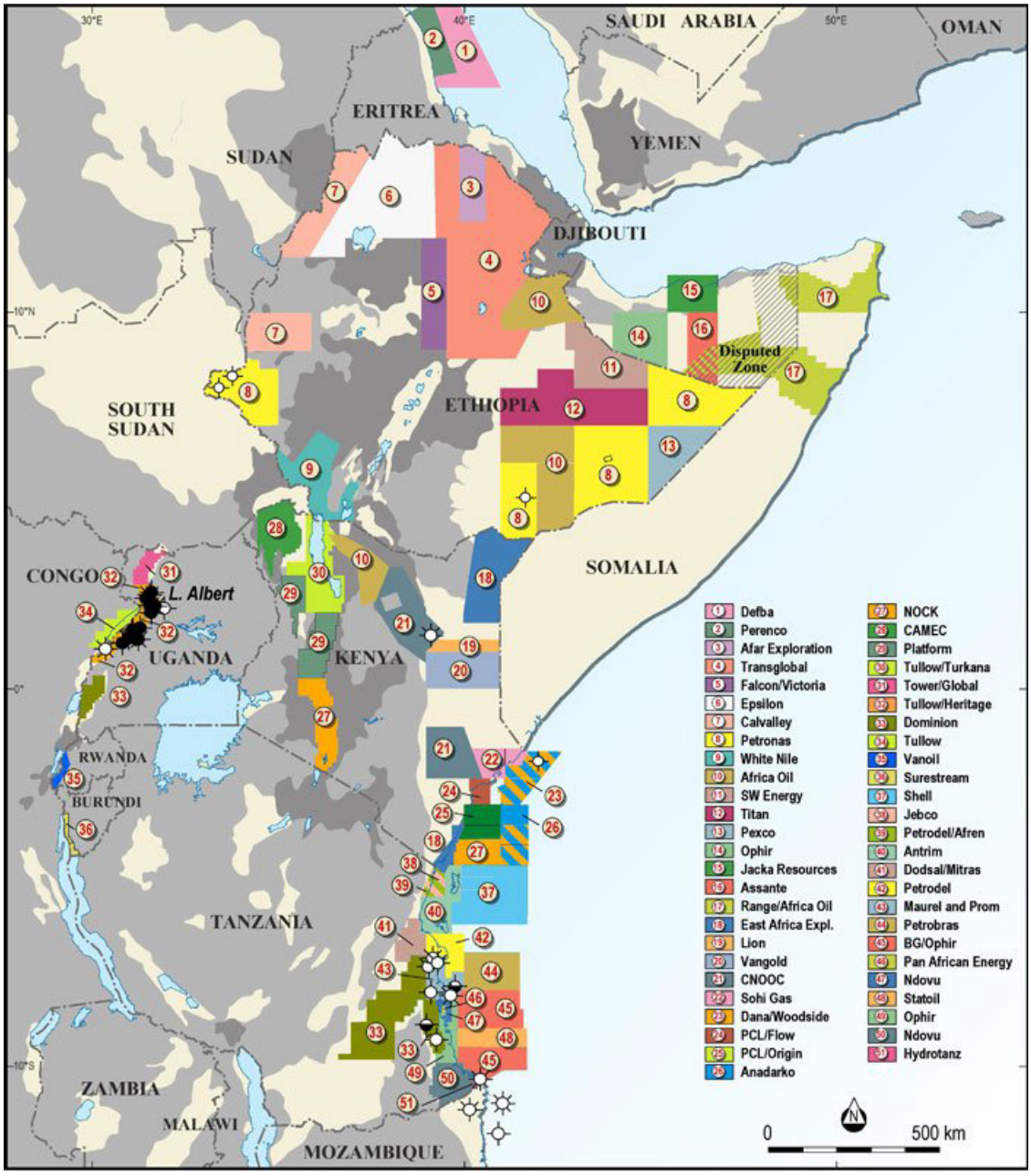
Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014



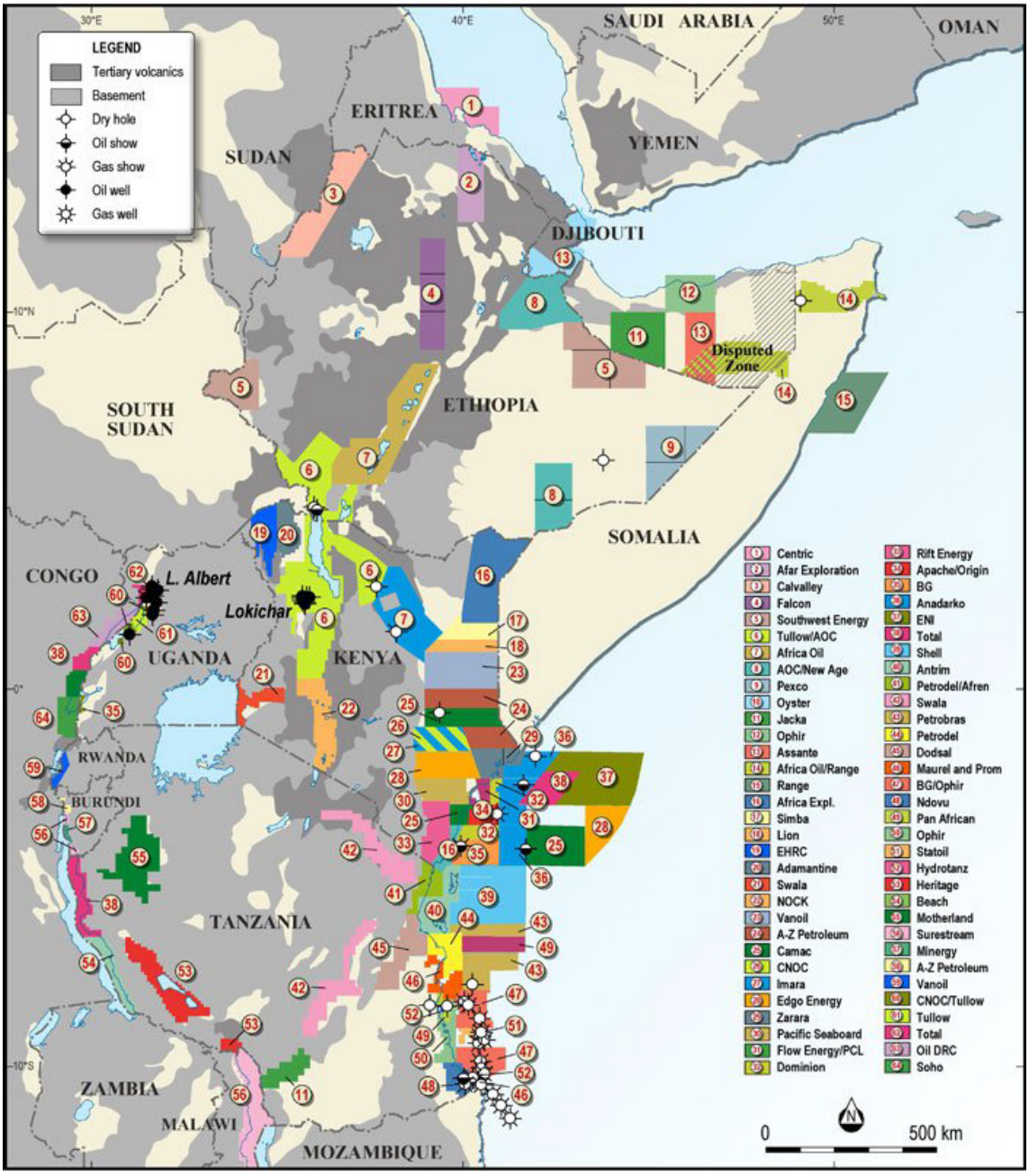
Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014



Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014

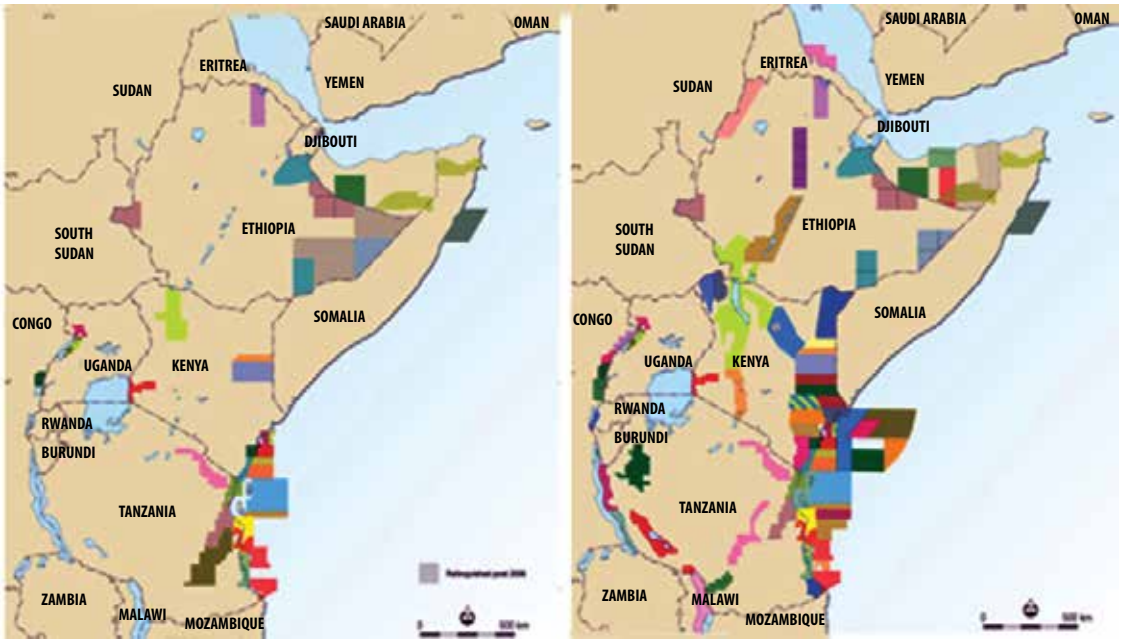


Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014



Source: Peter Purcell, P&R Geological Consultants Pyt Ltd, 2014

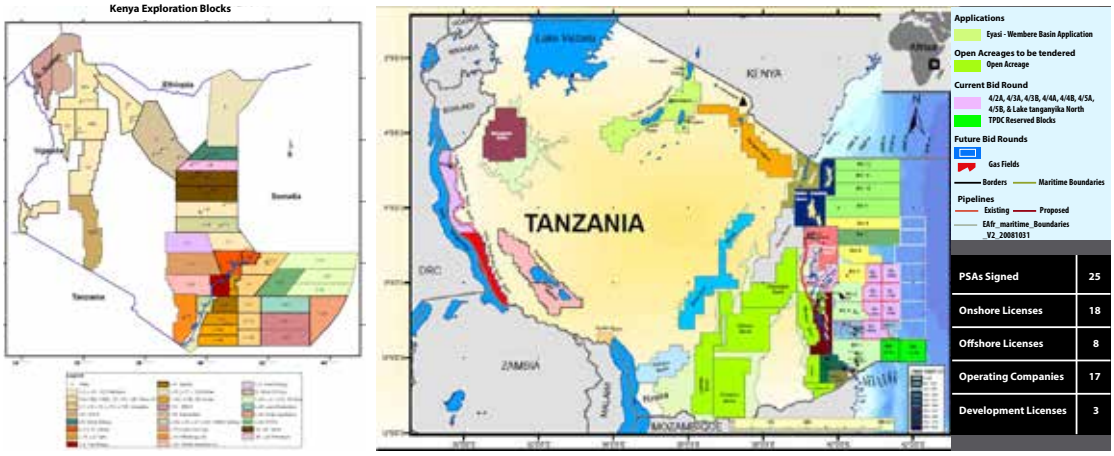
FIGURE 6.20 Permit issuance: 2006 vs 2012



Source: Peter Purcell, P&R Geological Consultants Pvt Ltd, 2014

Interest in exploration has expanded offshore, into the Indian Ocean. Somalia, Kenya and Tanzania have identified offshore blocks and expressed interest in attracting investors. Madagascar has similarly identified blocks, as has Seychelles.

FIGURE 6.21 Offshore exploration blocks of Kenya and Tanzania



Sources: Exploration Block Map of Kenya (Government of Kenya) and Exploration Block Map of Tanzania (TPDC)

There is so far no significant discovery of commercial quantities of offshore oil resources in the region, though this may change if current explorations yield positive results. Offshore national gas resources in Tanzania, however, are already being exploited and used in electricity generation to alleviate the regional energy shortage.

TABLE 6.1 Electricity generation from gas in Tanzania

Plant	Installed Capacity (MW)	Generation (MW)
SongoSongo Gas		
Songas Power Plants	191	189
TANESCO Ubungo Plant	100	100
TANESCO Jacobsen Plant	100	75
TANESCO Tegeta Plant	45	45
Symbion	112	-
SomangaFungu Plant	7.5	2.5
Mnazi Bay Gas		
TANESCO Mtwara Plant	18	12

Source: Emma Msaky, Oil and Gas Exploration - General Overview. Presentation to the delegation from the Tanzania Private Sector Foundation

6.2.3. Offshore Oil and Gas Resources - Remaining Challenges and Policy Opportunities

Eastern Africa is well-positioned to benefit from global interest and investment in its offshore oil and gas. Proved reserves of oil in South Sudan and Uganda, added to already identified reserves of gas offshore from Tanzania and Mozambique, have put the region on the global energy map. Oil and gas exploration around the island States and the allocation of exploitation rights are proof of expanding commercial interest. However, there are constraints that could prove problematic for the maintenance and further expansion of investment in the regional oil and gas sector. These include:

1. Security concerns. Instability in Somalia has already overflowed into Kenya with some impact on tourism and, potentially, on the energy sector. Investors are interested in Somalia's potential reserves, but remain wary because of security worries. Beyond Somalia, domestic terrorism and acts of violence create an image problem.
2. Maritime boundaries in the region, with the exception of Eritrea-Yemen, remain largely undemarcated. Somalia and Kenya are in dispute over their maritime border, at a time when both countries are hoping to attract offshore energy exploration. There are conflicting maritime territorial claims between Angola and the DRC. A trans-boundary resource-management and development framework is required for the region.
3. The ocean floor remains largely unexplored, and mapping the energy-resource profile of ocean floors and sea beds will continue to be a costly but unavoidable step for which finance will need to be found.

In addition, the environmental impacts of deep-sea and ocean oil and gas resource development are less understood in the region than perhaps they are elsewhere. The April 2010 oil spill from the BP-owned Macondo Prospect rig in the Gulf of Mexico

highlighted the importance of environmental impact assessments and management frameworks integral to the development of oil reserves. Similarly, while "fracking" for shale oil and gas has proven its potential for expanding extractable gas resources, the environmental impacts are largely unknown, and will require careful consideration.

The issue of resource management, particularly related to avoiding the "resource curse" and improving the social benefits derived from developing natural resources, remains crucial for both onshore and offshore operations. African experience amply demonstrates the importance of prudent management of fiscal revenues from resource exploitation to avoid the negative impacts on productive sectors of the economy of windfall gains. Moreover, designing schemes to expand the benefits of resource development to society at large, and particularly to communities directly affected by resource development, continues to be an important dimension of sustainable resource development. The following policy opportunities can contribute to meeting these challenges:

- improving regional peace and security and better protection of regional waters;
- proper demarcation of maritime borders;
- better mapping of ocean and deep-sea oil and gas resources, in partnership with investors;
- pursuit of regional co-operation and the joint development of trans-boundary ocean and sea-energy resources;
- adoption of Sovereign Wealth Fundss and appropriate fiscal policies to reduce the risk of corruption and ensure fiscal stability over time; and
- marine environmental impact assessments of offshore resource development.

6.3. Deep Sea and Marine Mining

6.3.1. Mineral Deposits of the West Indian Ocean and East Africa

There has long been interest in mining under the deep seas. The third United Nations Conference on the Law of the Sea ran from 1973 to 1982, following the adoption of the Declaration of Principles in 1970. It was to provide a global framework and guidance to the Law of the Sea in the United Nations Convention on the Law of the Sea (UNCLOS). The 1970 Declaration stipulated that the sea bed outside national jurisdictions was exclusively for peaceful use, and classified deep-sea mineral resources as the common heritage of mankind to be harnessed for the benefit of mankind as a whole. The International Sea Bed Authority (2013) warned that after decades of restraint, advances in marine mining and processing technology, as well as an increase in demand for metals and a decline in the quality of land-based reserves of cobalt, nickel and copper deposits, have increased interest in deep-sea mining.

Deep-sea minerals are being looked upon as a new source for:

- copper, lead, zinc, gold, silver and other metals found in polymetallic sulphides;
- cobalt, titanium, nickel, platinum, molybdenum, tellurium, cerium, other metallic and rare earth elements in cobalt-rich ferromanganese crusts; and
- manganese, nickel, cobalt and copper in polymetallic nodules (also known as manganese nodules).

In Eastern Africa, deep-sea mining is appealing for coastal and island countries as a potential source of economic development and revenue generation. However, technical hurdles remain before commercial operations can be undertaken. This includes better understanding the deep-sea mineral resources of Eastern Africa and the identification of areas that could be valuable for exploration and, eventually, mining. The first-ever commercial deep sea mining operation is only scheduled to start in 2016 in Papua New Guinea.

In addition to deep-sea minerals, there are opportunities in Eastern Africa to tap into near-shore mineral resources that may include sand and aggregates for construction, phosphate for fertiliser production, iron sands and placer deposits, such as gold, as an extension of terrestrial placer resources found onshore. As with deep-sea minerals, there has been limited research into the near-shore minerals of East Africa but they may serve as an entry point to marine mining.

In Eastern Africa, the West Indian Ocean represents the region whose deep-sea mineral deposits have been best studied. These include polymetallic sulphides, cobalt-rich ferromanganese crusts and polymetallic nodules (ISA 2015a). Potential resources of cobalt-rich ferromanganese crusts and polymetallic sulphides are found within the exclusive economic zones (EEZs) of Eastern Africa; but there are also other potential resources mainly outside EEZs such as polymetallic nodules (Table 6.2).

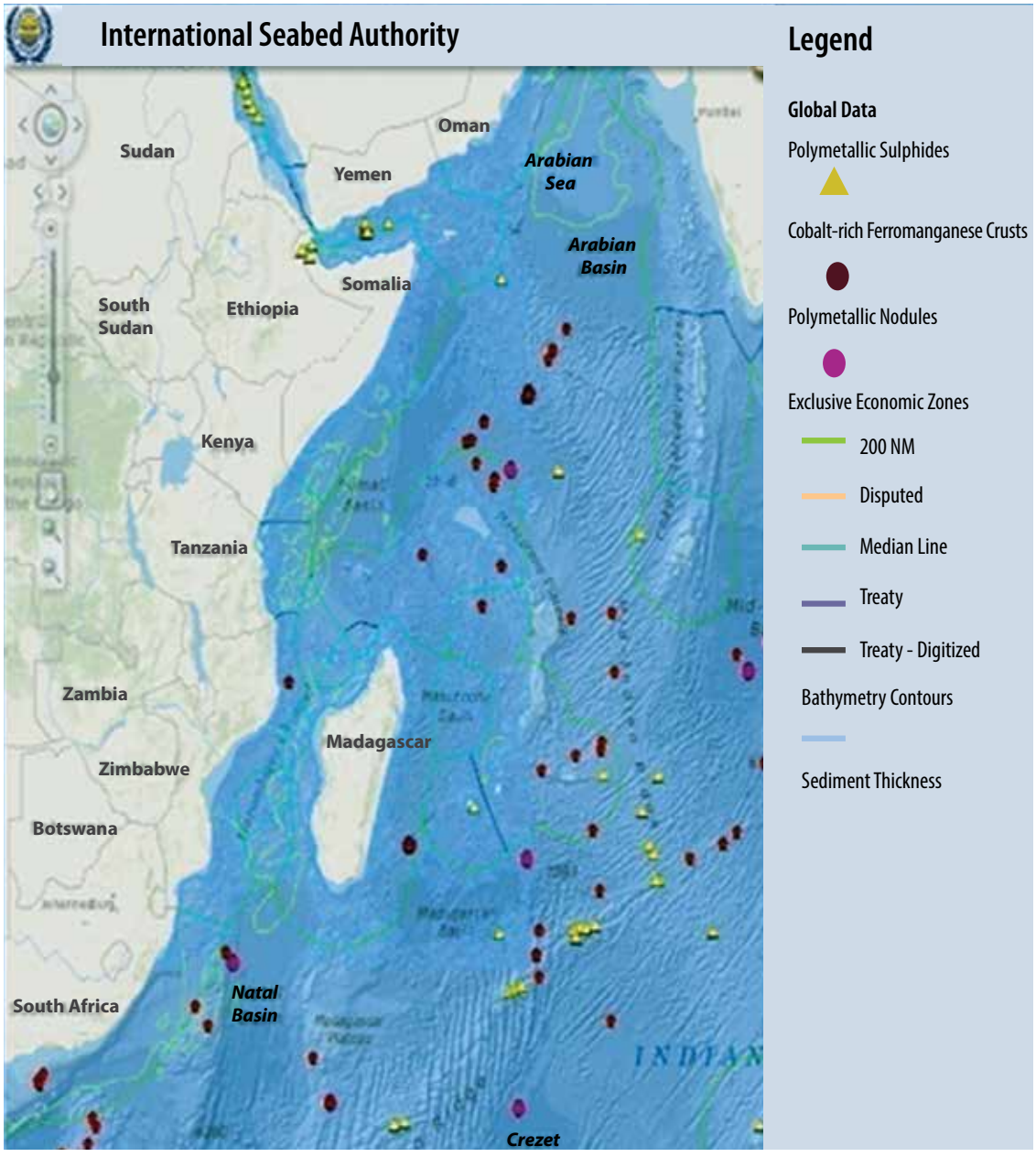
Of the Eastern African countries[2] with EEZs extending into the Indian Ocean, Djibouti and Somalia are known to have polymetallic sulphide deposits, while Madagascar and Seychelles are known to have polymetallic nodules. However, it is likely that there are many more deposits yet to be found in the West Indian Ocean and in the EEZ's of non-land-locked Eastern African countries.

In Eastern Africa, only the DRC faces the Atlantic Ocean, with 169 km of Atlantic coast and claims to a contested (by Angola) EEZ that extends 200 nautical miles into the Atlantic Ocean and in which there are significant crude oil resources and reserves. However, as yet, there are no known deep-sea mineral resources within the DRC's claimed EEZ.

[2] Eastern Africa includes: land-locked countries without any of their EEZs in the Indian Ocean; countries on continental Africa with coastlines as well as island countries, all of which have EEZs extending into the Indian Ocean. Land-locked Eastern African countries consist of: Burundi, Ethiopia, Rwanda, South Sudan and Uganda. Countries on the continent of Africa with coastlines consist of: D.R. Congo, Djibouti, Eritrea, Kenya, Tanzania and Somalia. Island nations consist of Comoros, Madagascar, and Seychelles

Whether the extraction of any of the known or unknown Eastern African deposits is economically viable, given current or future technologies and commodity prices, is uncertain and would require years of further research, exploration and economic assessment. It is widely assumed that in many cases deep-sea minerals will only become economic to mine when higher concentration and larger volume land-based mineral deposits are depleted (Coakley 1997).

FIGURE 6.22 Map of deep-sea mineral resources in the West Indian Ocean



Source: Modified from the ISA Web GIS Application (ISA 2015a)

TABLE 6.2 Types of deposits and their characteristics

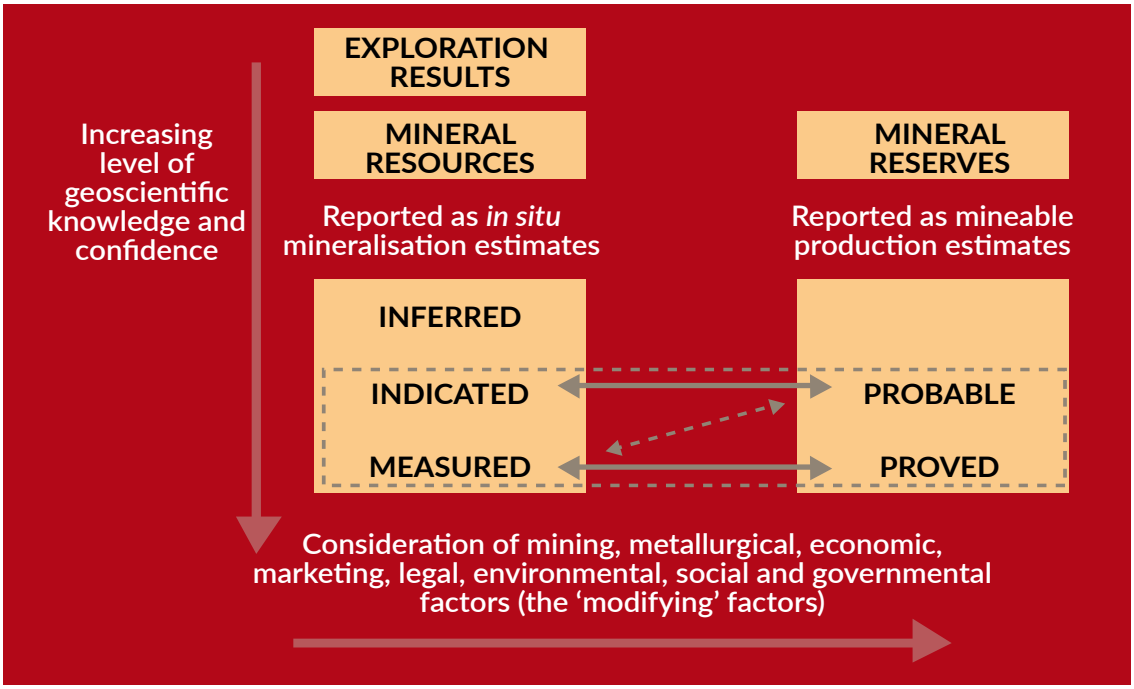
Type of deposit	Characteristics
Polymetallic sulphides	Deposits of sulphide minerals, formed through hydrothermal activity, which contain concentrations of metals including copper, lead, zinc, gold and silver. These deposits include both active sulphides and inactive sulphides. They may occur on seamounts, mid-ocean ridges or back-arc ridges exposed on the seafloor or as buried deposits.
Polymetallic nodule	A deposit or accretion of nodules on, or just below, the surface of the deep seabed, which contain manganese, nickel, cobalt and copper. Also called manganese nodules and ferromanganese nodules.
Cobalt-rich ferromanganese crusts	Hydroxide/oxide deposit of cobalt-rich iron/manganese (ferromanganese) crust formed from direct precipitation of minerals from seawater onto hard substrates in the deep sea on features with significant topographic relief, such as seamounts and ridges. Contain minor but significant concentrations of cobalt, titanium, nickel, platinum, molybdenum, tellurium, cerium, other metallic and rare earth elements. Synonymous with cobalt-enriched crust.

Source: Modified from ISA Scientific Glossary (ISA 2015b)

6.3.2. Mineral Resources, Reserves and Licenses

The terms "resources" and "reserves" have very specific meanings in relation to minerals and mining. They are used specifically to indicate the level of geo-scientific knowledge, along with technical mining, economic and governance-related considerations required to profitably extract minerals (Figure 6.23), and issue licences in the deep sea (see Table 6.3).

FIGURE 6.23 Relationship between exploration results, mineral resources and mineral reserves



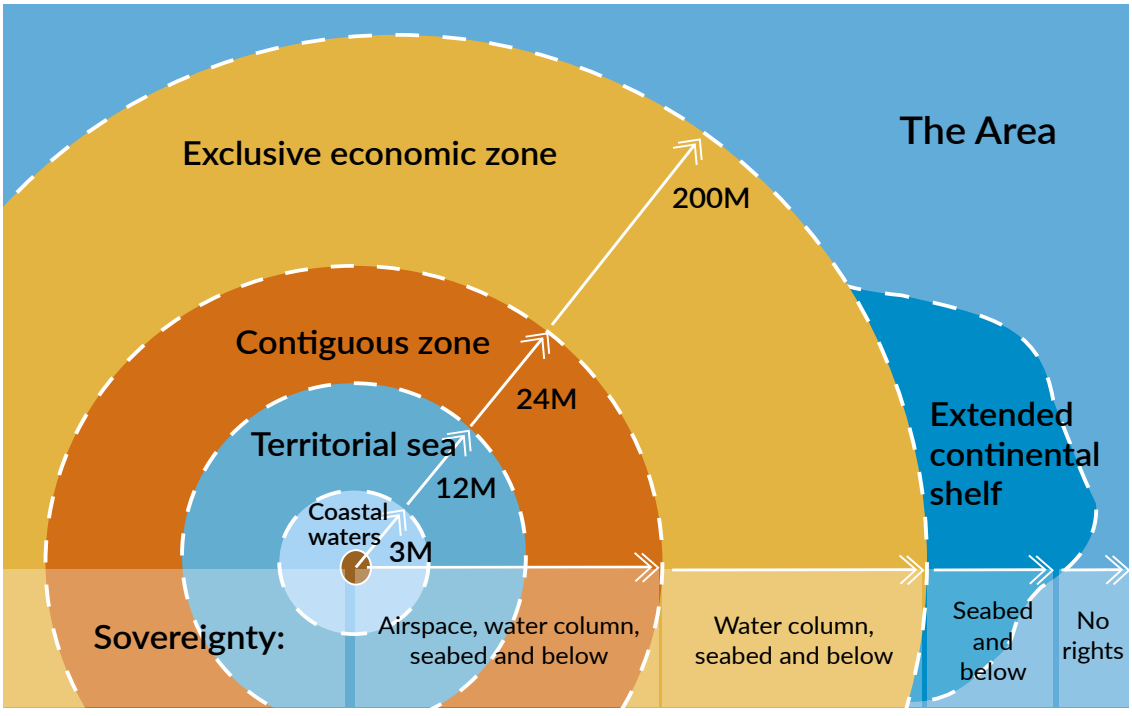
Source: SAMREC, 2009

In many cases, deep-sea deposits have been identified in a location but there may be insufficient geo-scientific knowledge to estimate the size, technical constraints or economic viability of mining them. It is only through exploration that mineral resources can be classified as being "inferred", "indicated" or "measured". Only after mining rights have been issued and a deposit is known to be economically viable can "mineral resources" be reclassified as "mineral reserves". Again, some reserves with a reasonable amount of geo-scientific information are considered 'probable' while reserves with a high level of geo-scientific information are considered 'proved' (Figure 6.23).

At each stage of research, prospecting and exploration, the costs go up dramatically, especially in deep-sea environments, hence mineral-resource prospecting and exploration is a risky business. Many potential deposits, on land or under the sea, are abandoned at some considerable cost without ever being mined due to poorer than expected exploration results or other technical difficulties related to the economic extraction of minerals.

When it comes to licensing, sovereign States can issue mineral prospecting, exploration or mining (i.e. extraction) permits for any location within their EEZ, but may also issue such permits for areas of the seabed within their extended continental shelf. For "The Area" outside the EEZ or extended continental shelf, also called 'the high seas', the International Seabed Authority (ISA) is responsible for issuing deep-sea mineral prospecting, exploration and extraction licenses (Figure 6.24). The ISA has a Mining Code that sets out the conditions and privileges under which prospecting and exploration is undertaken. A Mining Code is currently being developed for Extraction Licenses.

FIGURE 6.24 Jurisdictions and rights over mineral resources and mineral reserves

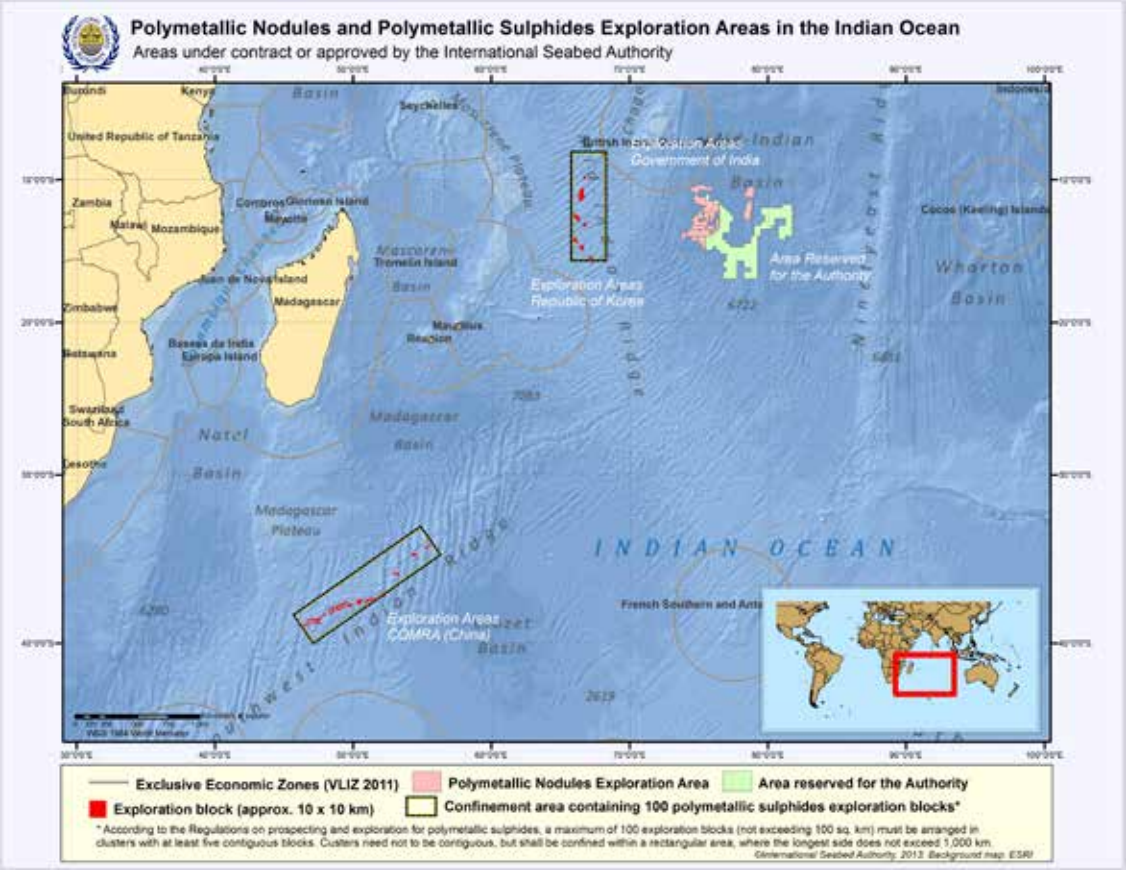


Source: GRID-Arendal 2014

6.3.3. Exploration

Deep-sea mineral exploration and the testing of extraction technologies has been ongoing since the 1970s (ECORYS 2014), but no commercial mining has started to date anywhere in the world (UNEP 2014). However, a commercial deep-sea mining permit has been approved by the government of Papua New Guinea for Nautilus Minerals from Canada to mine the Solwara 1 Prospect (UNEP 2014). In the Indian Ocean, the International Seabed Authority has issued exploration permits to COMRA of China and the Republic of Korea to undertake polymetallic-sulphides exploration. It has also issued permits to the Government of India to undertake polymetallic nodules exploration (ISA 2015c). Currently, there is no information to suggest that Eastern African countries have allocated deep-sea mineral exploration or mining permits (ECORYS 2014). However, it should be noted that in the 1980s there was limited exploration and sampling of polymetallic nodules in the Seychelles near the Admirante Islands (Coakley 1997).

FIGURE 6.25 Map of polymetallic nodules and polymetallic sulphides



Source: ISA 2015

In the case of near-shore minerals, there does not appear to have been much research, prospecting or exploration, perhaps reflecting a lack of known potential.

6.3.4. Mining

In principle, the mining of near-shore or deep-sea minerals from the sea floor involves three steps: extraction, lifting and processing (ECORYS 2014, ISA 2015d). Figure 6.26 illustrates different techniques and technologies related to deep sea mining. Polymetallic nodules can be vacuumed from the sea floor by specialised sea-floor production tools, while polymetallic sulphides and crusts are removed by sea-floor production tools that crush and grind the ore. Lifting is usually done by pumping the ore as slurry up to the sea surface and into a collection vessel. It is also possible to use continuous line bucket systems to lift the ore to the surface. In the collection vessel excess water is removed and returned by pipe to depth for disposal, while the ore is processed either on-board or after transportation to a platform with dedicated processing facilities. During processing, minerals are concentrated and extracted while tailings (i.e. wastes) are generated. Given that the mineral content of an ore can be from under 3% to 30 % (ISA 2015d), most of the material extracted will be returned to the environment as tailings. Similar technologies are used to extract near-shore minerals, and in many cases the precursors to technologies being developed for deep-sea mining have been developed for near-shore mining operations.

TABLE 6.3 Status of exploration contracts issued by the International Seabed Authority

Contractor	Sponsoring State	Date of contract	Date of expiration	Location	Size of area (in km^2)
Government of India		25 March 2002	24 March 2017	Central Indian Ocean Basin	75,000
Institut Français de Recherche pour l'Exploitation de la Mer	France	20 June 2001	19 June 2016	CCZ	75,000
Deep Ocean Resources Development Co. Ltd	Japan	20 June 2001	19 June 2016	CCZ	75,000
Yuzhmorgeologiya	Russian Federation	29 March 2001	28 March 2016	CCZ	75,000
China Ocean Mineral Resources Research and Development Association	China	22 May 2001	21 May 2016	CCZ	75,000
Interoceanmetal Joint Organisation	Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia	29 March 2001	28 March 2016	CCZ	75,000
Government of the Republic of Korea		27 April 2001	26 April 2016	CCZ	75,000
Federal Institute of Geosciences and Natural Resources of Germany	Germany	19 July 2006	18 July 2021	CCZ	75,000
Nauru Ocean Resources Inc.	Nauru	22 July 2011	21 July 2026	CCZ-Reserved Area	75,000

Tonga Offshore Mining Limited	Tonga	11 January 2012	10 January 2027	CCZ-Reserved Area	75,000
China Ocean Mineral Resources Research and Development Association	China	18 November 2011	17 November 2026	Southwest Indian Ridge	10,000
Government of the Russian Federation		29 October 2012	28 October 2027	Mid-Atlantic Ridge	10,000
UK Seabed Resources Ltd	United Kingdom	8 February 2013	7 February 2028	CCZ	58,600
Marawa Research and Exploration Ltd	Kiribati	To be signed		CCZ-Reserved Area	75,000
G-TEC Sea Mineral Resources NV	Belgium	14 January 2013	13 January 2028	CCZ	75,000
Government of the Republic of Korea		To be signed		Indian Ocean	10,000
Institut Français de Recherche pour l'Exploitation de la Mer	France	To be signed		Mid-Atlantic Ridge	10,000
China Ocean Mineral Resources Research and Development Association	China	To be signed		Western Pacific Ocean	3,000
Japan Oil, Gas and Metals National Corporation	Japan	To be signed		Western Pacific Ocean	3,000

Source: Policy Options Paper #5: Strengthening deep seabed mining regulation. Policy options paper prepared for the third meeting of the Global Ocean Commission, November 2013

6.3.5 Sovereign Wealth Funds and Oil and Gas Developments

Traditionally, high prices for hydrocarbons have resulted in economic booms in producing States. Sovereign Wealth Funds (SWFs) have become common practice in oil-producing countries to manage the resulting high revenues and to spread the benefits over time and lessen the impact of commodity-price volatility. Almost every member of the Organisation of the Petroleum Exporting Countries (OPEC) maintains a SWF. These funds are established to insulate the budget and economy from excess volatility in revenues, to help monetary authorities sterilise unwanted liquidity, to accumulate savings for future generations, or for economic and social development. Ghana, as an oil-producing country, has set up two SWFs to manage its oil and gas revenues, specifically for the purpose of budget stabilisation and savings for future generations. They have already received allocations that have, in turn, been invested in secure facilities to support economic development. Kenya has emulated Tanzania and Uganda in laying the legal framework for managing the revenues expected from recently discovered oil in offshore areas, with the proposed establishment of a USD 115 million SWF. The Kenya National Sovereign Wealth Fund (KNSWF) Bill aims to ensure that proceeds from oil, gas and mining activities do not destabilise the economy.

An underlying concept is that African SWFs can boost their local economies through allocating part of their assets to growing sectors in-country. The Angolan SWF has been a leader in targeting sectors vital to local development, including agriculture, power and transport. Similar efforts have been made by the Mozambican and Tanzanian SWFs to meet their long-term development goals.

SWFs can play an important role in sustainable investment if they are governed by an appropriate mechanism. They are crucial vehicles owned and managed by governments but they can be much more than this. They can be a vehicle for exporting best practices, ethical guidelines, better corporate governance, and more transparent and more socially responsible environmental policies. The role of SWFs in local development, however, has been questioned by, for example, the World Bank. If SWFs are captured by political interests or misused, mismanaged and abused by corrupt politicians and interest groups, they can represent a threat. In addition, although SWFs are helpful for stabilisation purposes, such a fund should not deprive today's population of investments in economic development for today's young and growing population.

6.3.6. Potential Impacts of Deep Sea and Marine Mining

There is a range of potential environmental, economic and social impacts related to deep-sea mining. Environmental impacts at depth include habitat destruction, the removal of materials, dust plumes, noise and vibrations, and introducing light to an environment that is otherwise dark (Figure 6.26) (UNEP 2014, ECORYS 2014). At the surface, there are potential impacts in terms of noise and light as mining operations are likely to be continuous day and night. There will be discharges from vessels, albeit regulated under the International Convention for the Prevention of Pollution from Ships (MARPOL) (UNEP 2014). At all stages of mining, on the sea floor, during lifting or at the surface, there is the risk of accidents and unintentional pollution. In addition to these environmental impacts, there is the issue of mine tailings which include coarse materials, as well as crushed elements that dissolve readily and can travel in plumes if not dumped properly or if disturbed by earthquake, for example, or by mass movements (the equivalent of underwater landslides). There are other environmental concerns associated with the mining of polymetallic sulphides, in particular, and whether the removal of minerals and the associated destruction of an ecosystem will limit the ability of organisms and ecosystems from moving along chains of active sub-marine hydrothermal vents. Similar concerns exist regarding the ability of organisms and ecosystems to move from seamount to seamount if a seamount in the chain is mined for cobalt-rich ferromanganese crusts. Polymetallic nodules take many millennia to form and any disturbance to such an ecosystem will take a very long time to recover.

Potential economic impacts include displacement of bottom-trawling fishing from seamounts where there is the mining of ferromanganese crusts. There may also be impacts on deep-sea commercial fisheries, although there is limited information available on whether they would be significant. Issues of competition are very important for near-shore mining, if only because of the proximity to shore and the number of people who are likely to be impacted. Fishing grounds will be affected in most cases and any environmental impacts will be much more noticeable to local populations.

Social tensions might arise when deep-sea mining operations occur in areas previously used for fishing. In addition to these negative impacts, there may, however, be some employment opportunities associated with deep-sea and near-shore mining, but most of the labour required will come from outside the countries concerned because of the high skill levels required. Competition for those jobs that are available could be strong and divisive, especially if jobs tend to go to one particular group, rather than to another. There are, however, also likely to be tax revenues for governments, assuming that they have not conceded too many concessions in the mining contracts. It should be noted that the way revenues are used or distributed can also create social tension unless the balance between supporting coastal local development and wider national development is carefully maintained.

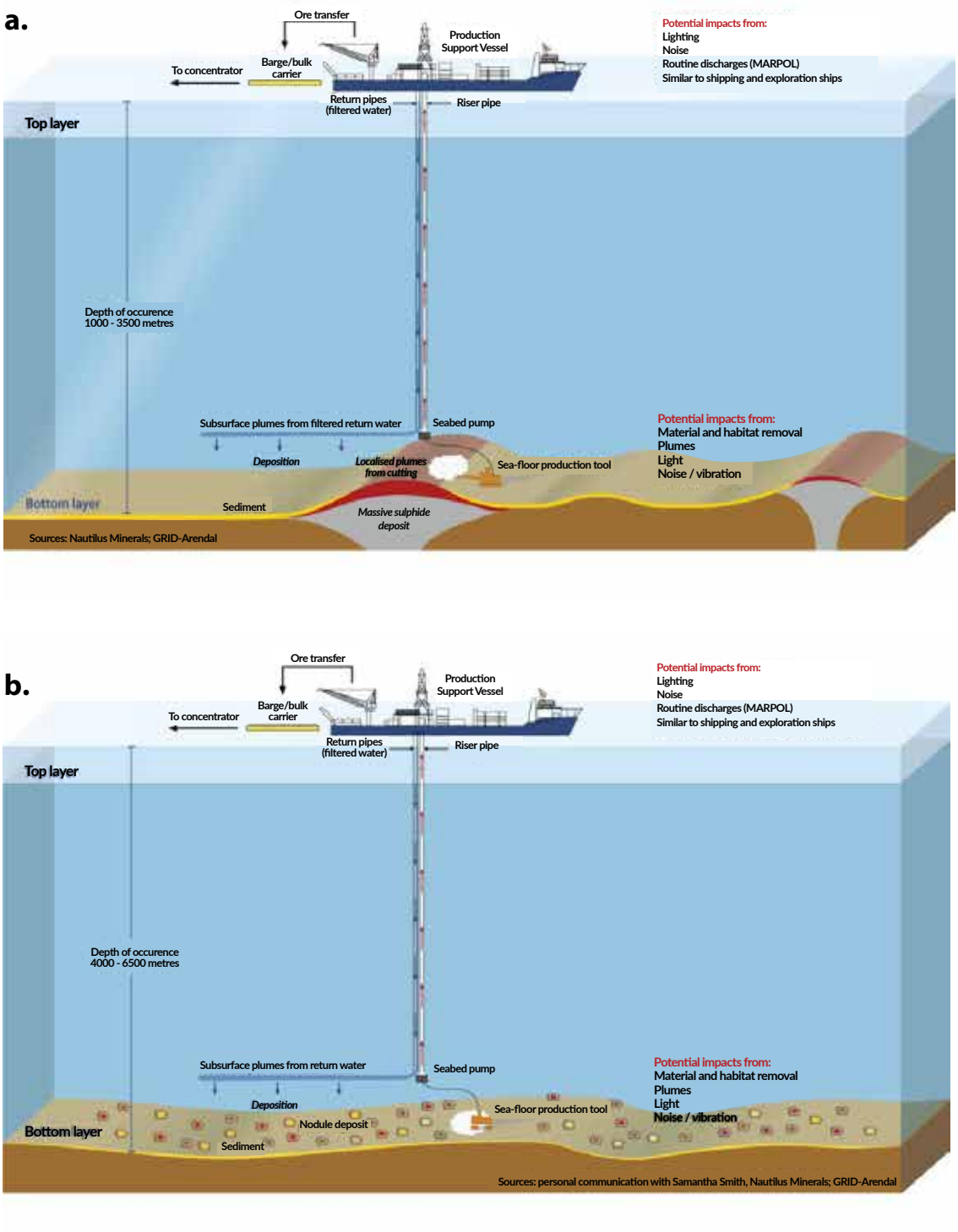
6.3.7. Challenges and Opportunities

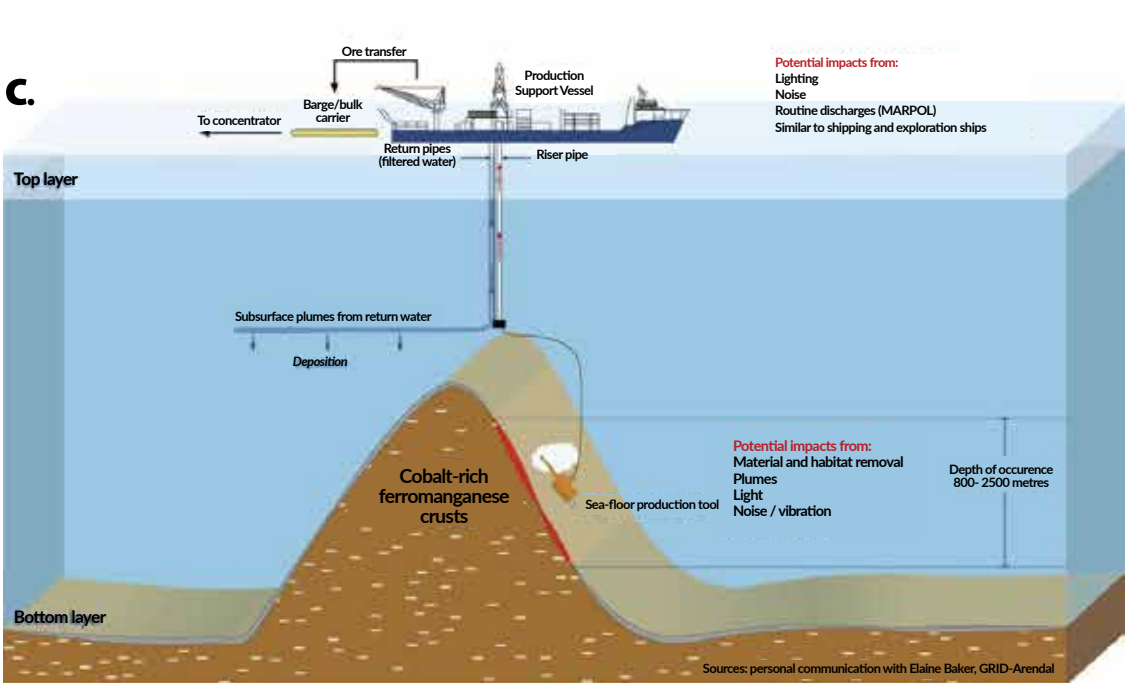
There is a range of technical and policy tasks associated with near-shore and deep-sea mining. More research is needed, in particular oceanographic surveys and sea-floor samples by which new deposits can be identified in the EEZs of coastal and island Eastern African countries. After the identification of deposits, there is a need to attract prospecting and exploration companies that can undertake the technically challenging and expensive task of improving the geological knowledge of these deposits. Prospecting and exploration will help establish the size and grade of deposits and the economic viability of extracting the desired minerals from the deposit. Currently this is a very high-risk business requiring specialised expertise and equipment, all of which are scarce. Given current levels of knowledge on deep-sea mineral deposits in the EEZs of Eastern Africa, it will take years of research, prospecting and exploration before significant resources and reserves can be identified and exploited.

The need for more research on near-shore and deep-sea minerals means that Eastern African countries need to consider launching research programmes and acquiring vessels to undertake collaborative research within their EEZs and extended continental shelves. Such collaboration can enhance the knowledge of potential near-shore and deep-sea mineral deposits, together with their associated ecosystems, while improving domestic research capacities.

Full-scale commercial mining of deep-sea minerals is yet to take place anywhere in the world in the face of technical challenges to their extraction and the disposal of excess water and tailings, as well as the management of other environmental impacts. There is a need for continued research into the design, construction and management of sea-floor production tools, lifting systems, dewatering mechanisms and the separation and safe disposal of tailings. The intellectual property related to these systems will belong to those organisations that develop them and consequently any operations using such technologies will have to pay for the capital and underlying intellectual property associated with them.

FIGURE 6.26 Schematic diagram of deep sea mining of (a) sea floor massive sulphides (b) manganese nodules and (c) cobalt-rich ferromanganese crust





Source: UNEP 2014

At the local level there will be environmental, social and economic impacts. In addition, there will be competition between deep-sea mining for cobalt crusts and bottom-trawling fishing on sea mounts. In many cases, countries lack adequate marine-mining policies to deal with these issues.

6.3.8. Marine Mining Policy Development

Deep-sea mining beyond national jurisdictions or in "The Area" is an activity governed by UNCLOS and regulated by the International Seabed Authority. Prospecting in the deep sea may be pursued following filing with the International Seabed Authority which ensures compliance with the Law of the Sea. The process aims to ensure that deep-sea mining beyond national jurisdictions will be conducted in a manner that will benefit mankind as a whole.

Within the context of the above global framework, the sustainability of mining is a key tenet of the *Africa Mining Vision* which was adopted by African Heads of State in February 2009 (AMV 2009). The AMV aims to have "Transparent, equitable and optimal exploitation of mineral resources to underpin broad-based sustainable growth and socio-economic development." As such, it is important to address potential environmental, economic and social impacts in advance through suitable deep-sea mining policies, legislation, licensing and regulation.

There is a growing arsenal of policy-development tools to address the challenges posed by the deep-sea mining of mineral deposits and to develop operations that are consistent with the AMV. This includes support from the African Minerals Development

Centre (AMDC) Project, which consists of the AUC, AfDB, UNDP and UNECA as implementing partners. Along with the AMV and the Action Plan for Implementing the AMV (AMV 2012), there are guidance documents that can be used to support national processes including *A Country Mining Vision Guidebook* (AMDC 2014). Other tools that can help countries implement the AMV include the World Economic Forum's Responsible Mineral Development Initiative (RMDI) and the Extractive Industries Transparency Initiative (EITI).

Eastern Africa can also refer to a growing body of information related to deep-sea mining policies, legislation and regulations. The ISA has a Mining Code which covers prospecting and exploration licenses in "The Area" and it is developing a model extraction license. The ISA Mining Code can serve as a template for East African countries and their deep-sea mining legislation. Several countries, including Fiji and Papua New Guinea, have made progress preparing policies, legislation and regulations to manage deep-sea mining operations. Lessons can also be drawn for the West Indian Ocean from the Deep Sea Mineral (DSM) Project, which is an initiative between the Secretariat of the Pacific Community (SPC) and the European Commission with the objective of: "support[ing] informed and careful governance of any deep sea mining activities in accordance with international law, with particular attention to the protection of the marine environment and securing equitable financial arrangements for Pacific Island countries and their people." (SPC 2015) Joint activities between East Africa and the SPC could facilitate South-South co-operation.

In line with the *Africa Mining Vision*, it is important that countries in Eastern Africa adopt policies that ensure upstream and downstream linkages within the economy, and ensure infrastructure and skills development. Upstream linkages include having goods and services in support of exploration and mining operations purchased from within Eastern Africa (including land-locked countries), rather than being exclusively imported from abroad. This could include food, wearables and safety equipment, repairs to machinery and banking services. It is also important to legislate for licensing agreements and the use of fiscal revenues related to deep-sea mining. To help ensure the development of effective and widely accepted policies, legislation, licensing and regulatory regimes it is important to have widespread participation in the development of national policies. A common vision of minerals and how they can benefit development can help. The use of revenues is an important issue to address in advance of mining along with the management of environmental impacts and the limited local employment opportunities that arise from deep-sea mining.

BOX 6.2 SIDS DOCK

An example for the Eastern African region is the "SIDS Dock Support Programme", which was launched by the World Bank and the governments of Denmark and Japan in 2011 to support the development of renewable energy projects in Small Island Developing States (SIDS). It is a South-South co-operation network that aims to create an enabling operational, legal, and institutional environment

to implement renewable-energy and energy-efficiency policy reforms based on international best practices. It also supports the implementation of renewable-energy and energy-efficiency initiatives for potential scale-up through climate finance and other sources of funding.

In the first phase of the programme, six clean-energy activities were initiated in the Caribbean, Pacific, and Africa regions, focused on creating an enabling environment for renewable energy and energy efficiency penetration.

World Bank. SIDS Dock Support Programme. Available [Online] at http://www.esmap.org/sites/esmap.org/files/DocumentLibrary/SIDS%20DOCK_Apr%202015-v3.pdf. Accessed January 15, 2015.

6.4 Conclusions and Recommendations

It will be some years before deep-sea mining, or even near-shore mining, is a reality in Eastern Africa because the industry is a new and emerging field in which geological knowledge, technology and policy gaps are evident. Meanwhile, near-shore minerals have only had limited attention to date. Mainstreaming the principles of the Africa Mining Vision offers the region pathways to optimise and sustainably manage its deep-sea and near-shore mineral resources. Renewable energy also presents potential benefits in Eastern Africa. The extent and source of renewable energy, however, will depend on each country. The Seychelles and Mauritius have made large-scale commitments to reduce their dependency on fossil fuels and increase reliance on renewable energy. Developments of other Blue Economy sectors, such as tourism or port development, should, where possible, be based on renewable energy. Ideally, governments will work with civil society and the private sector to develop a national energy vision that includes achieving national development goals with contributions from deep-sea and near-shore mining, renewable energy and oil and gas development.

Such a vision can guide legislation to cover all aspects including, for example, licensing, environmental protection, health and safety, taxation, and employment protection. Sovereign Wealth Fundss can be beneficial in managing fiscal receipts derived from the extractive industries. The AMV Action Plan[3] provides useful guidance on approaches to ensuring equitable regional benefits from exploiting coastal and offshore minerals. Co-operation, including South-South co-operation will also be important in maximising the transfer of knowledge and experience. Independent and transparent environmental-impact assessments can inform policy decisions on the concession of licences, while developing negotiation skills in concession countries can support States in their discussions with private parties. The type of ownership and distribution of (potential) benefits of exploration and extraction are crucial and need to be negotiated in such a way that they capture national benefits to the maximum extent possible, while safeguarding the environment.

[3] African Union Commission, African Development Bank, United Nations Economic Commission for Africa. (2012)

References

African Development Bank, (2004), *Strategic Plan for Wind Energy Development in Africa*, Tunis: AfDB

African Minerals Development Centre, (2014), *A Country Mining Vision Guidebook: Domesticating the Africa Mining Vision*. Available online 15/01/2015: http://api.ning.com/files/jPvKO*I18G8Dr9hckLtHVJ25h3JD6Mh9cW77*zgkQOAb4fldFDxhroE6yueELFIgwE*lFRMaSLuEQxyv8E4fRnHPXd3L-9iC/ACountryMiningVisionGuidebook.pdf

Africa Mining Vision, (2009), *Africa Mining Vision*, AMV: Addis Ababa

African Union Commission, African Development Bank, United Nations Economic Commission for Africa, (2012), *Building a sustainable future for Africa's extractive industry: From vision to Action: Action Plan for Implementing the Africa Mining Vision*, Addis Ababa: AMV-UNECA

Angelis-Dimakis A., M. Biberacher, J. Dominguez, G. Fiorese, S. Gadocha and E. Gnansounou, (2011), "Methods and Tools to Evaluate the Availability of Renewable Energy Sources", *Renewable and Sustainable Energy Reviews* 15: 1 182-200

Challaghan J., (2006), *Future Marine Energy- Results of the Marine Energy Challenge: Cost Competitiveness and Growth of Wave and Tidal Stream Energy*, London: The Carbon Trust

Charlier R.H. and J.R. Justus, (1993), "Ocean Energies - Environmental, Economic and Technological Aspects of Alternative Power Sources", *Elsevier Oceanography Series*

Coakley, G.J., (1997), *The Mineral Industry of Indian Ocean Islands*. Reston, Va: United States Geological Survey. Available online 16/02/2015: http://minerals.usgs.gov/minerals/pubs/country/1997/ioi97.pdf

United Nations, (1970), *Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction, GA Resolution 2749 (XXV)*, New York: UN. December 1970

ECORYS, (2014), Study to investigate the state of knowledge of deep-sea mining. *Report for the European Commission - DG Maritime Affairs and Fisheries*. Available online 15/01/2015: https://webgate.ec.europa.eu/maritimeforum/sites/maritimeforum/files/FGP96656%20DSM%20Interim%20report%20280314.pdf

Esteban, M. and D. Leary, (2012), "Current developments and future prospects of offshore wind and ocean energy", *Applied Energy 90: 128-136*

GRID-Arendal, (2014), *Deep Sea Minerals and the Green Economy*, Arendal: GRID-Arendal Available online 31/03/3015:

Hammar L., J. Ehnberg, A. Mavume, B.C. Cuamba and S. Molander, (2012), "Renewable Ocean Energy in the Western Indian Ocean", *Renewable and Sustainable Energy Reviews* 16: 4938-4950

International Sea Bed Authority, (2013), "Towards the development of a regulatory framework for polymetallic nodule exploitation in the Area", *Technical Study No. 11*

International Renewable Energy Agency, (2014), *Ocean Energy: Technology Readiness, Patents, Deployment Status and Outlook*, Masdar City: IRENA. Available online 12/01/2015: http://www.irena.org/DocumentDownloads/Publications/IRENA_Ocean_Energy_report_2014.pdf

International Seabed Authority, (2015a), *International Seabed Authority Online GIS*, Kingston: ISA. Available online 15/01/2015: http://mapserver.isa.org.jm/GIS/

International Seabed Authority, (2015b), *International Seabed Authority Scientific Glossary*, Kingston: ISA. Available online 15/01/2015: http://www.isa.org.jm/scientific-glossary

International Seabed Authority, (2015c), *International Seabed Authority Map of Polymetallic Nodules and Polymetallic Sulphides Exploration Areas in the Indian Ocean*, Kingston: ISA. http://www.isa.org.jm/sites/default/files/maps/indianocean.jpg

International Seabed Authority, (2015d), *International Seabed Authority Seabed Technology Brochure*, Kingston: ISA Available online 15/01/2015:

http://www.isa.org.jm/files/documents/EN/Brochures/ENG10.pdf

Khan J. and G. Bhuyan, (2009), *Ocean Energy: Global Technology Development Status*, Surrey: Powertech Labs

Khan J., G. Bhuyan, M.T. Iqbal and J.E. Quaicoe, (2009), "Hydrokinetic Energy Conversion Systems and Assessment of Horizontal and Vertical Axis Turbines for River and Tidal Applications: a Technology Status Review", *Applied Energy* 86: 1823-1835

Magagna, D. and A. Uihlein, (2015), 2014 *JRC Ocean Energy Status Report: technology, market and economic aspects of ocean energy in Europe*, Brussels: European Commission

Mauritius Research Council, (2012), *Marine Based Renewable Energy for Small Island States - the Case of Mauritius*, Ebene Cybercity: MRC

South African Mineral Codes, (2009), *The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC) 2007 Version as Amended in 2009*, Durban: SAMCODE. http://www.samcode.co.za/downloads/SAMREC2009.pdf

Secretariat of the Pacific Community, (2015), *Deep Sea Minerals Project* webpage. Available online 15/01/2015: http://www.sopac.org/dsm/

Todd, J., J. Chen and F. Clogston, (2013), *Creating the Clean Energy Economy Analysis of the Offshore Wind Energy Industry*, Washington D.C.: International Economic Development Council

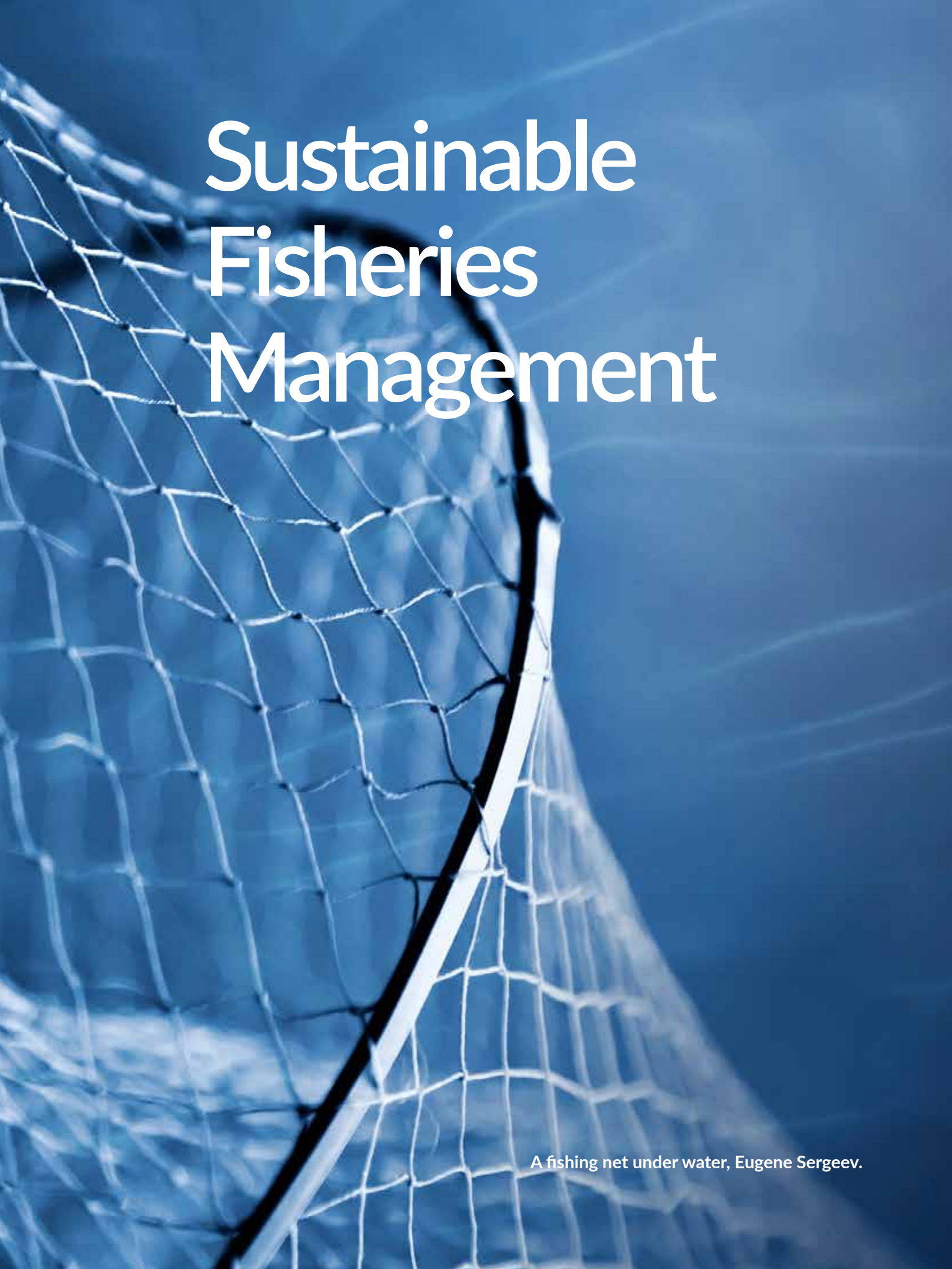
United Nations Environment Programme, (2014), *Wealth in the Oceans: Deep sea mining on the horizon?* Nairobi: UNEP, Global Environmental Alert Service (GEAS), May http://www.unep.org/pdf/GEAS_May2014_DeepSeaMining.pdf, Accessed 15 January 2015

United Nations Economic Commission for Africa (2014), *Energy Access and Security in Eastern Africa: Status and Enhancement Pathways*. Addis Ababa: UNECA

United Nations Economic Commission for Africa (1985), *Study on the Possibility of Developing Ocean Energy Resources of East African Coastal Member States.* Addis Ababa: UNECA

Wang S., P. Yuan, D. Li and Y. Jiao, (2011), "An Overview of Ocean Renewable Energy in China", *Renewable and Sustainable Energy Reviews* 15:91-111

Sustainable Fisheries Management



A fishing net under water, Eugene Sergeev.

7.1 Introduction

The fisheries sector is crucial for the Blue Economy in its potential to provide food security, livelihood and employment benefits while also generating wealth at the national level. Fisheries resources are an important – often the main – source of protein for coastal communities. The fishing industry generates direct and indirect employment and is a source of fiscal revenues, as well as income from servicing foreign fleets in regional ports (Allison, 2011). The Eastern African region's coastal and island States (Comoros, Djibouti, Eritrea, Kenya, Madagascar, Seychelles, Somalia and Tanzania) cover a very large Exclusive Economic Zone (EEZ) of nearly 4 million km^2 in the Indian Ocean. The Eastern African region even has access to the Gulf of Guinea in West Africa through the Democratic Republic of Congo (DRC) coastline of 37 km. East African fisheries are responsible for 50% of all catches in Africa [1] and provide employment for some 730,000 fishers. Production reached over 3.7 million metric tonnes in 2009.[2]

The fisheries sector in Eastern Africa is diverse. It includes an export-oriented Nile perch fishery in Lake Victoria, a large tuna fishery in the Indian Ocean and aquaculture developments of tilapia and catfish in Uganda, Kenya and Madagascar, as well as artisanal fisheries throughout the region's oceans, lakes and rivers. The region is rich in inland water bodies, with the largest lake in Africa, Lake Victoria (shared by Kenya, Tanzania and Uganda), and the two other African Great Lakes, Lake Tanganyika (Africa's second largest, shared by Burundi, the DRC, Tanzania and Zambia) and Lake Malawi (shared by Malawi, Mozambique and Tanzania), in addition to a number of smaller lakes, man-made dams and rivers. The large rift lakes in Eastern Africa are home to great diversity of fish species. Uganda and Tanzania recently entered the large-scale fish production, which is an indication that the industry is fast becoming more than an artisanal activity providing livelihood and nutrition but also a source of economic opportunity. According to the United Nations Food and Agriculture Organisation (FAO), Uganda ranks seventh in the world's top inland-water fish captures, while Tanzania occupies the eighth position (Bartly et al. 2014).[3] Aquaculture in the region holds potential but is still limited in scale.

The theme common to all these fisheries is their importance for the economic and social development of the region. They also have the potential to contribute to food security for increasing populations and may also provide opportunities for export. Fisheries management, however, has traditionally failed to receive significant financial support from governments preoccupied with direct forms of poverty alleviation.[4] Almost 90% of the fish produced in the Eastern Africa region originates from freshwater sources and only the remaining 10% comes from the vast marine areas off the coast. There is, therefore, a risk that inland fisheries are being overfished, whereas offshore, EEZ resources still have room for expansion under sustainable management regimes. [5] In addition, there are concerns on the direct and indirect impacts of climate change on the fisheries sector.

---

1 FAO, 2010

2 FAO, 2010

3 Bartley, D., G. De graaf, J.Valbo-jørgensen and G..Marmulla. Inland capture fisheries: status and data issues. Fisheries Management and Ecology, 2015, 22, 71–77

4 http://acpfish2-eu.org/index.php?page=eastern-africa

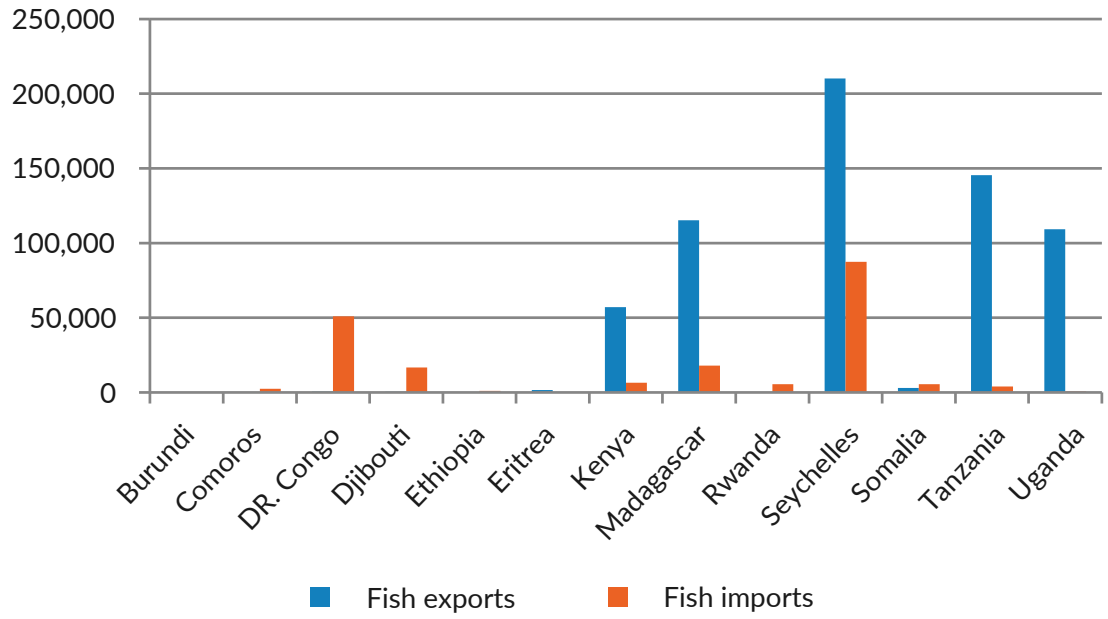
5 http://acpfish2-eu.org/index.php?page=eastern-africa

7.2 Marine Fisheries in Eastern Africa

7.2.1 Exports and Imports

Fish is highly traded and one of the leading export commodities from Africa. In addition to its direct food value, fish also contributes indirectly to Africa's food self-sufficiency through trade and exports to the European Union, Asia and elsewhere. The majority of the beneficiaries from these commercial fisheries are private-sector fishers, fish processors and traders. Participants in the fisheries sector have created relationships with international, local, national and regional trade systems in Africa and around the world as part of a global fish chain. In Africa the value added by the fisheries and aquaculture sector as a whole in 2011 was estimated at more than USD 24 billion, 1.26% of the continent's GDP. Among the branches, the highest value is produced by the marine small-scale fisheries (0.43% of African GDP per cent), followed by marine industrial fisheries (0.36%), inland fisheries (0.33%), and aquaculture (0.15%) (FAO, 2014).[6]

FIGURE 7.1 Volume of fish exports and imports in Eastern Africa average 2008-2012

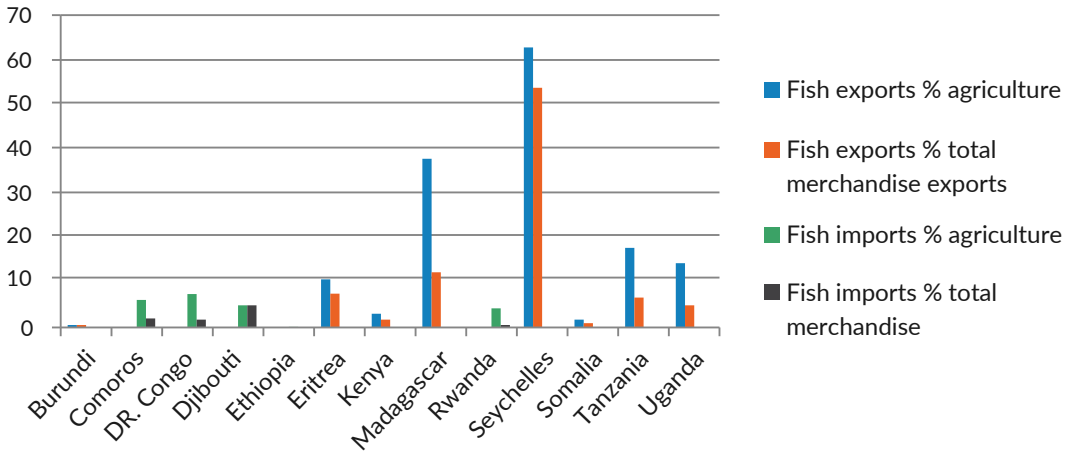


Source: FAOFISHSTAT

Seychelles, Tanzania, Madagascar, Uganda and Kenya export the highest volumes of fish products. Seychelles is also a large importer of fish products, however, and so is the DRC. Seychelles, Madagascar, and, perhaps surprisingly, Eritrea have fish exports as a high percentage of both agricultural exports of total merchandise exports (Figure 7.2). This data, however, does not include the product of illegal, unreported and unregulated (IUU) fishing. IUU fishing is high in some of the countries involved but, though it is often difficult to quantify, it is thought to amount to about 18% of the reported catch.

[6] The FAO dataset is frequently used in this chapter, although the data suffers from acknowledged imprecisions due to the nature of the industry in developing countries

FIGURE 7.2 Magnitude of fish exports and imports in Eastern African countries



Source: FAOFISHSTAT Trade statistics average 2008-2012

Commercial marine fisheries are mainly concentrated in the Eastern African EEZs targeting the tuna and tuna-like species in the West Indian Ocean (WIO). [7] Tuna and other large pelagic species are caught primarily by European purse seiners and Asian long liners. More recently, the use of artificial fish aggregating devices (FADs) has become widespread. FADs work by taking advantage of the propensity of tropical tuna to congregate around floating objects (Parrish and Edelstein-Keshet 1999). Once deployed, a FAD is left to drift freely in the open ocean for several months, with its spatial location monitored remotely via a satellite-tracked buoy (Dagorn et al. 2012). The FADs are then revisited by fishing vessels and the aggregated tuna and associated bycatch species captured. This fishery enhancement tool now accounts for over 40% of all of the world's annual tropical tuna catch. Global catches of the main species caught by tuna fisheries in 2011 amounted to 4.6 million tonnes (t) (FAO, FishStatJ database), with catches in the WIO of around 540 000 t (IOTC, Nominal Catch Database) representing 12% of the global total (DG-MARE, 2014). Yellowfin and skipjack tuna represented 88% of the catches made by vessels in the WIO in 2011 (POSEIDON, MRAG, NFDS, & COFREPECHE, 2014).

Access by Distant Water Fleet (DWF) vessels for tuna and tuna-like species in the EEZs of WIO States can be granted through a number of different mechanisms, all of which are used extensively. These include Fisheries Partnership Arrangements (FPAs),[8] bilateral intergovernmental agreements, reflagging, chartering, joint ventures or similar arrangements between WIO states and foreign vessels, and private commercial agreements between foreign associations or companies and governments in the region. Of the Eastern African countries, the EU currently has active protocols with Comoros, Madagascar, and Seychelles (POSEIDON et al., 2014). Kenya and Tanzania are currently

[7] The major tuna and tuna-like species contributing to the catches include Yellowfin tuna *(Thunnus albacares)*, Skipjack tuna *(Katsuwonus pelamis)*, Big eye tuna *(Thunnus obesus)*, Longtail tuna *(Thunnus tonggol)*, and Kawakawa *(Euthynnus affinis)*. Other species found in the catches include Swordfish *(Xiphias gladius)*, Albacore tuna *(Thunnus alalunga)*, Blue Marlin *(Makaira nigricans)*, Black Marlin *(Makaira indica)*, Striped Marlin *(Tetraptunus audax)*, Indo-pacific sailfish *(Istiophorus platypterus)*, Southern Bluefin tuna *(Thunnus maccoyii)*, Narrow barrel Spanish mackerel *(Scomberomorus commerson)*, and Billfish *(Xiphioidei)*.

[8] FPAs are used by the EU to gain access for its vessels with some coastal States in the region.

the only two fishing zones in the southern part of the WIO that do not have FPAs or protocols with the EU. Given existing private access agreements in place for the purse seine fleet in these countries, FPAs and protocols between the EU and both Kenya and Tanzania could potentially be of interest to the EU and for the countries involved and should be further explored (POSEIDON et al., 2014). Seychelles is one of the few countries to have shown marked interest in large pelagics over the past few years, gradually adding new vessels to the national fleet since 1995 while setting up joint ventures to supply the Victoria cannery. Madagascar has developed a semi-industrial fleet since the end of the 1980s (COFREPECHE, 2011).

Port Victoria in the Seychelles is the main tuna base for the pelagic fishery fleet in the Indian Ocean and about 85% of the total catch is unloaded regularly at the port. In May 2013, Seychelles renewed its FPA with the EU. This agreement allows some 48-purse seiners and 12 long liners from EU to operate in Seychelles waters for a total financial contribution of EUR 16.8 million. Seychelles also issues private fishing licenses to non EU purse seine vessels and foreign flagged vessels. Mauritius and Seychelles have an on-going bilateral fishing agreement. The plan offers incentives and business advantages to maintain Port Victoria as a tuna hub in the Indian Ocean, including the creation of a free zone area, extension of the deep-water quay and working space and additional processing areas. The processing facilities in Mauritius could serve as an example for Seychelles.[9]

BOX 7.1 Improving the value-chain benefits

Tuna fishing is the major industrial fishery of Mauritius. Fishing boats using Mauritius are able to store tuna onboard at -40 °C. Two new processing plants have been established in recent years which can also hold tuna at-40 °C degrees, which allows diversification away from canning, mostly for the European market, into the provision of high-quality tuna to the Asian and Japanese markets. These facilities can produce high-value products, such as sashimi, particularly for Japan. The fishery is, thus, more profitable. The processing facilities provide livelihood and employment to tens of workers as well as for those working in associated enterprises. The new quality product has also sparked interest from other countries such as Russia and South Korea. These investments, however, were, financed with foreign capital and the level of trickle-down effects of the benefits to the local level remains to be seen.

The Nile perch fishery of Lake Victoria is also of great importance for the exports of the three countries on its shores. The Nile perch fishery is the most important one on the lake, accounting for approximately 60% of the landed value of its fish (Mkumbo and Marshall, 2015). However, catches are declining and the fishery may be in danger of collapse (Mkumbo and Marshall, 2015). Although Nile perch is no longer the dominant species in the fishery in terms of weight, having been replaced by small pelagic species, it is still the most important in terms of value.

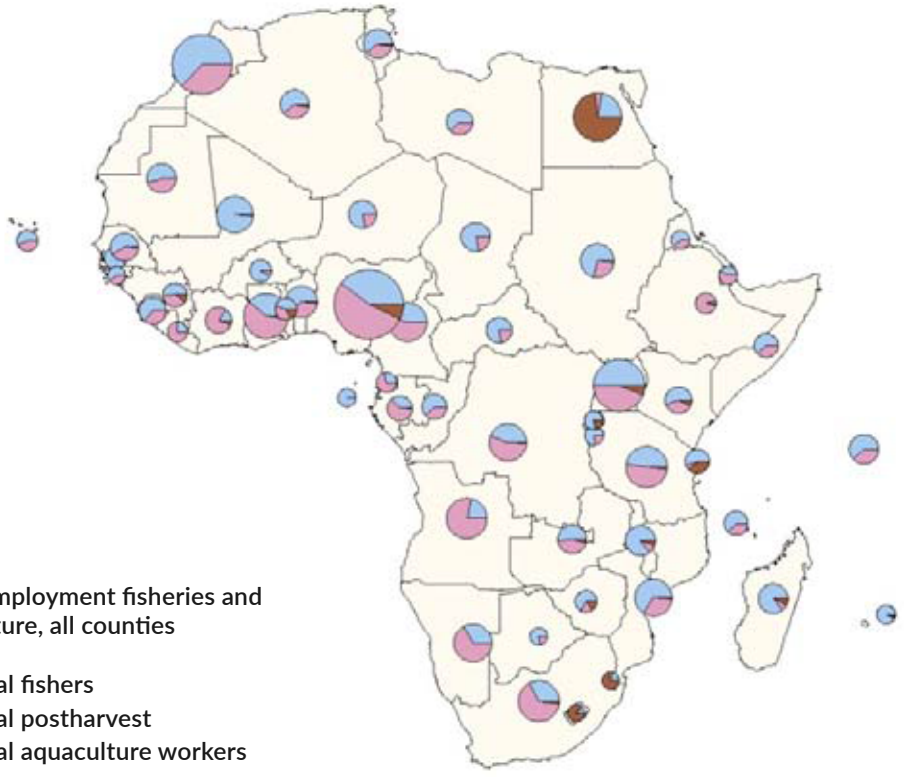
[9] See http://fishingnewsinternational.com/fishing/processing-plant/

7.2.2. Livelihoods and Employment

Fisheries have multiplier effects on employment and livelihoods. For each person directly employed in capture fisheries and aquaculture production, about three jobs are produced in secondary activities (Allison et al., 2011). These include formal and informal intermediaries, workers in processing plants, distributors, exporters, boat builders, mechanics and so on. Where fisheries or aquaculture are important activities, those employed in them are often landless with cash incomes to spend in remote areas, which helps sustain markets for agricultural produce, consumption goods and various services, ensuring that the income from fishing stays in the local area (Allison, 2011).

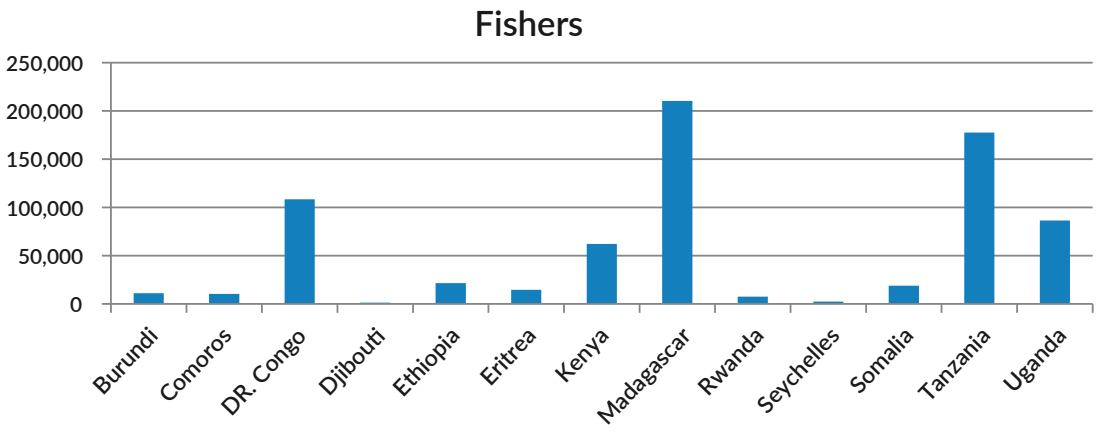
Fisheries in Africa are characterised by large numbers of small-scale fisheries contributing greatly to employment. While fishing itself is clearly an important source of employment, the bulk of fisheries employment is in post-harvest activities, which includes fish processing and marketing (De Graaf and Garibaldi, 2014, World Bank, 2012). The fisheries and aquaculture sector in Africa employs about 12.3 million people. Half of the mare fishers, 4.9 million (42.4%) are processors and 0.9 million (7.5%) work in fish farming. In the region 40% are employed in the inland fisheries, 33% in the small-scale marine sector, 19% in the industrial marine sector, and 8% in aquaculture. These figures include both primary workers (fishers) as well as those working in associated employment (e.g. processing, marketing) (FAO, 2014) (Figure 7.3). Many of those involved in the fish chain (e.g. in processing and trading) are women.

FIGURE 7.3 Employment by type of work in fisheries sector in Africa



Source: De Graaf & Garibaldi, 2014

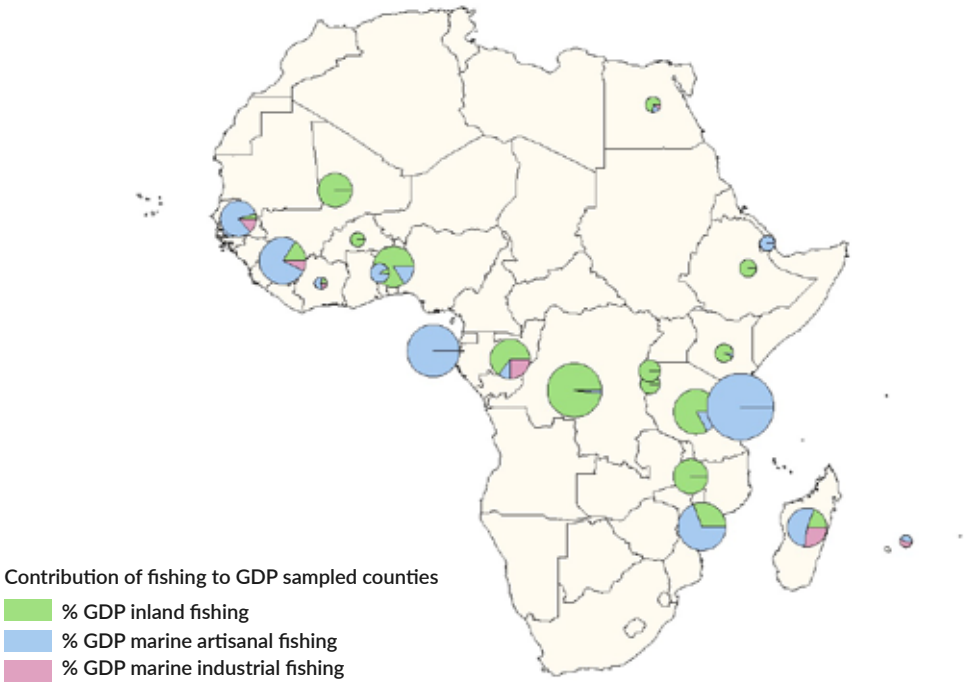
FIGURE 7.4 Absolute highest numbers of fishers in Eastern Africa



Source: Monnereau, Mahon, Mcconney, & Nurse, 2013

The absolute numbers of fishers are in Madagascar, Tanzania, DRC, and Uganda (Figure7.4), which is not surprising, given the size of these countries. The three island States of Seychelles, Comoros and Madagascar, however, have the highest proportion of fishers as a percentage of the economic active population (Monnereau et al. 2013). The Nile perch fishery of Lake Victoria provides livelihood and employment to a large number of people. It is estimated that almost 200 000 people are directly employed in the fisheries, almost 600 000 are indirectly employed, and when dependants are included, the fisheries as a whole support some 4 million people. Inland fisheries are mostly artisanal, including the various subsectors of catching, processing, transportation, trade and gear manufacture (Chauvin, Mulangu, and Porto, 2012).

FIGURE 7.5 Contribution of fishing to GDP by activity in selected African countries



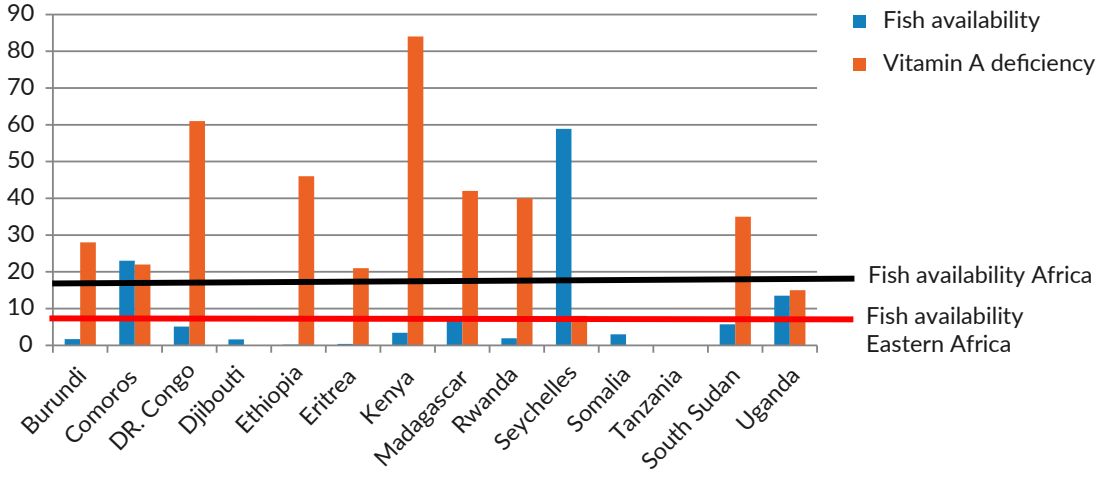
Source: De Graaf & Garibaldi, 2014

7.2.3 Food Security

The sub-Saharan Africa region has the highest prevalence of undernourishment in the world, with 30% of the population chronically hungry (Gordon et al. 2013). Population growth in the region could continue to be an important driver of fish consumption but projections for 2030 fish consumption show a decline of the consumption per capita. In the Eastern African region, where fish is often readily available, fish consumption could be an important part of the solution to food and nutritional insecurity that plagues the region.

With a few exceptions for particular species, fish is usually low in saturated fats, carbohydrates and cholesterol but contains vitamins, minerals and omega-3 fatty acids. While average per capita fish consumption may be low, even small quantities of fish can have a significant positive nutritional impact by providing essential amino acids, fats and micronutrients that are scarce in vegetable-based diets (FAO, 2012). Even small quantities of fish in human diets can make an important difference in brain development; fish is also beneficial for the development of bone and muscle tissue; and can help prevent blindness, heart attacks and cancer.[10] The level of food security fish provides, and could provide, differs substantially across the region. For the whole continent, fish provides on average 18.8% of animal protein in the human diet. For the Eastern African region, however, the figure is only 9.8% and, thus, a little over half the African average (Figure 7.6). [11]

FIGURE 7.6 Fish availability and undernourishment in Eastern Africa in 2009



Source: Fish availability: FAO FISHSTAT 2008-2012 Food Balance Sheets and Fish Contribution to Protein Supply and Vitamin A deficiency

Low-value fish is of particular importance to poor consumers in Eastern Africa because it can be purchased in extremely small quantities (Infofish 2008; Ssebisubi 2011), whereas meat is often only offered in for sale in larger pieces. Fish chunks are available, as are small pieces of smoked or powdered dried fish. The divisibility of fish makes

[10] http://www.fao.org/fsnforum/post2015/re-e-consultation-hunger-food-and-nutrition-security-126

[11] FAO, 2009 Food Balance Sheets and Fish Contribution to Protein Supply

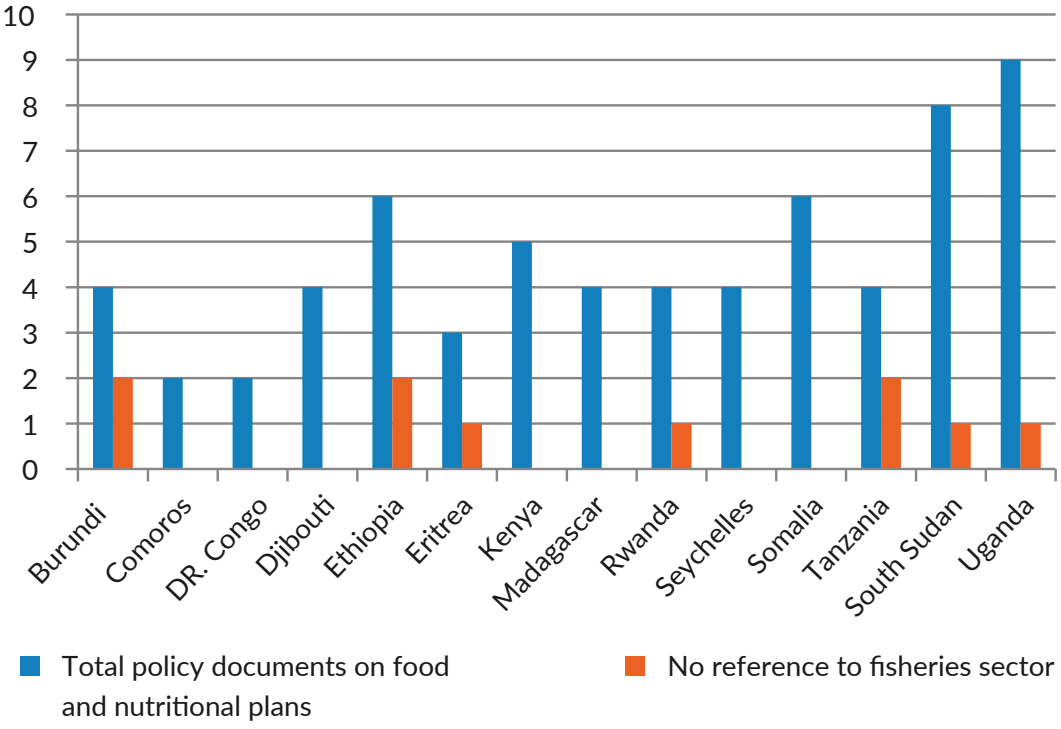
it accessible to people who have extremely limited income, as they can buy however much they can afford. Traditional processing methods, such as smoking, drying, and fermenting, make it possible to transport, store, and market fish in areas without a cold-chain infrastructure, and where poor consumers have no access to refrigerators and electricity to store fish at home (Gordon et al. 2015).

Fish supply refers to the amount of fish available for consumption by the local population. It is calculated by adding imports to domestic production and deducting non-food use and exports – all expressed in life-weight equivalents. This quantity, divided by the population, gives the indicator of 'fish supply per capita per year'. Fish availability per capita is highest in Comoros and Seychelles, followed by Uganda (see figure 7.6). However, it also important to note that the nutritional benefits differ according to the species of fish consumed and will also be influenced by local processing methods and eating patterns (Allison, 2011). Small-scale fisheries tend to contribute more directly to food security in comparison to large-scale fisheries because their catch is generally destined for human consumption and a greater share is sold at the local markets (Allison et al, 2012).

Food security is often conceptualised at the household level, yet individual consumption patterns and nutritional outcomes not only depend on the ability of households to secure food but also how food (including fish) is distributed within households (Gordon et al. 2013). In addition, there is evidence to suggest that there are large differences in sub-Saharan Africa in intra-household consumption patterns and that distribution appears to be relatively heterogeneous. The distribution depends, for example, on age, status, gender, and special nutritional needs related to life stages such as weaning and pregnancy (Gordon et al. 2013). Women are often involved in the fish chain and as they are usually responsible to the household, children and other community members, they play an important role in household nutrition.

The role of fish as an essential source of protein for the poor in most of the Eastern African countries is limited and the importance of fish as a food source is not always recognised. These issues are important in designing food-security policies at the national level. Kurien and Lópes Ríos (2013) have extensively examined policy documents related to food and nutritional plans and strategies in each country in the region. They found that, of the 65 documents examined, 10 had no reference to the fisheries sector (Figure 7.7). There is thus a failure to adequately include the sector in national as well as regional policies. More attention to fisheries as a source of food security could, therefore, be paid, particularly in Burundi, Ethiopia, and South Sudan but also in most other countries.

FIGURE 7.7 Reference to the fisheries sector in policy documents on food and nutritional plans and strategies



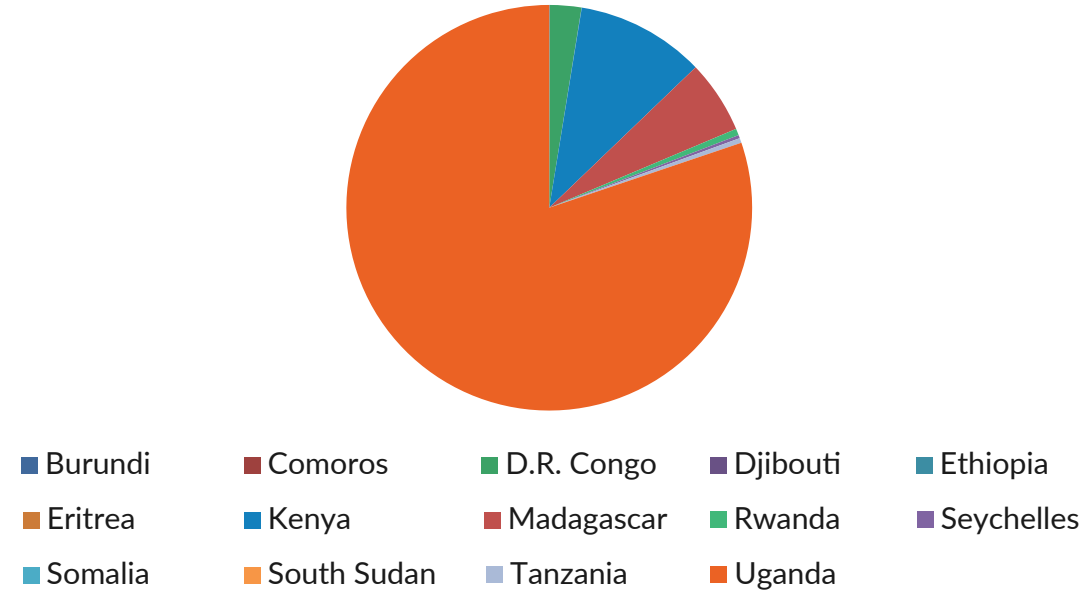
Source: Kurien and Lópes Ríos, 2013

Most fish consumption as food in Africa falls into the "low-value" group, as defined in "Fish to 2020". According to this classification, in 41 out of 49 countries, 70% or more by volume of all fish consumed is categorised as low-value (Gordon et al. 2013). Knowledge of the fish-eating culture – and of fish species – is important if the objective is to enhance consumption of fish. In Rwanda, for example, people have good access to fish and fish products, yet there is no established fish-eating culture. It is, therefore, important to create awareness events that focus on cooking demonstrations to introduce potential consumers to new and flavourful ways of eating fish. Materials to encourage the simple and hygienic preparation of fish for eating are also necessary at these demonstrations. Improving fish processing in order to decrease post-harvest losses, developing aquaculture (as in Uganda and Nigeria), and ensuring the sustainable harvesting of marine-capture fisheries while increasing production (e.g. by means of FADs), are also essential to enhancing food security through increasing fish consumption in Eastern African countries.

7.3 Aquaculture in Eastern Africa

With an annual average growth rate of 8.8% over the past 30 years, aquaculture is the world's fastest growing agro-food sector (Toufique and Belton, 2014). Projections are that by 2018, half the fish produced for direct human consumption will be farmed (FAO, 2012) and by 2022 aquaculture is forecast to provide an additional 22 million tons of fish (an increase of 35% over current levels) (Toufique and Belton, 2014). Aquaculture[12] has thus become increasingly important in meeting the deficit created by a declining capture fishery worldwide and the increasing demand for fish on domestic, regional and international markets, as well as improving food security for the poor. In general terms, aquaculture has the potential to contribute to food security, poverty alleviation and economic development. Aquaculture in the sub-Saharan African region has grown very rapidly in some countries, admittedly starting from a low baseline (Gordon et al. 2015). The Eastern African region has high potential for aquaculture production because of: its numerous lakes, rivers, wetlands, and the coastline; the availability of suitable native species; its locally available inputs for feed production; a suitable temperature range for fish growth; and expanded local, regional and international market access and trade. However, aquaculture development in the region is still in its infancy and currently the continent only produces 1% of all global aquaculture. The largest producers are Egypt and Nigeria. In Eastern Africa Uganda and Kenya are by far the largest producers. The high aquaculture production in these two countries has been attributed both to increased investment by the private sector as well as specific public-sector interventions.

FIGURE 7.8 Aquaculture production in 2010 in Eastern Africa



Source: FAO 2010

[12] Aquaculture, also known as fish farming, is the controlled cultivation of freshwater and saltwater animals or plants (Boto, Phillips, & D'Andrea, 2013). It implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated (www.fao.org/fishery/statistics/global-aquaculture-production/en)

Aquaculture production mainly includes catfish, tilapia, and seaweed. The main producer is clearly Uganda (see fig. 7.8) with Kenya and Madagascar as second and third. Of the top 10 aquaculture producers in Africa, Uganda is the third (with 7.4% of total), followed by Kenya, fourth, (1% of total) and Madagascar in seventh position (0.5% of total). The objectives of aquaculture can be different, however, with production in Madagascar mostly concerned with small-scale subsistence type of aquaculture for food security. African aquaculture production is overwhelmingly dominated by fin fishes (99.3% by volume), with only a small fraction from marine shrimps (0.5%) and marine molluscs (0.2 %) (FAO, 2012). The main freshwater cultured fish are Nile tilapia and African catfish. These species are native, with high demand on the local and regional markets, and are found in virtually all aquatic systems. On the Indian Ocean coastline the main aquaculture species include prawns, milk fish, mullet and pearl oysters, as well as some farming of seaweed. Marine shrimp culture is concentrated in Madagascar, although there are a few farms in Seychelles and Kenya.

The central part of the Eastern African region is particularly suitable for aquaculture development (Brummett et al, 2008). Aquaponics, a form of sustainable aquaculture combining aquaculture and hydroponics (plant cultivation using enriched water with little or no soil), is still in its infancy but could provide potential in the region. Aquaponics is capable of producing fish, fruit and vegetables in a recirculation system that conserves freshwater resources. Some aquaponics farms exist in Rwanda and Kenya. With many African nations facing food-security issues, as well as water shortages and droughts, the timing of this technology is appropriate. In addition, aquaponics systems can take many forms, are directly saleable and can fit any level of investment, be it for family food supplementation or as a stand-alone economic activity.

In most countries rural fish ponds with extensive/semi-intensive management are the most commonly used aquaculture systems. Madagascar, Malawi, South Africa and Zambia, amongst others, have rural, subsistence-oriented fish ponds and a more intensive commercial sector, comprising small-, medium-, and large-scale aquaculture enterprises. Each of these aquaculture production systems contribute in varying degrees to different policy goals. Where household food security and increased resilience for the poor is the main objective, (partially) subsidised and longer-term support to subsistence and integrated fish farming systems, development of locally appropriate production systems and training, if affordable, may be a worthwhile investment. Where income generation and job creation is the main target, promotion of small- and medium scale aquaculture enterprises may be a viable strategy, though this will probably not reach the poorest and most vulnerable groups directly. Where foreign-exchange earnings are sought, large(r)-scale commercial aquaculture could be promoted, though preferably cash returns to local economies should be re-invested in new and effective development schemes. Interventions and impact pathways leading from aquaculture production to policy goals such as local food production, local income generation or export earnings are different, and this has important implications for national policies aimed at encouraging the growth of aquaculture.

In their review of cage aquaculture in sub-Saharan Africa, Blow and Leonard (2007) note its development uniquely for tilapia production in freshwater sites. Ghana, Kenya, Malawi, Uganda, Zambia, and Zimbabwe are production centres, mostly through small

and medium sized enterprises. They consider the area of greatest potential to be in the Great Lakes region and West Africa. Constraints include technical, economic, and policy issues. Several countries are reluctant to introduce high-performing tilapia species from elsewhere. High production costs, due to limited economies of scale and expensive feed, also limit potential. Despite high-level endorsements from programs such as NEPAD, local applications of policy remain a constraint in many countries (Blow and Leonard 2007). Compared to fishing, mariculture is a recent phenomenon in the SW Indian Ocean and it appears to have positive future prospects, particularly in Madagascar, Mozambique, Tanzania and Kenya.

7.4 Legal and Policy Frameworks and Co-ordinating Organisations

In Eastern Africa, fisheries management is vested in central government ministries responsible for fisheries, within the department of fisheries, under the guidance of national fisheries legislation (Fisheries Act and regulations). Nevertheless, in many countries there is a significant disconnect between the regulations and objectives outlined in fisheries policies and the actual practice of fisheries and its administration (Benkenstein, 2014).

Although African fisheries provide major benefits, they are under threat from ineffective governance that leads to over-exploitation, often well beyond biologically sustainable limits (Chimatiro, n.d.). The primary agency for co-ordinating African fisheries policy has been NEPAD's Partnership for Africa's Fisheries (PAF) (Benkenstein, 2014). PAF works to improve the sustainability of Africa's fisheries and improve the returns provided by this sector. The PAF aims to support an emerging political unit in defining processes that will strengthen Africa's capacity to consider, determine and implement responsive reforms in fisheries governance and trade. Reforms are needed not only to ensure that these benefits are sustained, but also to generate and sustain wealth from fisheries. A number of other regional fisheries bodies and economic communities, such as the Southern African Development Community (SADC), the West Indian Ocean Marine Science Association (WIOMSA) and the Sub-Regional Fisheries Commission in West Africa, also play an important role in developing regional policies and facilitating co-operation among African fisheries administrations (Benkenstein, 2014). These institutions should, therefore, help devise a plan for including the fisheries sector in the development of the Blue Economy. The Comprehensive African Fisheries Reform Strategy (CAFRS) is a joint initiative with the World Bank's PROFISH programme and the PAF. PAF will support and help implement earlier African fisheries instruments targeting reform. These include the Abuja Declaration (NEPAD, 2005); the NEPAD Action Plan (2005); and the regional economic integration policies of the Regional Economic Commissions. Africa's Integrated Maritime Strategy (2050 AIM Strategy) will incorporate and implement a common fisheries policy for the conservation, management and exploitation of fish stocks in accordance with the ecosystems and with a precautionary approach (AIMS Strategy 2014).

7.5 International Agreements and Signatories

A number of international agreements and international commissions are relevant to Eastern Africa (Table 7.1). Three major international agreements have been the United Nations Convention on Law of the Sea (UNCLOS), the FAO Code of Conduct of Responsible Fisheries, and the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing. Port State Measures are important in IUU fishing, whether it occurs under national jurisdiction or on the high seas. The implementation of these measures by port States, using minimum standards agreed at global and regional levels, is of vital importance for the sustainability of the tuna resource. Port State measures are considered to be among the most robust and cost-effective tools in the global arsenal to combat IUU fishing. They impose major sanctions, including denial of entry into port or use of port and could lead to further investigation, prosecution, license revocation and inclusion on an IUU Vessel List of a Regional Fisheries Management Organisation (RFMO).

So far worldwide only 45 countries have signed the agreement including in Eastern Africa only Kenya and Seychelles. Kenya is losing an estimated USD 118 million annually due to IUU fishing in its waters. Monitoring, Control and Surveillance (MCS) is being carried out in some Eastern African states with different levels of intensity. Seychelles uses the Vessel Monitoring System for monitoring fishing vessels in its EEZ. However, the other coastal states do not have such a system, leading to the region's vulnerability to large-scale IUU fishing.

The two Great Lakes - Victoria and Tanganyika –benefit from two Regional Fishery Bodies (RFBs): the Lake Victoria Fisheries Organisation (LVFO) and the Lake Tanganyika Authority (LTA) (Table 7.1). Both have management decision-making powers. The coastal States and those in the Indian Ocean participate in the Indian Ocean Tuna Commission (IOTC) and the South West Indian Ocean Fisheries Commission (SWIOFC), through which management decisions are made.

The Indian Ocean Tuna Commission (IOTC) is an intergovernmental organisation responsible for the management of tuna and tuna-like species in the Indian Ocean. The organisation works to achieve this by promoting co-operation between its Contracting Parties (Members) and Co-operating Non-Contracting Parties in order to ensure the conservation and appropriate utilisation of fish stocks and encourage the sustainable development of fisheries. The objective of the Commission is to promote the conservation and optimal utilisation of tuna and tuna-like stocks covered by the IOTC Agreement, and to encourage the sustainable exploitation of fisheries.

The main objective of the SWIOFC is to promote the sustainable utilisation of the living marine resources of the Southwest Indian Ocean region, by the proper management and development of these resources, and to address common problems of fisheries management and development faced by the Members of SWIOFC, without prejudice to the sovereign rights of coastal States. The recommendations of the SWIOFC are, however, not binding on the member states. Only Seychelles is also member of South Indian Ocean Fisheries Agreement (SIOFA). The Nile Basin Initiative (NBI) is

a partnership among the Nile riparian States that seeks to develop the river in a co-operative manner, share substantial socioeconomic benefits, and promote regional peace and security.

TABLE 7.1 Signatories to international agreements and members of international commissions

	BURUNDI	COMOROS	DJIBOUTI	DRC	ETHIOPIA	ERITREA	KENYA	MADAGASCAR	RWANDA	SEYCHELLES	SOMALIA	SOUTH SUDAN	TANZANIA	UGANDA
United Nations Convention on Law of the Sea	X	X	X	X			X	X	X	X			X	X
FAO Code of Conduct of Responsible Fisheries	X						X	X	X	X	X		X	X
Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing							X			X				
Indian Ocean Commission (IOC)		X	X		X	X	X	X		X	X		X	X
The Convention of Sustainable Management of Lake Tanganyika	X			X									X	
Convention for the Establishment of the Lake Victoria Fisheries Organisation (LVFO)							X						X	X
South West Indian Ocean Fisheries Commission (SWIOFC)		X						X		X	X		X	
Agreement of the Indian Ocean Tuna Commission (IOTC)		X				X		X		X			X	
South Indian Ocean Fisheries Agreement (SIOFA)										X				
Nile Based Initiative**	X			X	X	X*	X		X				X	X

Source: Adapted from NEPAD 2012

*Observer

** NBI website

7.6 Challenges Facing the Marine Fisheries Sector and Aquaculture

Climate-change impacts such as sea-level rise, increasing coastal water temperatures (often resulting in coral bleaching), ocean acidification, as well as the increasing frequency and strength of extreme events such as tropical storms, hurricanes and droughts, pose significant threats to the region's coastal zones, maritime areas and economies. Yet, the direct (ecological) and indirect (both social and environmental) pathways between climate change and its impact on the fisheries sector are not well known but will vary across regions and countries because of their differing exposure, sensitivity and level of adaptive capacity. Climate change can impact the economy of the fishing industry through variations in the production ecology and fishing operations, impacting communities' livelihoods in a number of ways (Daw et al. 2009; Barange et al 2014; Monnereau et al. 2015).

The impact of climate change on pelagic fish living in open water, such as tuna, is expected to be less severe than it will be on bottom- or near bottom-dwelling demersal species because of the declining health of the coral-reef marine ecosystem. Pelagic fish can simply change location in reaction to changes in the marine environment brought about by climate change. This could imply gains for some countries and losses for others. Tuna are considered thermo regulators (Lehodey et al., 2010), which means that they can tolerate a wide range of temperatures by maintaining a fairly constant internal temperature. Habitat modelling and projections using Intergovernmental Panel on Climate Change(IPCC) scenarios have been useful in calculating potential changes in the distribution of pelagic species. Such projections mainly suggest pole ward latitudinal shifts of present distributions that seem to be corroborated by recent observations, for example of Bluefin tuna migrating further north in summer following the warming of water masses (MacKenzie et al. 2015) or comparisons with past warm events (such as El Niño phases). This will impact fisheries in the West Indian Ocean (WIO) region as they depend to a large degree on pelagic fisheries.

Sustainable exploitation of Eastern Africa's fisheries is under threat. Over-exploitation of ocean fisheries from intensive fishing by small-scale fleets and foreign industrial vessels, IUU fishing, added to the nature of resources that are based on migratory species, lack of data on fish stocks, and weak and ineffective fisheries governance render the industry particularly vulnerable. Institutional weaknesses, lack of capacity for effective policy implementation and increasing demand also contribute to increasing the fragility of fish stocks. Fisheries are already facing the impact of climate change through pollution, destruction of habitats and decreasing biodiversity. The current status and trends in African capture fisheries landings suggests limited scope for expansion. Growth in the consumption of pelagics can only be expected if infrastructures, including transport and storage facilities, are developed to link landing sites to the consumption centres. The upgrading of tuna-processing plants would bring benefits that part of the industry.

Less is known about the health of Africa's inland fisheries, but the evidence suggests that they experience similar resource-exploitation pressures, lack of effective management, and are unlikely able to deliver significant and sustained increases

in landings (Gordon, Dugan and Egerton 2006; Welcomme and Lymer 2012). Inland fisheries have been more affected by changes in watershed management than by shifts in fisheries management (Gordon et al. 2015).

African coastal nations need to reconcile their exploitation of coastal and marine assets with the obligation to protect them from degradation and exploitation. The governance of commercial fisheries, particularly relating to industrial fishing by foreign boats supplying markets in Europe and Asia, is frequently undermined by a lack of transparency and accountability. Distant water fleets (DWF) often engage in illegal fishing and are known to transfer fish illegally at sea. Tension as a result of piracy, mostly around Somalia, has, however, reduced the presence of DWFs and this affects the countries catering to the DWFs such as Seychelles. Catches of yellowfin, skipjack and bigeye tuna from within the Seychelles EEZ have fallen dramatically, as have port revenues and income from fishing licenses. Between 2008 and 2009 the total catch from the EEZ fell by 45%, largely because of piracy.

Government-service provision to the fisheries sector varies between States, but generally faces the following challenges:

- Weak or ineffective institutional and legal frameworks, often without policy-level guidance documents, lead to lack of coherent strategies and practical action plans, low institutional capacity, weak sector governance, insufficient baseline knowledge, increasing fishing pressure and ineffective legislation and poor implementation regulations enforced by fisheries officers with insufficient or up-to-date training;
- Control and enforcement capabilities are very low with insufficient monitoring, control and surveillance of fishing activities, weak human-resource capacity, poor enforcement and prosecution systems, and legal regimes with inadequate human and financial resources;
- Large-scale IUU fishing that distorts competition, harms honest fishers, weakens coastal communities, promotes tax evasion, and is frequently associated with transnational crime such as narcotraffic and human trafficking;
- Complete data on the total extractions of living resources from marine ecosystems are needed in order to understand the sustainability of fisheries, both in terms of ecology and economics. Catches reported to national and international agencies (e.g. the FAO) exclude IUU, discards and often small-scale and recreational fishery catches;
- It is also important to include and develop new methodological approaches and concepts (e.g. Ocean Investment Principles and Life-Cycle Analysis) and indicators for measuring blue economy benefits (e.g. a Blue Economy Index);
- The fisheries sector suffers from a lack of co-ordination between the multiple agencies that share regulatory responsibility. Countries may have legislation that may not be in harmony with the state of the industry, and there can be unclear and or conflicting priorities within the policy-making and regulatory spheres;
- Global economic volatility impacts fish exports. For example, competition with Nile perch fillets from Asian tilapia. This has large scale impacts down the value chain;
- Impacts of climate change are not adequately researched and projections at national levels for the effect on marine ecosystems and, consequently, on humans are lacking. Climate-change impact on the fisheries sector are also not mainstreamed in national policies;

- The open-access nature of the fisheries resources for inland and marine small-scale fisheries leads to overfishing. For example, overfishing is one of the major contributors to the long-term decline in total Nile-perch harvests. A study by the Smart Fish Program suggests that the species may be extinct in the wild in three or five years;
- DWFs are moving from the WIO to the Eastern Indian Ocean because of declining production in the former, which can impact the negotiating strength of Eastern African states with large tuna importers;
- Large post-harvest losses and low quality fish are due to the lack of sufficient adoption of technical advances and innovations in Eastern African landing sites. In addition, the industry still lacks adequate infrastructure and services (including hygienic landing sites), reliable power supplies, potable water, access roads, ice plants, cold rooms and refrigerated transport means. These factors, associated with tropical temperatures, result in a high proportion of post-harvest losses and quality deterioration. This leads to health risks for consumers, translates into economic losses and reduces market potential;
- It is important to promote public private partnerships. However, the private sector suffers from administrative, legal, institutional and macroeconomic constraints for operations that stifle its growth and ability to invest in Blue Economy initiatives;
- The development of aquaculture in most Eastern African countries is constrained by low adoption of appropriate technologies, inadequate investment in research to boost productivity-enhancing technologies and innovations, weak aquaculture extension services, low capacity in fish disease diagnosis, inadequate understanding of technical matters and the market, insufficient infrastructure, poor culture management and unavailability of quality fish seeds and feeds.

7.7 Conclusions and Recommendations

The Eastern African countries are typically characterised by rapid population growth and a significant deficit in protein supply. They also suffer from high levels of unemployment. Of the 14 countries covered in this chapter, 12 are Least Developed Countries (LDCs).[13] The fisheries sector is vital for achieving and maintaining food security, providing employment and earning foreign exchange. However, at the policy level, this role goes frequently unrecognised. There is limited knowledge and lack of appreciation in the region of the cultural and economic importance and development potential of ocean resources.

Fisheries face significant challenges derived from a number of sources including poor data collection (particularly for inland fisheries but also for marine-capture fisheries), IUU, overfishing, ineffective fisheries governance and the relatively low profile of fisheries in Africa, compared to, for example, agriculture (Gordon et al. 2013). The future of fisheries resources will, therefore, require careful balancing between satisfying increasing demands on the sector and maintaining its sustainability.

[13] LDCs were first officially recognised as a separate group by the United Nations in 1971 on the basis of their low gross domestic product (GDP) per capita, weak human assets and high degree of economic vulnerability. Currently there are 48 LDCs

The Blue Economy approach could help address some of these challenges in the region by emphasising the potential of the fisheries sector to enhance food security, generate wealth, reduce poverty and create job opportunities. The "Greening" of fisheries and aquaculture requires overall recognition of the wider societal contribution – in particular of small-scale operators – to local growth, poverty reduction and food security. Fishers and fish farmers should, given their dependence on the resource for their livelihoods, be more actively involved as stewards of the marine environment. Small-scale fisheries should be promoted to ensure more social inclusion in the sector. This entails difficult choices between supporting large-scale industrial fishing that provides public revenues or local small-scale operators to improve local food security. Governance structures should be responsive to the welfare function of fisheries because, in a developing-country setting, small-scale fisheries not only generate income, but also absorb labour through job creation and provide a safety net to poor families through additional income and as a cheap, nutritious food source. With improved management, fisheries can contribute increasingly to pro-poor and sustainable growth.

MCS is often sub-standard and the coast guards and fisheries officers often lack sufficient human, financial and technical capacity. Acknowledging the limits of centralised fisheries governance efforts, there has been a move towards co-management. This is a partnership approach between regulating officials and fishing communities through fishers' committees. The establishment of these systems has not been without its challenges, however. Fishers' committees can be compromised by influential local individuals who benefit from illegal fishing practices, while surveillance and enforcement may be undermined by corruption or weak support from fisheries inspectors. Cooperation with the private sector should be actively sought to ensure public-private partnerships to further boost Blue Economy activities in the roam of fisheries.

IUU fishing remains a major threat to marine ecosystems and the sustainability of the fisheries sector. Therefore, many countries are striving to implement the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA–IUU), while RFBs have engaged in vigorous campaigns to combat IUU fishing. The binding 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) has come into force on June 5th 2016 and has the potential to be a cost-effective and efficient means of combating IUU fishing. In June 2014, the FAO Committee on Fisheries (COFI) endorsed the "Voluntary Guidelines for Flag State Performance".

Female workers dominate in the post-harvest value chain, so needed improvements will likely impact on the livelihoods of women. High post-harvest losses occur in small pelagic fisheries that support the livelihoods and food security of many people. Fish is a highly perishable good and needs timely harvesting, efficient transportation, and advanced storage if it is to remain of comestible quality. However, while technological innovation and training can ensure sufficient quality for human consumption, opportunities to reduce post-harvest losses also exist in, for example, fish-meal production for use in animal feed and aquaculture. Reducing the discarding of by-catch at sea and improving landed products could be achieved by equipping vessels with better storage and handling facilities, producing higher-value frozen products and the on-board use of ice, but such facilities are beyond the financial reach of small fleets.

BOX 7.2 Combating IUU fishing

The use of Vessel Monitoring Systems for real-time position reporting by licensed vessels (for example as used in the FISH I project) can help deter IUU fishing. The NEPAD Stop Illegal Fishing Working Group plays an important role in supporting African states' efforts to control IUU fishing, co-operating with international organisations such as Interpol and the European Union. Some African states have explored technology- and information-sharing initiatives, such as FISH-i Africa, while new and more advanced satellite tracking systems show promise in identifying illegal industrial vessels, though not to small-scale fleets. In West Africa, the area with the highest levels of IUU fishing in the world (representing up to 37% of the region's catch), the West Africa Regional Fisheries Programme and Sub-Regional Fisheries Commission co-ordinate fisheries governance, monitoring, control and surveillance. In 2012 Senegal acted decisively against illegal fishing and questionable fishing permit allocations to foreign trawlers by revoking the permits of 29 trawlers. In Sierra Leone small-scale fishers use mobile telephones and Global Positioning System-enabled cameras to record incidences of illegal fishing by industrial trawlers. International environmental NGOs, such as Greenpeace and the Environmental Justice Foundation, play an important role in facilitating these anti-IUU actions. These types of actions could be of interest to the Eastern African region.

Tuna fisheries in the region are crucial. However, due to declining production the DWF are moving from the Western Indian Ocean to the East, a phenomenon that limits the economic negotiating power of the countries involved. One option would be to pursue the idea of setting up a business-consultation mechanism under the leadership of the SFA for a sustainable tuna by-products industry. This would facilitate ventures between onshore enterprises and vessels owners, and could include fleet owners stationed at Port Victoria. Such an innovative scheme could seek financial and technical support from national and external development funding agencies such as the EDF or UNDP/GEF. "Vessel Day Schemes" in the Pacific could provide an example for the Eastern African region to reap higher benefits from the tuna fishery and decrease IUU fishing.

The region should promote strengthening of RFBs, national fisheries-management agencies, fishing communities and fisheries workers' organisations. There is a need to harmonise fisheries policies and legislation to manage shared or trans-boundary resources. Public-private partnerships are crucial for further development. In addition, climate change should be mainstreamed into fisheries policies and regulations. The potential of the seas and oceans to meet sustainable development needs by providing employment, food, medicine, cultural values and other ecosystem services should be appreciated. The full potential of the sector will not be realised without effective steps to deal with the challenges and threats it faces from climate change, poor governance, illegal fishing and inadequate data sources. In order to enhance sustainability of the resource Marine Protected Areas should be further implemented and adequately enforced.

In the face of 'Greening the economy' of the fisheries sector it is also crucial to reduce energy use and its 'carbon footprint'. Enhancing the linkages between markets for

BOX 7.3 Tuna fisheries' agreement

An example of improving the benefits received from the agreements with DWF would be to take an example of the Pacific tuna fisheries. Here the Parties to the Nauru Agreement (PNA) have developed a "vessel day scheme" (VDS). The VDS is a scheme where vessel owners can purchase and trade fishing days at sea in places subject to the PNA. The purpose of the VDS is to constrain and reduce catches of target tuna species, and increase the rate of return from fishing activities through access fees paid by Distant Water Fishing Nations (DWFNs). The total allocation of fishing days is set and apportioned between Pacific Island members for one-year periods up to three years in advance. The VDS now enforces a minimum payment of US$6,000 per fishing day, providing significant greater financial benefits to PNA members than before. At the end of 2013, PNA began to successfully market internationally certified sustainably caught skipjack in Europe, generating a premium price for the product. The nine countries party to the PNA managed to stop purse seine fishing in several high seas enclaves, effectively making these areas high seas MPAs.

carbon sequestration projects (e.g. Blue Carbon projects) and as a result of protecting mangroves, seagrass beds and saltmarshes, which will improve the sustainability of fisheries by protecting vital fisheries nursery grounds and habitats, should be examined.

Although the promise of aquaculture for income, employment and food supply has been widely recognised and often promoted, its development in most parts of Africa has been disappointingly slow, and has frustrated the attempts of internal development agencies, governments and private-sector investors alike. However, with a greater recognition of the role of markets, and a rise in demand for aquaculture products, particularly around major urban centres and for export purposes, the prospects for aquaculture appear to be changing for the better. It is clear that the development of aquaculture has important potential for improving the livelihoods of millions of Africans. Improved governance and management systems, collaboration between different stakeholders and targeted investments in infrastructure and marketing would accelerate the growth of aquaculture. Such improvements would be aligned with NEPAD's Comprehensive Africa Agriculture Development Programme (CAADP) and its action plan for fisheries and aquaculture that promotes a pragmatic approach to developing the fishery sector. It is unlikely that aquaculture could be a viable micro-scale activity, and it may have to be organised at least at community level. Evidence from Asia is also that the cultivation of non-marketed, often small endemic aquatic species can be very important for poorer groups; similar conditions may apply in African countries.

Sustainable fisheries management may perhaps only be achieved in Eastern Africa if the economic problems of poor institutional settings are properly addressed, facilitating reform. Consequently, the activities and investments of donors, partners and multilateral agencies should be aligned with such a reform process in order to optimise development outcomes and enhance the progress of the Blue Economy.

References

Allison, E. H., (2011), *Aquaculture, fisheries, poverty and food security*. Penang, Malaysia. Working Paper 2011-65

Allison, E., N. Franz, C. Fuentevilla, and L. Westlund (2014). Greening small-scale fisheries and aquaculture. In: UNEP, FAO, IMO, UNDP, IUCN, WorldFish Center, GRID-Arendal, *Green Economy in a Blue World*. GRID-Arendal, Norway. Pp: 20-36

Allison, E. H., A. L. Perry, M.C. Badjeck, W.Neil Adger, K Brown, D.Conway andN.K. Dulvy, (2009), "Vulnerability of national economies to the impacts of climate change on fisheries". *Fish and Fisheries*, 10(2), 173–196. doi:10.1111/j.1467-2979.2008.00310.x

Barange, M., G. Merino, J.L. Blanchard, J. Scholtens, J. Harle, E.H. Allison, J.I. Allen, J. Holt and S. Jennings, (2014). "Impacts of climate change on marine ecosystem production in societies dependent on fisheries", *Nature Climate Change* 4(February). doi:10.1038/NCLIMATE2119

Benkenstein, A. (2014). *Development, Sustainability and Social Justice: The Elusive Balancing Act of African Fisheries Governance* (p. 4). doi:POlicy Note 3: Governance of Africa's Resources Programme

Blow, P. and S. Leonard, (2007), "A review of cage aquaculture: sub-Saharan Africa". In M. Halwart, D. Soto and J.R. Arthur, eds. Cage aquaculture – Regional reviews and global overview, FAO *Fisheries Technical Paper*. No. 498. Rome, 241p

Boto, I., S. Phillips and M. D'Andrea, (2013), *Fish-farming: the new driver of the blue economy.* Brussels, Belgium. doi:Brussels Development Briefing 32

Brander, K., (2010). "Impacts of climate change on fisheries". *Journal of Marine Systems*, *79*(3-4), 389–402. doi:10.1016/j.jmarsys.2008.12.015

Brander, K. M., (2007), "Global fish production and climate change" *Science*, 104(50), 44–46

Brummett, R.E., J. Lazard and J. Moehl, (2008), "African aquaculture: realising the potential". *Food Policy*, 33: 371–385

Chauvin, N. D., F. Mulangu and G. Porto, (2012), "Food Production and Consumption Trends in SubSaharan Africa: Prospects for the Transformation of the Agricultural sector". *Working Paper 2012- 011*, Regional Bureau for Africa, United Nations Development Programme

Cheung, W. L., V.W.Y. Lam, J.L. Sarmiento, K. Kearney, R. Watson, D. Zeller, and D. Pauly, (2010), "Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change." *Global Change Biology*, 16(1), 24–35. doi:10.1111/j.1365-2486.2009.01995.x

Chimatiro, S. (n.d.). *Outline and Road Map to Deliver on PAF Comprehensive African Fisheries Reform Strategy (CAFRS)* (pp. 1–9). Johannesburg, South Africa

Dagorn L, K.N. Holland, V. Restrepo and G. Moreno, (2012), "Is it good or bad to fish with FADs? What are the real impacts of the use of drifting FADs on pelagic marine ecosystems?" *Fish Fish*; doi:10.1111/j.1467-2979.2012.00478.x

Daw, T., W.N. Adger, K. Brown, and M.-C. Badjeck, (2009),"Climate change and capture fisheries: potential impacts, adaptation and mitigation". In Cochrane, K., C. De Young, D. Soto and T. Bahri, eds. "Climate change implications for fisheries and aquaculture: overview of current scientific knowledge", pp. 107–150. FAO *Fisheries and Aquaculture Technical Paper* No. 530. Rome, FAO. 212 pp

De Graaf, G. and L. Garibaldi, (2014), "The value of African fisheries", *FAO Fisheries and Aquaculture Circular #76*

Food and Agricultural Organisation, (2013), *State of the World Fisheries and Aquaculture 2012*. Rome: FAO

Gordon, A., P. Dugan, and C. Egerton, 2006, *Fisheries Opportunities Assessment. Appendix 3. Africa's Freshwater Fisheries: An Assessment of Potential Investment Opportunities for USAID.* Narragansett,RI: Coastal Resources Center, University of Rhode Island and Florida International University

Kurien, J. and J. López Ríos, (2013), *Flavouring Fish Into Food Security.* GCP/RAF/466/EC SmartFish Project. Report SF-FAO/2013/14. Rome: FAO

Lehodey, P., I. Senina, J. Sibert, L. Bopp, B. Calmettes, J. Hampton, and R. Murtugudde, (2010), "Preliminary forecasts of bigeye tuna population trends under the A2 IPCC scenario." *Progress in oceanography*, 86, 302-315

Mahon, R. (2002). *Adaptation of Fisheries and Fishing Communities to the Impacts of Climate Change in the CARICOM Region*, Issues paper, (May)

Mkumbo, O.C. and B. E.Marshall, (2015), "The Nile perch fishery of Lake Victoria: current status and management challenges". *Fisheries Management and Ecology*, 22: 56–63. doi: 10.1111/fme.12084

Monnereau, I., R. Mahon, P. McConney, L. Nurse, R. Turner and H. Vallès, (2015), "Vulnerability of the fisheries sector to climate change impacts in Small Island Developing States and the Wider Caribbean". *CERMES Technical Report No. 77*: 88pp

Monnereau, I., R. Mahon, P. Mcconney and L. Nurse, (2013), "Vulnerability of the fisheries sector to climate change impacts in Small Island Developing States and the Wider Caribbean: early findings", *CERMES Technical Report*, No 56, (p. 45)

Mora, C., (2013), "The projected timing of climate departure from recent variability". *Nature*, *502*(7470), 183–187. doi:10.1038/nature12540

Nurse, L. A., (2011), "The implications of global climate change for fisheries management in the Caribbean". *Climate and Development*, 3(3), 228–241. doi:10.1080/17565529.2011.603195

Parrish J.K. and L. Edelstein-Keshet, 1999, "Complexity, pattern, and evolutionary trade-offs in animal aggregation", *Science* 284: 99–101

Pörtner, H.-O., D.M. Karl, P.W. Boyd, W.W.L. Cheung, S.E. Lluch-Cota, Y. Nojiri, D.N. Schmidt, and P.O. Zavialov, (2014), "Ocean systems". In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]., Cambridge and New York: Cambridge University Press

Toufique, K.A. and B. Belton, (2014), "Is aquaculture pro-poor? Empirical evidence of impacts on fish consumption in Bangladesh". *World Development* 64:609–620

Welcomme, R. and D. Lymer, (2012), "An Audit of Inland Capture Fishery Statistics: Africa". FAO *Fisheries and Aquaculture Circular* 1051. Rome: FAO

World Bank, 2012, *Hidden harvest: the global contribution of capture fisheries*. Washington DC: World Bank


8

The Blue Economy & Sustainable Tourism Management in Eastern Africa

Restaurant on the Indian Ocean near Zanzibar Coastline, Yakov Oskanov.

8.1 Introduction

Various definitions have been advanced for the term tourism. Goeldner and Ritchie (2003) explain the term as *the sum of the phenomena and relationships arising from the interaction of tourists, business suppliers, host governments and host communities in the process of attracting and hosting these tourists and other visitors.* Cook, Yale and Marqua (2002) give a common definition of tourism as *the temporary movement of people to destinations outside their normal places and residence, the activities undertaken during their stay in those destinations and the facilities created to cater to their needs*. These definitions are adequately supported by the United Nations World Tourism Organisation (UNWTO), the body enshrined with the regulation of the world's tourism activities, which defines the trade as "activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business or other purposes" (UNWTO, 2008).

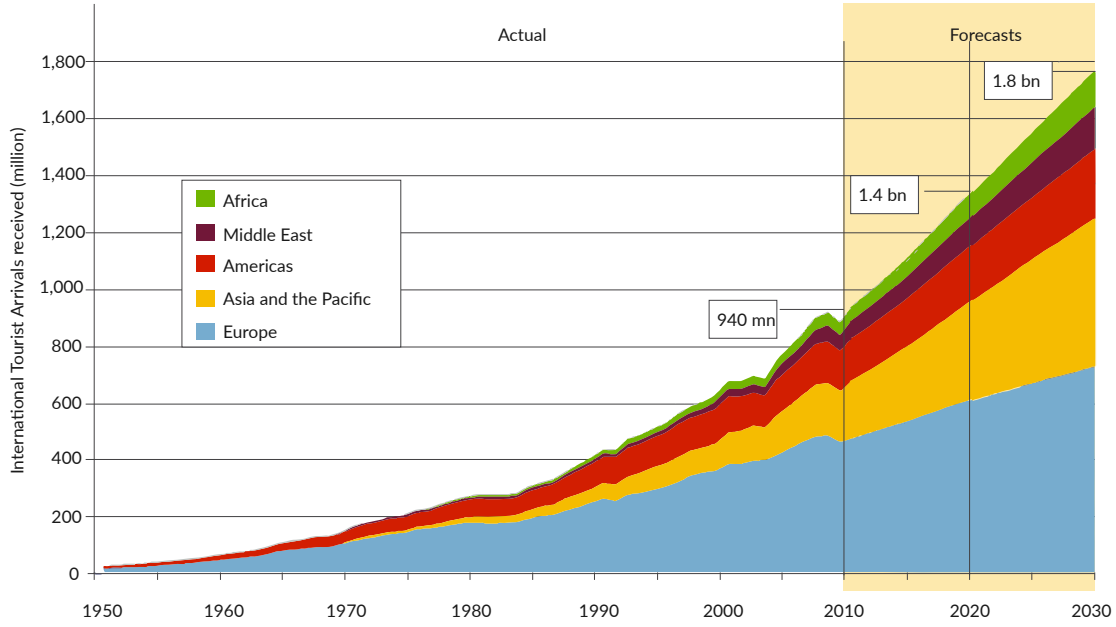
Tourism is thus understood as travel for recreation, leisure, religious, family or business purposes and usually for a limited duration. Traditionally it was more associated with international travel, but today it also refers to travel to another place within national boundaries. Global tourism has seen massive growth in the past two decades. In 2014, total international arrivals were 1,133 million, more than double the figure for 1990. Tourism is seen as one the largest industries, contributing 9% of the world's GDP and employing 1 out of 11 people globally (UNWTO, 2015).

Tourism is increasingly receiving recognition of its part sustainable and equitable growth. World leaders meeting at two major summits in 2012, the United Nations Conference on Sustainable Development (Rio+20) and the G20, agreed that tourism can make an important contribution to many of the world's most pressing challenges. The United Nations Environment Programme (UNEP) Green Economy report identified tourism as one of 10 sectors that are vital to greening the global economy. The United Nations Economic Commission for Africa (UNECA), in its *Sustainable Tourism Master Plan for The Inter-Governmental Authority on Development (IGAD) Region 2013-2023* highlighted the importance of tourism for seven countries in the Eastern African region. The UNWTO estimates that tourism activities will continue to rise (Figure 8.1), particularly in Africa.

In this projection, Africa's tourism is expected to grow phenomenally by the year 2030. Coastal tourism is expected to continue to rise (UNCSD, 2012a) and this may affect the marine and coastal environment. Coastal tourism is among the largest tourism market segments, providing substantial opportunities for coastal countries. Seychelles, for example, has very extensive and pristine coral reefs; Comoros has very rich and varied historical, religious and cultural sites that reflect the population of the islands by successive waves of immigrants from a variety of regions including the African mainland, the Persian Gulf, Europe and Madagascar. Cultural sites include religious sites, tombs, fortifications and buildings associated with the sultanates (UNECA, 2014).

At the same time, this special environment is sensitive and fragile. Many coasts contain important habitats and have a very rich biodiversity. Land, fresh potable water and other natural resources are often scarce on the coast, partly as a result of the focus and

FIGURE 8.1 Projected Tourism numbers – 1950 to 2030



Source: UNWTO, 2014b

pressure of human activity (Leijzer and Denman, 2013). In the context of Blue Economy, governments and tourism enterprises should be careful to respect the principles of sustainability, so that tourism can play a positive role in preserving the environment and contributing to the wellbeing of local communities. The same principles apply to the industry in land-locked States where tourists are attracted to freshwater resources.

Tourism within a Blue Economy approach reflects the sustainable development principles while aiming at a model that can support local economies and reduce poverty. "Blue Economy" in this sense refers to models that shift society from scarcity to abundance using locally available water masses as well as marine and ocean resources, while confronting issues that cause environmental and related problems (Pauli, 2010). Such innovations combine the pursuit of economic activity and environmental conservation as a means of sustaining livelihoods. It unifies the principles of low-carbon resource efficiency and social inclusion. This is very important for developing countries because it responds to their needs in the face of fresh threats resulting from strained resources and climate change.

8.2 Economic Significance of Tourism

Tourism has grown steadily in the Eastern African region and, according to the UNWTO's Tourism Highlights (UNWTO, 2015), it is now a very significant economic activity for a number of countries in the region. Kenya, Uganda, Tanzania and Rwanda are the most active destinations (Table 8.1), while tourism in Rwanda and Uganda has been growing rapidly since 2010. Growth in the industry elsewhere in the region was less pronounced. The tourism industry has been and still continues to be a major source of foreign exchange earnings for Ethiopia, Kenya and Uganda (UNECA, 2013).

The economy of the Seychelles is largely based on tourism, which contributes up to 63% to its GDP. The tourism sector in this country has also grown significantly over the past few years with a growth in revenues of 25% since 2010. For the African continent, as a whole, South Africa and Morocco constantly emerge as the leading destinations.

TABLE 8.1 Tourism arrivals and receipts among Eastern African countries

	International tourist Arrivals 1,000s					International tourist revenues (USD million)				
Country	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Kenya	1,470	1,750	1,619	1,519		800	926	966	940	798
Uganda	946	1,151	1,197	1,206		784	960	1,135	1,184	1,355
Tanzania	754	843	1,043	-		1,255	1,353	1,713	1,880	1,950
Rwanda	504	688	815	1,137	-	202	252	282	294	305
Ethiopia	468	523	596	681	-	522	770	607	621	350
Madagascar	196	225	256	196	222	196	-	-	-	-
Seychelles	175	194	208	230	233	274	291	310	344	398
Burundi	142	-	-	-		2	2	1	2	-
Eritrea	84	107	-	-	-	-	-	-	-	-
DRC	81	186	167	191		11	11	7	1	-
Comoros	15	19	-	-		35	44	39	-	-
Djibouti	51		60	63	-	18	19	21	22	-

Source: UNWTO, 2014, 2015

The East African Community (EAC) countries (Burundi, Tanzania, Uganda, Kenya, and Rwanda) possess opportunities for growth in the sector. The main tourism activity in the EAC is wildlife-oriented, with a majority of the national parks and game reserves in Kenya and Tanzania. However, there is significant beach and other forms of tourism including culture and heritage sites, convention venues, sports and adventure activities. Tourism is a powerful engine for economic growth and job creation (World Bank, 2013).

The sector's contribution to the global economy in 2014 was USD 7.6 trillion (2014 prices), which equates to 9.8% of total world GDP that year (WTTC, 2015). This enabled the industry to generate 2.1 million new jobs directly and a total of 6.1 million new jobs from direct, indirect and induced activities (ibid). The World Travel & Tourism Council

estimates that 3.8 million jobs (including 2.4 million indirect jobs) could be created by the industry in sub-Saharan Africa over the next 10 years (Christie, Fernandes, Messerli, and Twining-Ward, 2013). In Eastern Africa, tourism is also a significant contributor to the economy. It employs a considerable number of people and makes a major contribution to GDP both directly and indirectly (Table 8.2).

TABLE 8.2 Tourism and its contribution to GDP and employment in Eastern Africa (2015)

Country	GDP Contribution		Employment Contribution	
	Travel & Tourism's Direct Contribution to GDP (USD billion)	Travel & Tourism's Total Contribution to GDP (USD billion)	Travel & Tourism's Direct Contribution to Employment (1000s)	Travel & Tourism's Total Contribution to Employment (1000s)
Burundi	0.065	0.14	38	85.5
Comoros	0.025	0.06	6	15
Ethiopia	0.23	0.52	1,014	2,326.5
Kenya	2.23	5.82	592.5	1,564
Rwanda	0.23	0.63	59	165
Seychelles	0.37	0.95	12	28
Tanzania	1.7	4.99	386	1,151
Uganda	0.88	2.13	464.5	1,173

Source: WTTC, 2016

Tourism involves many other economic sectors that contribute to the success of the industry. It creates jobs in the construction sector during the development phase, it generates demand for furniture and furnishings as well as other capital equipment that maybe locally available. Christie et al (2013) asserts that tourism acts as a catalyst for the development of small businesses in related production and service sectors, especially for regions whose main development options may be their cultural and natural resources. Indeed, some of the other sectors that have developed as a result of tourism include the garment industry, handicrafts and the goods and services provided by the informal sector. In the East African countries where tourism is fairly developed, such as Kenya, the handicrafts business supports many local communities that produce wood carvings and other artisanal items popular with tourists.

The significance of tourism as a catalyst for development can be seen from the contribution it makes to the economies of the tourist-destination countries. For example, in 1990, sub-Saharan African countries attracted some 6.7 million visitors; by 2012, this number had risen to 33.8 million with consequent increases in revenues. Receipts from tourism in 2012 amounted to over USD 36 billion and directly contributed 2.8% to the region's GDP, while the total contribution, including direct, indirect and induced, may have reached 7.3% of regional GDP (Christie et al., 2013).

The Eastern African region enjoys extensive coastlines and oceans to attract coastal tourism, as well as large inland freshwater water masses – Lakes Tanganyika, Victoria,

Turkana, Malawi and Albert – that can also benefit the industry. The Blue Economy approach requires that resources should be used efficiently and optimally, while respecting environmental and ecological parameters (Pauli, 2010). However, there are challenges associated with developing tourism in the context of the Blue Economy. Countries have a tendency to opt for Foreign Direct Investment (FDI) for financing the industry because of its capital-intensive nature, especially at start-up. There is some concern about whether this is an appropriate strategy, since the benefits that accrue from FDI are directly relative to the degree of local economic and human development, as well as the absorptive and productive capacities of receiving countries (UNECA, 2013).

It is expected that Europe will continue to be an important tourist market globally, despite its lower growth rate than the global average. The Chinese market will also constitute a large share of the global market. Though the numbers are still relatively small, Africa and the Middle East are the fastest growing markets at 6.2% and 9.9% per annum, respectively, and generating 27.5 million and 36 million international tourist arrivals, respectively, in 2010. The challenge for the Eastern African region is to develop appropriate products to tap into the domestic and regional tourist markets (UNECA, 2013)

8.3 Comparative Analysis of the Tourism Sector in Eastern Africa

Tourism is one of the fastest growing economic sectors in the world and sub-Saharan Africa enjoys an average growth rate of 5.5% compared to the global average of 6% (UNWTO, 2014). The main tourism activities in Eastern Africa revolve around wildlife, beaches, marine facilities, culture and heritage, as well as natural sceneries and landscapes (Table 8.3). Tourists come mainly from Europe, North America, the Middle East and China, in addition to the African continent. There are a number of common challenges, however, facing East African countries in realising their tourism potential (Section 8.7, below).

The attractiveness of any tourism destination depends not only on its natural and cultural features, but also, to a large degree, on the nature and quality of the facilities and services that are available. These include: primary services (accommodation, restaurants and travel services); secondary services (shopping, recreation, entertainment and visitor information) and tertiary services (health care, emergency and safety, and financial. Generally, across the Eastern African region these are not up to global standards (UNECA, 2013). In addition, with the exception of Ethiopia and Kenya, air transport infrastructures remain undeveloped across the region (UNECA, 2013). The growth of ecotourism is constrained by limited community involvement, market penetration by tourism operators, product development, financial incentives, a weak policy, legal and regulatory framework and increased environmental degradation (UNECA SRO-EA, 2011). The Eastern African countries have made considerable efforts to grasp tourism-development opportunities, but have to contend with a series of challenges summed up in Table 8.3.

TABLE 8.3 Summary of tourism activities and challenges amongst Eastern African countries

Countries	Some tourism activities	Major source market	Challenges
Burundi	Wildlife, natural endowments (lakes, rivers and mountains), Culture and history.	France, Germany, Italy, Russia, UAE, South Africa.	Unfavourable business environment. Insufficient infrastructure, insufficient marketing, over reliance on traditional nature-based tourism products, lack of appropriate tourism regulatory framework.
Comoros	Beaches, diving and water sports, active volcanoes and waterfalls	South Africa, France, Reunion, Mayotte and some European countries.	Undeveloped tourism, regional instability, heavy reliance on nature-based tourism, weak institutional framework and structures for tourism development, insufficient funding, lack of skilled labour.
Djibouti	Beach and marine tourism, culture and history.	France, USA, China, Middle East & other African countries.	Insufficient investment, insufficient infrastructure and tourism services, insufficient price competition, lack of appropriate skills and knowledge.
DRC	Wildlife, natural endowments (rivers, mountains), water sports, historic sites, culture and heritage, Botanical gardens	France, Belgium, UK, USA, China, South Africa.	Weak institutional frameworks, inadequate funding, weak local private sector, inadequate infrastructure and related services, conservation dangers and insecurity.
Eritrea	Historic sites, culture, beach and tourism, wildlife, water sports.	Italy, Germany, UK, France, USA, Saudi Arabia and other African countries	Undeveloped tourism sector, lack of competitiveness, weak local private sector, inadequate tourism infrastructure and related services, lack of relevant skills and knowledge
Ethiopia	Culture, religious and historic sites, wildlife, Meetings, incentives, conferences, and exhibitions (MICE)	USA, France, Germany, Italy, Russia, UAE, UK.	Over-reliance on traditional culture-oriented products, insufficient market presence, inadequate skilled labour, perceived difficulties for foreign direct investors.
Kenya	Wildlife, beach and marine tourism, MICE, natural endowments, culture and historic sites.	UK, USA, Germany, France, Italy, China, India.	Insufficient implementation of laws and regulations, over-reliance on traditional source markets, unimplemented standardisation guidelines for tourist facilities, inadequate research in tourism, inadequate capacity for tourist security.
Madagascar	Beach and marine tourism, wildlife, culture, history, water sports and adventure.	France, Reunion, Italy, Germany, UK, South Africa.	Insufficient supportive policies and regulations, insufficient investment climate, weak country credit rating, insufficient airline connectivity, inadequately skilled labour, insufficient funding for tourism development & marketing.
Rwanda	Wildlife tourism, culture, historic sites and museums, natural endowments (waterfalls, rivers and lakes).	France, UK, USA, Germany, Italy, China, India.	Over reliance on nature-based tourism, insufficient infrastructure and related services, lack of skilled labour, insufficient quality of service, insufficient airline connectivity.

Seychelles	Beaches, museums and monuments, marine parks, water sports.	Eastern Europe, UK, Germany France, Italy, USA, other African countries	Tight controls of foreign currency, insufficient funding for tourism, insufficient services and maintenance of facilities, limited range of tourism product options, high cost of accommodation and access.
Somalia	Wildlife, beach and marine tourism, water sports, natural endowments (mountains, flat semi-desert plains).		Internal conflict and insufficient governance, insufficient tourism infrastructures, lack of skilled manpower, negative publicity.
South Sudan	Wildlife, historic sites, culture and heritage.		Insufficient institutional capacity, political instability, insufficient infrastructure, lack of regulatory framework and unskilled manpower.
Tanzania	Wildlife, beach and marine tourism, MICE, natural endowments, culture and historic sites.	UK, USA, Germany, France, Italy, China, India.	Insufficient services and transport infrastructure, over reliance on nature-based tourism, insufficient airline connectivity, insufficient service standards, overcrowding in some areas, insufficient security, lack of funding and marketing resources.
Uganda	Wildlife and avian tourism, sports fishing, water sports, primate tracking, trekking, MICE, mountaineering.	UK, USA, Germany, France, Italy, China, India.	Inadequate skills, insufficient sectorial co-ordination, limited funding, insufficient services and transport infrastructure, weak private sector, lack of relevant and up-to-date tourism legislation, insufficient skilled labour, insufficient airline connectivity.

Source: Summarised from Tourism Agencies of Eastern African Countries

8.4 Tourism Products in Eastern Africa – Actual and Potential

The main tourist activities in Eastern Africa revolve around the coasts and wildlife, with Kenya and Tanzania taking the lead in these two areas. There are, however, a number of other forms of tourism in the region. Coastal and island countries have found significant growth in both cruise-ship and marine tourism. The latter involves visiting marine parks in glass-bottomed boats that enable visitors to observe undersea life. Kenya, Tanzania, Seychelles, Comoros and Madagascar have great potential for the development of marine and cruise-ship tourism. Other forms of coastal tourism activities are scuba diving, surfing, snorkelling, sports fishing and beach sports. Similar activities could be introduced around large inland water masses like Lake Victoria, which would primarily benefit Kenya, Uganda and Tanzania.

Archaeology is largely underexploited as a tourism resource in the Eastern African region but, as can be seen in Egypt and Ethiopia, can provide further opportunities for the industry. The island nations of Seychelles and the Comoros possess a rich maritime history and the deep waters around them are ideal for maritime archaeological tourism

(UNECA, 2014). Hunter (2014) provides substantial evidence of Indian Ocean maritime archaeology around the coastal and island countries. This could be developed as niche market and an alternative to regular beach tourism.

Culture, religion, and heritage sites constitute further rich resources for tourism in Eastern Africa and can be part of a sustainable tourism agenda since their exploitation has very little effect on biodiversity. UNESCO (2014) lists 35 World Heritage Sites in Eastern African countries. Other forms of culture and heritage could also be packaged and set up in theme parks for consumption by tourists.

Today coastal and beach products require greater innovation to align customers' needs with conservation efforts. Infrastructures that give access to these products should be designed to enhance the quality and authenticity of the sites, while giving rise to activities with minimal damage to the integrity of oceans and coastlines. Marinas in basins or sheltered harbours catering to small vessels and recreational boaters represent one such novel activity.

FIGURE 8.2 English-Point Marina, Mombasa, Kenya

Source: English-Point Marina, 2015

In East Africa, Kenya has taken lead in this new market segment with the establishment of English-Point Marina on a 4-acre beach-front site opposite the historic Fort Jesus. It has apartment-style living in the comfort, luxury and security of a typical hotel. In its development, English Point Marina has incorporated best-practice standards of sustainability currently available, covering areas such as the conservative use of energy, the treatment and recycling of grey water, and sewage treatment, among others. This could be replicated in the Lake Victoria region as well as in the Ethiopian lakes system to help open up the hinterland for greater innovations in tourism.

Business travel, alongside meetings, incentives, conferences, and exhibitions services (MICE), is gaining traction in the Eastern African region. As part of its MICE strategy to revamp tourism and to ensure continued growth in the sector, Tanzania is to construct a

large and modern state-of-the-art conference auditorium (Republic of Tanzania, 2009). Rwanda, Kenya and Ethiopia are also improving their MICE facilities. The UNWTO's global report on the meetings industry highlights various approaches that countries should take when developing the MICE strategy (UNWTO, 2014a).

Sustainable tourism development in the context of the Blue Economy is crucial for the region. The UNWTO (2014b) defines sustainable tourism as that which takes full account of its current and future economic, social and environmental impacts, while addressing the needs of visitors, the industry, the environment and host communities. Ecotourism is an important and rapidly growing "niche market" within the global tourism industry. It offers an opportunity to develop products that contribute to environmental conservation, to socio-economic and cultural objectives, to local livelihoods and to raising the value of local traditions and culture (UNECA-SRO EA, 2011).

Ecotourism, though still a relatively new phenomenon in the IGAD region, is increasingly being recognised by member States as a viable element of sustainable tourism. Kenya, Uganda and Ethiopia have undertaken a number of initiatives to promote and strengthen the application of ecotourism principles in the various sections of the industry through private-sector and civil-society initiatives. The term refers to a sub-sector within the industry that focuses on minimising the environmental and cultural impacts of tourism, while contributing to conservation, community projects and environmental education. However, sustainability principles are not restricted to ecotourism, they also apply to all types of tourism activities, operations, establishments and projects, including conventional and alternative forms (UNECA SRO-EA, 2011).

BOX 8.1: Ensuring local benefits of tourism

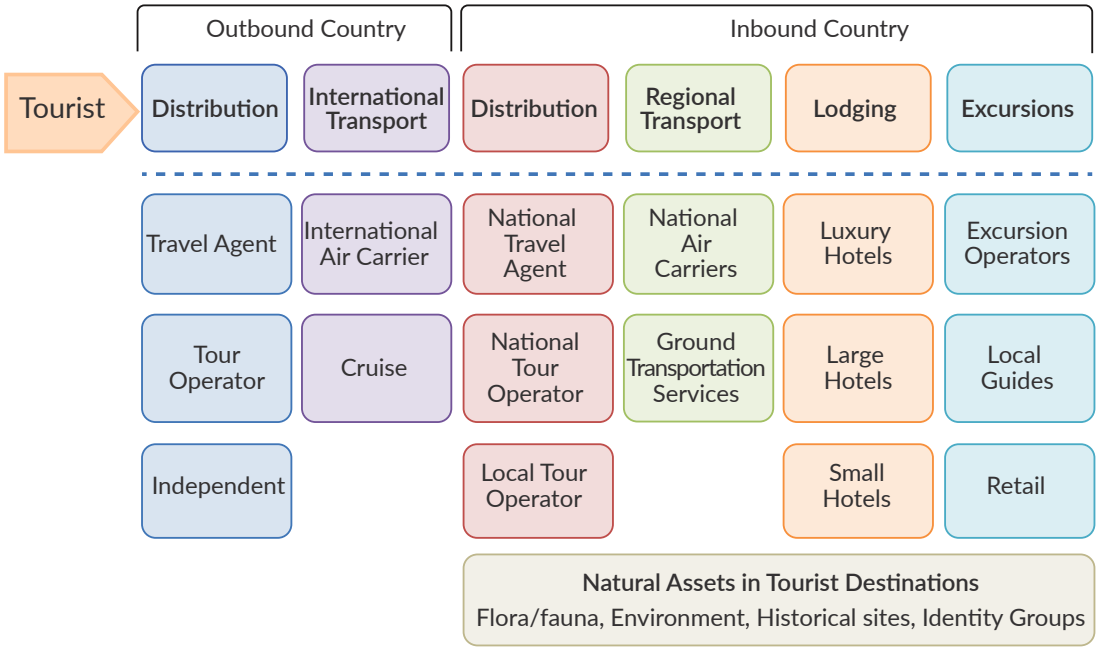
Madagascar: The government national park service has a policy of distributing 50% of the admission revenue from all parks to local conservation and community development projects. The latter, proposed by special committees made up of elders from individual villages, tend to be very practical (such as fruit-growing schemes, bee keeping or the construction of grain stores) supporting sustainable livelihoods as an alternative to slash-and-burn agriculture. The funding link with the local park enhances community awareness and support for conservation.

8.5 Mapping the Tourism Value System

An integrated global tourism value chain was outlined by Christian (2010) (Figure 8.3). This framework aligns elements from the outbound source of tourists to the inbound destination of tourists and including all the economic actors linked to the process of bringing tourists into and around a destination, as well as providing accommodation. This schematic presentation outlines the requirements for proper tourism utilisation of natural and socio-cultural assets as well as the ultimate economic benefits to the host country. It has been recognised as accurate in a joint international report (OECD,

WTO and UNWTO, 2013). Countries in the region need to consider the inter-related activities, processes and institutions that work together to enable the smooth operation and management of tourism along this value chain. These include destination planning and product innovation, training, marketing, tour and travel operations, transportation and the management of attractions. Tourism support services, such as restaurants, cafés, bars, as well as accommodation and financial, health and ICT services, cannot be ignored and attention needs to be given to general service quality as well as the level of hospitality in the host community.

FIGURE 8.3 Tourism Value Chain



Source: Christian, 2010

This value chain begins with the conception of products and their development, a process that requires the active involvement of all stakeholders. UNWTO (2011) provide guidelines for developing new products and fully addresses all aspects including market relevance, innovation, tourism-area development guides, and sustainability. For ecotourism products, Fotiou et al (2002) suggest wide involvement to include local communities to enable full appropriation of sustainable tourism and ensure equitable use of resources and benefits across all sections of interest. Most tourism products in the Eastern African region are based on inherent resource opportunity rather than a planned business product initiative.

Critical to the tourism value chain is the quality of local human resources: education, training and service culture. There is, therefore, a need for a national human-resource development initiative linked to the needs of the industry (Johnson and Bartlett (2013). An example of successful human-resource development policies in the tourism industry is Singapore (UNECA, 2011). The island nation now boasts an excellent educational

system and world-class training facilities for tourism development. Among the Eastern African countries, only Kenya can boast a high ranking in tourism human resources similar to Singapore. Many universities and middle level colleges in Kenya now offer a variety of education and training programmes in tourism and hospitality at diploma, undergraduate and post-graduate levels. Most Eastern African countries however, face challenges in being deficient in well-trained and motivated workforces to deliver tourism services (Table 8.3).

According to Morrison (2013), proper destination management and a comprehensive programme for destination marketing are the foundations for excellence in tourism management, but marketing of tourism opportunities in most Eastern African countries is under-funded. Morrison proposes models for sustainable destination competitiveness. Coupled with marketing, the delivery of tourism services using accredited intermediaries is also prominent in the value system. In this regard, the integration of sustainability into tour and travel operations businesses is essential and has been acknowledged in a report on "Tour Operators Initiative for Sustainable Tourism Development" (Schwartz, Tapper and Font, 2008).

Eastern African countries must give serious and systematic attention to the management of tourist attractions, facilities and sites as critical elements of the tourism value chain. These services have a strong influence on tourists' perception of a destination. The overall infrastructure (transport, energy and ICT) and other services that contribute to visitors' well-being while at the destination should be another focus in the region, alongside hospitality services, including that of the host community. Service quality should include the unique qualities of the host region and serve to reassure visitors that their well-being is being cared for, leaving them to enjoy their stay.

Tourism development can support local economies and reduce poverty. Indeed, Poverty Reduction Strategy Papers frequently incorporate tourism activities as a means of generating incomes in rural areas, finance infrastructure improvements, diversify employment opportunities and attract Foreign Direct Investment (FDI). The share of spending in the local economy determines the local economic effects of tourism. Increasing the involvement of local communities in the value chain can contribute to the development of local economies and poverty reduction. In order to do so, 'greening' of tourism services is necessary. This can be achieved through proper and careful planning, renewable energy development, and the efficient use of energy, as well as water and waste management, as a crucial pillar in a Blue Economy strategy.

8.6 Initiatives and Developments

A healthy environment is fundamental to any form of 'blue' tourism and favours the growth potential of new forms of tourism. High-quality bathing and diving waters and pristine coastal and marine habitats have a high recreation value. This increases the attractiveness of coastal areas which, in turn, increases the growth potential of activities such as nautical tourism and sports, and green tourism such as whale watching. A level of visitor usage of tourism facilities that exceeds the environment's

carrying capacity results in negative impacts on the environment and the depletion of natural resources. Typical physical impacts include the degradation of ecosystems by tourism-related land clearing and construction, as well as by continuing tourist activities and long-term changes in local economies and ecologies (UNEP, 2014).

Thus, in order to achieve high levels of sustainability, tourism destinations in Eastern African countries have to develop strategies that promote the sustainable use of resources. The strategies should address the key challenges of pollution, physical impacts and depletion of natural resources, as well as inclusive growth and employment.

Tourism activities thrive on the continued existence of the natural, cultural and (or) heritage attractions at the tourist destination. At the United Nations Conference on Sustainable Development (Rio+20) in 2012, the concept of the "green economy", first launched in 1989, was further advanced to the concept of the Blue Economy (UNCSD, 2012b) (UNECA, 2014). This now blends well with tourism sustainability concerns in the Eastern African region. A number of countries have established tourism regulatory frameworks that are intended to control the industry in favour of conservation and sustainability (WEF, 2014). These schemes comprise social, economic, and environmental components and they provide an intellectual basis for societies around the world to coalesce around the principles of sustained and universal levels of prosperity. A typical concern for most of these initiatives is the involvement of local people and motivating them to continue in engagement.

In a study by Silva (2014) on conservation in Namibia, the question of how to include the residents of a conservation area in the effort to ensure sustainability of resources was raised. This study established that some groups look for economic incentives while others are influenced by community values. It concluded that strong attachment to places and preferences for social cohesion can motivate people to comply with conservation rules, especially where economic incentives are also available. SawHill (1996) acknowledged that a number of parties and institutions are involved in conservation and sustainability efforts. He thus proposes a framework for creating biodiversity alliances through "co-operative partnerships".

Tourism can significantly contribute to environmental protection, conservation and restoration of biological diversity and sustainable use of natural resources. Pristine sites and natural areas are valuable assets and protected areas (national parks, game reserves, wildlife parks and reserved areas) have been created to protect them. Governments have enacted laws and regulations that protect such areas and the wildlife therein, with controlled entry for only small groups of individuals who pay for a permit and park fees. For example, a gorilla tracking permit in Rwanda and Uganda cost USD 750 and USD 600, respectively, plus park fees (Republic of Rwanda, 2015; Uganda Wildlife Services, 2015). The receipts have contributed to development at the local, national and regional levels.

In a research paper on the effects of tourism development on rural livelihoods in the Okavango Delta in Botswana, Mbaiwa and Stronza (2010) describe several benefits accruing to the local communities, resulting from the implementation of Community Based Natural Resource Management (CBNRM). The benefits include employment

opportunities from the safari companies that sublease the community areas and the ensuing financial contributions to the community from consumption. The scheme has also resulted in enhanced social capital in the three villages where the project has been implemented because the people have agreed that some of the revenue generated from CBNRM projects may be used to fund social services and related community-development projects such as water supply and distribution. This model could be applied to the various cases of sustainability of tourism in Eastern Africa.

8.7 Governance and Institutional Framework in the Management of Tourism

Bhagavan and Virgin (2002) found that the institutional framework for tourism requires three sets of institutions: knowledge-generating establishments (colleges, universities and research units); government entities (government departments, management, policy and regulatory units); and civil society and trade associations.

A number of Eastern African countries face the challenge of inadequate institutional capacity and sound governance in the management of tourism (Table 8.3). *The Sustainable Tourism Master Plan for the Inter- Governmental Authority on Development (IGAD) for 2013-2023* emphasises the importance of creating and building appropriate institutions to ensure sound management of governance in tourism amongst the member nations (UNECA, 2013). As a result of this, Kenya's National Tourism Strategy for 2013 to 2017 has declared institutional capacity and the governance framework as among its pillars in the strategic management of tourism (Republic of Kenya, 2013), as have Ethiopia and Uganda. Ethiopia has developed a National Sustainable Tourism Master Plan covering the period 2015 to 2025 (Republic of Ethiopia, 2014), while Uganda developed its Tourism Development Master Plan for the period 2014 to 2024, with funding from UNWTO and UNDP (UNWTO 2014d).

The UNWTO provides the global foundation for building and developing institutional capacity in tourism management. These generic guidelines should then cascade to national institutions starting with the country's department or ministry in charge of tourism and roll down through its sectoral implementation agencies and regulatory systems to the devolved or regional tourism management units. The establishment of appropriate training and research institutions is included in this mechanism to help build human capacity for the management and governance of tourism. The private sector is also included in the mechanism through private-sector tourism associations (travel agents' trade associations, tour operators, hoteliers, restaurateurs etc.) and civil society, including sustainable tourism lobby groups, is accorded a role as well.

Certain aspects of tourism may need special attention. Following a UNWTO report on Collaborative Actions for Sustainable Tourism, a 5-year project targeting nine African countries *(Cameroon, Senegal, Kenya, Tanzania, Mozambique, The Gambia, Ghana, Nigeria and Seychelles)* was undertaken in 2009 to identify an integrated approach to planning

for coastal tourism (Leijzer, 2014). The project is funded by the Global Environment Facility (GEF) in collaboration with UNEP as the implementing agency; the United Nations Industrial Development Organisation (UNIDO) is the executing agency in partnership with the UNWTO.

8.8 Conclusions and Recommendations

Eastern African countries need to realise their potential as tourism destinations in a global environment where tourism is on the rise. The sector can act as a pillar of economic development for countries in the region, especially if sustainable tourism policies underpin initiatives in the industry. There are, however, a number of vulnerabilities that will need to be overcome if the sector is to realise its potential in the region as part of a Blue Economy strategy:

i. There is inadequate institutional capacity to guide tourism development and management and governance in the industry is weak.
ii. There is a general lack of co-ordinated development plans to can guide the relationship between tourism development and other forms of land use and developments.
iii. There is slow systematic development and maintenance of physical infrastructure and amenities; there are still very insufficient road, air, rail and water transportation systems.
iv. Most governments have not set aside adequate funding for the development, management and marketing of tourism.
v. The region relies too much on traditional nature-based attractions and culture despite risks from climate change, increased competition and the changing profiles of tourists and other travelling publics.
vi. Climate change is a significant risk because it causes disturbance of marine ecosystems, increases the frequency and intensity of disasters and causes sea levels to rise.
vii. The region suffers from mismanagement, corruption and political instability, which slows economic growth.
viii. Regulatory frameworks are generally inadequate for the industry.
ix. Terrorism causes insecurity resulting in negative travel advisories in source countries.
x. There is over reliance on traditional source market in Europe and North America instead of an increased focus on Asia and intra-continental and interregional tourism.

A Blue Economy approach to the tourist industry implies shifting growth and development to using coastal and inland water masses, as well as other marine and ocean resources, while confronting issues that cause environmental and related problems. Such a shift requires innovations that combine economic exploitation of

resources with environmental conservation as a means of achieving sustainable livelihoods. It endorses principles of low carbon emissions, resource efficiency and social inclusion. It the context of the Blue Economy, the hinterland of Eastern Africa remains largely under-exploited for tourism, despite the immense opportunities that exist. A summary of recommendations to enable Eastern African countries to realise the full benefits from its tourism potential might include:

a) Creating a framework to guide the planning, development and management of sustainable tourism in Eastern Africa within the principles of Blue Economy;
b) Developing sustainable national and regional tourism-area development plans with both inter- and intra-generational equity;
c) Establishing adequate institutional capacity and governance for tourism management;
d) Improving regional physical infrastructure and tourism amenities;
e) Setting aside more funds for tourism development, management and marketing at the national and regional level;
f) Ensuring harmonisation of all legislation at the national level relevant to the sustainability of tourism;
g) Developing innovative and niche products;
h) Engaging all stakeholders in tourism development;
i) Establishing regulatory frameworks to protect tourism resources;
j) Ensuring tourism contributes local economic benefits;
k) Practising sustainable tourism by means of renewable energy, limited demand on freshwater resources and 'ecotourism', as well as more extensive use of Environmental Impact Assessments (EIA) as a requirement placed on developers;
l) Diversifying market outreach to exploit potential source countries, such as in Asia;
m) Providing a safe and secure environment;
n) Encouraging research and development as a fundamental element of tourism development to inform policy formulation and product development, as well as analysis of changing consumer trends, marketing strategies and the impacts of tourism development and how to manage them.

Regional Economic Communities (RECs) are at different stages in the development of their tourism sectors and there is a need to share lessons and best practices. A co-ordinated regional approach could derive benefits from the comparative advantages shared by Eastern Africa. A strategic tourism plan, therefore, would provide a vision for tourism development in the region and enhance its competitiveness as a tourist destination. Such a regional action plan should be aligned with national, regional, continental and international development initiatives and economic development plans.

These and other interventions can contribute to realising the potential of the tourism industry in Eastern Africa and result in significant contributions to economic and social development across the region.

References

Bhagavan, M.R. and I. Virgin, (2004), *Generic Aspects of Institutional Capacity Development in Developing Countries*. Stockholm: Stockholm Environment Institute

Christian, M., (2010), "Tourism Scoping Paper", prepared for the *Capturing the Gains* research network. London: UK Department of International Development (DFID)

Christie, I., E. Fernandes, H. Messerli and L. Twining-Ward, (2013), "Tourism in Africa: Harnessing Tourism for Growth and Improved Livelihoods." *World Bank Report*, Washington, DC: World Bank

Cook R.A., L.J. Yale and J.J. Marqua, (2002), *Tourism: the business of travel*, New Jersey: Prentice Hall

English-Point Marina (2015). Available at: http://www.englishpointmarina.com/EnglishPoint%20Brochure.pdf. Accessed on 02/02/2015

Fotiou, S., D. Buhalis and G. Vereczi, (2002), "Sustainable development of ecotourism in Small Island Developing States and other small islands, "*Tourism and Hospitality Research*, *4*(1) 79–88

Goeldner C.R. and J.R.B. Ritchie, (2003), *Tourism: Principles, practice and philosophies*, New Jersey: John Wiley & Sons

Johnson, K. R. and K. R. Bartlett, (2013), "The role of tourism in national human resource development: a Jamaican perspective". *Human Resource Development International*, 16(2) 205–219

Hunter, J. (2014), *Indian Ocean: Maritime Archaeology*. Available at: http://www.academia.edu/6109169/Hunter_J._2014_Indian_Ocean_Maritime Archaeology. Accessed on 02/02/2015

Leijzer, M., (2014), *The COAST Project's Governance and Management Mechanisms for Sustainable Tourism in Coastal Areas in Africa*. Available at: http://coast.iwlearn.org/en/News%20and%20Events/the-coast-project2019s-governance-and-management-mechanisms-for-sustainable-tourism-in-coastal-areas-in-africa/ accessed on 14/12/2014

Mbaiwa, J. E. and. A. L. Stronza, (2010), "The effects of tourism development on rural livelihoods in the Okavango Delta, Botswana." *Journal of Sustainable Tourism* 18(5) 635 – 656

Morrison, A., (2013). *Destination Management and Destination Marketing: The Platform for Excellence in Tourism Destinations.* Available at: http://www.lyxk.com.cn/fileup/PDF/2013-1-6.pdf. Accessed on: 02/02/2015

Republic of Ethiopia, (2014), *Sustainable Tourism Master plan: 2015 – 2025*. Addis Ababa: Federal Democratic Republic of Ethiopia

Republic of Kenya, (2013), *National Tourism Strategy: 2013 to 2017*. Nairobi: Ministry of East African Affairs, Commerce and Tourism

Republic of Rwanda, (2015), Rwanda Development Board. Available at: http://www.rdb.rw/tourism-and-conservation/gorilla-trekking.html. Accessed on the 20/04/2015

Republic of Tanzania, (2009), *Tanzania Tourism sector survey report*, Dar es Salaam: Ministry of Natural Resources and Tourism (MNRT)

SawHill, J. C., (1996), "Creating Biodiversity Partnerships: The Nature Conservancy's Perspective". *Environmental Management* Vol. 20, No. 6, pp. 789-792

Schwartz, K., R. Tapper and X. Font, (2008), "A Sustainable Supply Chain Management Framework for Tour Operators. *Journal of Sustainable Tourism* 16(3) 298 – 314

Seychelles National Tourism Board, (2012), '*Sustainable Tourism Management in African National Parks and Protected Areas: Challenges and Opportunities*.' Session Paper presented at the first Pan-African Conference Arusha, Tanzania

Silva, J.A., (2014), "'How Could I Live Here and Not Be a Member?' Economic Versus Social Drivers of Participation in Namibian Conservation Programs", *Journal of Human Ecology*, No. 42:183–197

Uganda Wildlife Services, 2015, *Safari Tariff*. Available at: http://www.ugandawildlife.org/images/pdfs/Tariffs-2014-2015.pdf. Accessed on 24/04/2015

United Nations Conference on Sustainable Development, (2012a), *RIO + 20: Towards the Green Economy and Better Governance – Stakeholders Consultation Paper*. Rio de Janeiro: UNCSD

United Nations Conference on Sustainable Development, (2012b), "The future we want". "*Blue Economy Concept Paper Rio +20*, New York: UNCSD

United Nations Department of Economic and Social Affairs (2010), *Trends in Sustainable Development: Small Island Developing States*, New York: United Nations

United Nations Environment Programme, (2014), "Tourism's Three Main Impact Areas", *Business Sectoral Activities News*. Available at: http://www.unep.org/resourceefficiency/Business/SectoralActivities/Tourism/FactsandFiguresaboutTourism/ImpactsofTourism/EnvironmentalImpacts/TourismsThreeMainImpactAreas/tabid/78776/Default.aspx/ accessed 16/12/2014

United Nations Economic Commission for Africa, (2014), *Unlocking the full potential of the blue economy*, Addis Ababa: UNECA

United Nations Economic Commission for Africa, (2013), *Sustainable Tourism Master Plan for the Inter-Governmental Authority on Development (IGAD) Region 2013-2023*, Addis Ababa: UNECA

United Nations World Tourism Organisation, (2014a), *UNWTO Tourism Highlights 2014*, Available at: http://www.e-unwto.org/doi/pdf/10.18111/9789284416226. Accessed on 05/02/2015

United Nations World Tourism Organisation, (2014b), *UNWTO Annual Meeting Reports, Global report on Meetings*, Madrid: UNWTO

United Nations World Tourism Organisation, (2014c), *Sustainable Tourism Development*. Available at: http://sdt.unwto.org/content/about-us-5. Accessed on 01/02/2015

United Nations World Tourism Organisation, (2014d), *Uganda Launches Tourism Development Master Plan on World Tourism Day*, Madrid: UNWTO. Available at: http://cooperation.unwto.org/news/2014-10-10/uganda-launches-tourism-development-master-plan-world-tourism-day. Accessed on: 21/10/2015

United Nations World Tourism Organisation, (2015), *UNWTO Tourism Highlights 2015*, Available at: http://mkt.unwto.org/publication/unwto-tourism-highlights-2015-edition. Accessed on 30/06/2016

United Nations World Tourism Organisation, (2011), *Handbook on Tourism Product Development*, Madrid: UNWTO and the European Travel Commission (ETC). Available at: https://pub.unwto.org/WebRoot/Store/Shops/Infoshop/4E6D/E076/AAE5/B827/BFEC/C0A8/0164/205F/110907_product_development_excerpt.pdf. Accessed on 21/10/2015

United Nations World Tourism Organisation, (2008), *Understanding Tourism: Basic Glossary*. Available at: http://media.unwto.org/en/content/understanding-tourism-basic-glossary. Accessed on 02/04/2015

UNESCO, (2014), *World Heritage Sites*. Available at: http://www.worldheritagesite.org/index.php. Accessed on: 03/02/2015

World Bank, (2013), T*ourism in Africa: Harnessing Tourism for Growth and Improved Livelihoods*, Washing ton DC: World Bank

World Trade Organisation, Organisation for Economic Co-operation and Development and United Nations World Tourism Organisation, (2013), *Aid for Trade and the Value Chain in Tourism*, Madrid: UNWTO

World Travel and Tourism Council, (2015), *Economic Impact of Travel and Tourism: 2015 Annual Update*, London: WTTC. Available at: http://www.wttc.org/-/media/files/reports/economic%20impact%20research/regional%20reports/world2014.pdf. Accessed on 21/10/2015

World Travel and Tourism Council, (2016), *Economic Impact of Travel and Tourism: 2016 Annual Update*, London: WTTC. Available at: http://www.wttc.org/-/media/files/reports/economic%20impact%20research/regions%202016/world2016.pdf. Accessed on 30/06/2016

Enabling Environment to Anchor the Blue Economy: Policy Frameworks, Partnerships and Development Opportunities

Anchor in the blue sea 3D render, depositphotos.com.

9.1 Introduction

All countries in Eastern Africa – large and small, islands, coastal and land-locked – are turning to their Blue Economy sectors to bolster wealth creation, discover new opportunities for investment and employment, and build competitive advantage in emerging industries such as deep-seabed mining and maritime biotechnology. New strategic "Blue Economy" development plans concerning coasts and oceans, along with freshwater masses, are being devised to stimulate growth. This report highlights five sectors of the Blue Economy: fisheries and aquaculture; shipping and transport; tourism; energy and deep-sea mining. There are different development opportunities and challenges for each of these sectors in Eastern African countries and their potential differs according to ecological, geographical and political circumstances. Security is paramount for the development of the Blue Economy in the Western Indian Ocean (WIO) region, alongside challenges from climate change and environmental threats that have a negative impact on community livelihoods and economically important sectors. In addition, conflicts over maritime boundaries in the region threaten to exacerbate international and regional tensions.

Furthermore, realising Africa's transformation agenda requires the sustainable maximisation of the continent's resources. Key areas such as aquaculture, maritime transport and offshore oil and gas exploration are being identified as crucial in growing the economy in the Eastern African region. Fisheries, for example, supply direct employment to nearly one million people and millions more are engaged in the fish chain in the processing, trade and marketing of fish. Many are small-scale operators supplying food to local and sub-regional markets. International commerce by water affects people and industries throughout the entire continent, including land-locked hinterland countries. The numerous vessels, ports, shipyards, and support industries also provide thousands of jobs for Eastern Africans. Oil and gas exploration provides potential for some States while renewable energy potential can be identified in many other countries in the region. All of these sectors make the Blue Economy an essential component of Eastern African pathways to wealth creation and sustainable development.

9.2 Challenges and Opportunities of Development of the Blue Economy

A number of significant challenges to the development of the Blue Economy in Eastern Africa emerge from this report. The main ones refer to climate-change impacts including ocean acidification; coral bleaching; changes in fish-species productivity; and coastal erosion and rising sea levels. Data on climate-change impacts are often not adequately communicated to the regional or national level hampering detailed projections and making adaptation measures difficult. Furthermore, insufficient data collection on ocean and marine ecosystems (e.g. regional projections of climate-change impacts on fisheries' productivity, pollution, coral-reef health and analysis of deep-sea mining resources) interferes with sound management. Where data is available, it may not be regionally distributed and monitored due to a lack of mechanisms for data sharing between jurisdictions, RECs/NGOs, evaluation institutions and UN agencies.

Transnational organised crime in the maritime domain is extensive in the region and affects the development of the Blue Economy. Ocean governance in the region is highly sectorial. Issues, such as the laying of seafloor cables, seabed mining and ocean dumping, are governed by separate treaties. At a regional level the patchwork of regulations and entities can be very complex. There is a lack of regional integration and governance frameworks in relation to the Blue Economy.

TABLE 9.1 Challenges and opportunities of specific Blue Economy sectors

Ecosystem services	Blue Economy sectors	Some (potential) opportunities through development of the sectors for Eastern Africa	Some (potential) challenges in development of the Blue Economy sectors
Harvesting of living aquatic resources (supplying seafood, plant marine organisms, and marine-biotechnological products)	Fishing (inland, coastal and deep seas)	- improved food security - improved benefits from advancing participation and enhancing global value chains through local content policies - improved benefits at the national level for Eastern African countries through bilateral and multilateral (pelagic) fishing agreements - use of certification opportunities - use of innovative investments in green technology (low impact, fuel-efficient fishing methods; reduced energy use; and greener refrigeration technologies)	- Illegal, Unreported and Unregulated (IUU)Fishing - environmental crimes - lack of data on fish stocks - insufficient capital at national level to build Distant Water Fleets (DWF) or improve processing plant facilities - unequal power relations in establishment of fisheries agreements - impacts of climate change on marine resources (e.g. ocean acidification, coral bleaching)
	Aquaculture	- innovative aquaculture production systems (e.g. aquaponics) - support for development of small and medium-sized businesses - opportunity for foreign-exchange earnings through exports	- need for land, water and energy - requires (fish) feed, creating pressure on fisheries elsewhere - weak aquaculture extension services - inadequate know how - insufficient infrastructure - unavailability of quality fish seeds and feeds - inadequate facilities, training, and technical capacity - pollution
	Mariculture	- food security and livelihoods - can be promoted via the tourism sector (e.g. Zanzibar)	-space conflicts -biodiversity changes -pollution
	Pharmaceuti-cals, chemicals, cosmetics, genetics research	- knowledge production - possible benefits to governments - possible livelihood improvements through employment generation	- impacts on the marine and aquatic ecosystems - securing adequate supply of inputs - economic benefits and knowledge remain with private companies or research institutes outside Eastern Africa - risk of intellectual property claims over marine biotechnology products

Ecosystem services	Blue Economy sectors	Some (potential) opportunities through development of the sectors for Eastern Africa	Some (potential) challenges in development of the Blue Economy sectors
Extraction of non-living resources and generation of new energy resources	Deep-sea mining	- revenue generation for governments and private companies	- lack of information on resources - lack of technical, financial and human capacity at the national level - outsourcing of skilled labour - impacts on marine ecosystem (e.g. noise and light pollution, discharges from vessels and equipment, fluid leaks)
	Off-shore oil and gas	- revenue generation for governments and private companies - employment and capacity building - possible reduced dependency on energy imports - difficulty in participatory process involving various stakeholders	- space conflicts with other user groups - marine ecosystems impacts (e.g. oil spills, air, noise and light pollution) - weak revenue capture at national level - risk of Dutch disease and resource curse - decommissioning of infrastructure creates environmental pressures - legal challenges, as offshore activities are subject to the rules of international law
	Renewable energy	- Enhanced access to renewable energy - transition to low-carbon economies - improved knowledge base to build and maintain infrastructure - environmentally friendly - reduced dependence on energy imports -contributes to a more diversified energy portfolio	- capital intensive - many initiatives still in R&D phase - space conflicts - technologies not accessible, adaptable and affordable to the needs and circumstances of Eastern African countries
Commerce and trade in and around the ocean	Maritime transport and port infrastructure and services development	- green port developments promoting greater energy-efficiency of ships, reductions in fuel consumption and in emissions - job creation at the small-and medium scale - cheaper imports due to decreased handling costs and growing capacity - enhanced container connectivity attracts investments and businesses - promotion of ratification and implementation of all of IMO's environmental treaties	- privatisation and foreign investments in port infrastructures - piracy, human trafficking, drugs and arms smuggling - pollution (e.g. noise pollution, discharge of ballast water, risk of release of invasive species, potential for leaks, spillage and emissions, impacts on water quality and marine ecosystems) - membership of different RECs can hinder co-operation - space conflicts - challenging to match wealth creation by port development with social inclusion

Ecosystem services	Blue Economy sectors	Some (potential) opportunities through development of the sectors for Eastern Africa	Some (potential) challenges in development of the Blue Economy sectors
	River transport	- high potential for corridor development (e.g. as support for tourism development) - enhanced intra- and inter-regional trade - job creation	- pollution (risk of leaks, spillage and noxious emissions, water quality) - need for deeper rivers can alter ecosystems and impact food security
	Tourism and recreation	- opportunities for marketing traditional and new local products at small-and medium scale - linking tourism to the development of (new) protected areas or e.g. through "blue-carbon" projects - tourism development should link with environmental conservation principles (e.g. renewable energy)	- high energy and water needs - mangroves and seagrass beds removal to create open beaches - space conflicts - pollution from infrastructural developments and run-off - biodiversity loss due to (illegal) collection of marine organisms (e.g. black coral) - marginalisation of coastal populations due to "blue-carbon" projects and creation of Marine Protected Areas
Protection	Aquatic protection	- establishment of "blue-carbon" projects (seagrass and mangroves) - develop a framework to initiate, expand, and/or improve the management effectiveness of Marine Protected Areas	-climate change impacts (e.g. ocean acidification) -overexploitation of marine and aquatic resources -marginalisation of populations -nutrient pollution -biodiversity loss
Cultural and religious values	Cultural and religious practices	- use of traditional knowledge to enhance knowledge necessary for effective policy design and implementation	- insufficient incorporation of traditional knowledge
Knowledge and information	Biophysical, socio-economic and political research	- build knowledge centres on the Blue Economy to collect data, store and share information - provide regional knowledge platforms based on partnerships	- knowledge platforms are limited - insufficient data collection and uptake of data in policy making - lack of data-sharing and evaluation mechanisms

9.3 Blue Economy Principles

The Blue Economy facilitates the design and implementation of processes that integrate science, awareness and social change and that lead to real improvements in environmental health and social well-being. Moving into more collaborative and inclusive patterns of work by harnessing the full potential of all actors at multiple levels of scale is essential to reach the fundamental principles of the Blue Economy.

The first principle is related to the promotion of the **sustainable** use and management of marine and aquatic ecosystems and associated resources to trigger the structural transformation of local and national economies. This is to be achieved through a multi-sectorial approach and clustering, with special focus on value addition, job creation, economic diversification, skills acquisition, broad-based technology and increased participation in decision making. Structural transformation cannot occur without enhanced regional integration, infrastructure development, trade and industry development, and the promotion and exchange of information technology to support a knowledge economy. Assessing the potential for cumulative impacts of multiple activities on the oceans and designing management based on Marine Spatial Planning and Integrated Coastal Zone Management principles is crucial for the marine environment. For freshwater bodies similar types of integrated management systems are necessary at the continental and regional level, following the example of the Nile Basin Initiative.

The second principle includes the equitable share of **benefits** through an inclusive policy response would ensure that local communities, marginalised groups (e.g. women, youth and indigenous groups) and low- as well as high-skilled workers in the coastal and peripheral regions of Eastern Africa benefit from Blue Economy development. This includes providing equitable benefit-sharing throughout the value chain and work with small-scale producers in local communities (i.e. fishers, farmers) to establish new market linkages emerging from the Blue Economy. Inclusive-growth policies promote capacity building through skills development and by encouraging the participation of all stakeholders at various levels of design and implementation of future Blue Economy activities that may affect them. Countries need to resolve concerns over access to marine bio-technologies and claims of intellectual property over marine products. Offshore oil and gas exploration, in particular, should ensure benefit sharing at the national and local levels in order to ensure wealth creation. Blue Economy activities need to support small- to medium-sized enterprises, as these are where most spill-over impacts occur.

The third principle promotes the **conservation** of aquatic ecosystems and associated resources through reduction of threats and impacts from climate change and natural disasters. Climate change will impact all sectors of the Blue Economy through global warming, rising sea levels, droughts and food scarcity in a context already affected by new maritime activities. Some sectors are already facing unsustainable practices and climate change is expected to exacerbate this.

The fourth principle advocates the attainment of the **Sustainable Development Goals** (SDGs) throughout the development of the Blue Economy. The United Nations has adopted ocean development and the concept of the Blue Economy as part of the SDGs. The Blue Economy is interlinked with the majority of the Goals in a variety of ways, yet goal numbers 14 and 6 are of major importance. Goal 14 *"Conserve and sustainably use the oceans, seas and marine resources for sustainable development,"* responds to growing environmental concerns over the use of aquatic resources. This overarching goal includes multiple sub-goals, like setting aside 10% of the oceans as protected areas by 2020 (currently less than 3% enjoy this protection);

reducing significant marine pollution of all kinds by 2025; and, by 2030, increasing the economic benefits for Small Island Developing States and lesser developed countries from sustainable use of marine resources. Goal 6 is *"Ensure access to water and sanitation for all."* Water scarcity, poor water quality and inadequate sanitation negatively impact food security, livelihood choices and educational opportunities. The sub-goals include achieving universal and equitable access to safe and affordable drinking water for all by 2030 and improving water quality by reducing pollution, eliminating dumping and minimising the release of hazardous chemicals and materials, halving the proportion of untreated waste water and substantially increasing recycling and safe reuse globally by 2030.

These principles are at the heart of Blue Economy development and should guide further policy frameworks, partnerships and development opportunities.

9.4 Actions

Achieving optimal sharing of benefits among different stakeholders at national level is a prerequisite to the sustainable development of the Blue Economy. This requires an effort to maintain the flow of benefits from renewable resources (sustainable fisheries, for example) by ensuring sustainable practices and fair benefit-distribution agreements. It is equally essential to capture the benefits and ensure wealth creation at the national level from non-renewable resources (including oil and gas) while ensuring that the flow of benefits extends long after the depletion of mineral and extractive resources by means of, for example, Sovereign Wealth Funds.

It is also important to ensure equity in the distribution of benefits at all levels and for marginalised groups (in particular, in the use of revenues from non-renewable resources and big infrastructural developments such as ports), and that expanded activities do not generate conflicts. Marine spatial planning and providing analysis of the overlapping uses of aquatic space in a multiple-sector approach is crucial. Clusters bring together one or more sectors within a given region and focus on networking and co-operation.

Fostering the promotion of social equity, inclusive growth and food security is also key and can be facilitated through enhanced training and skills development of specialised workers; and traditional management and the use of traditional knowledge systems combined with modern approaches. The use of innovative investments in green technology to enhance food security and social benefits as well as enhanced participatory engagement of all stakeholders at multiple levels and promoting the inclusion of youth, women, local communities and under-represented groups in all Blue Economy sectors by addressing cultural barriers can also help social equity and inclusion. Providing equitable benefit sharing throughout the value chain and working with small-scale producers in local communities (including fishers and farmers) to establish new market linkages emerging from the Blue Economy is essential.

It is equally crucial to strengthen capacity building to move towards a co-management approach in relevant resource-based sectors of the Blue Economy in which a partnership is created between public and private sectors, civil society organisations and local communities. Encouraging knowledge and information building is fundamental. It can be achieved through awareness raising of populations and all stakeholders at multiple levels on the opportunities and challenges of the Blue Economy; and building onto existing indigenous knowledge and value systems to create a strong basis for further empowerment, resource rights and focused action.

Healthy aquatic resources require effective application of the commitments made under Blue Economy initiatives and significant investment in both the physical and social aspects of science as well as building knowledge centres to enhance data collection and storage, and creating mechanisms for sectorial and international data sharing. A shared national and regional knowledge base of human activities in aquatic ecosystems including formal and informal activities is necessary. More extensive and effective use of Environmental Impact Assessments(EIAs) and Strategic Environment Assessments (SEAs) when developing Blue Economy activities is called for.

The strengthening of institutional capacity is paramount. Enhanced implementation of the statutory and institutional frameworks at the national and regional level is required. National management agencies of all sectors, and local and national civil society organisations need to be promoted and strengthened. Opportunities for enhanced training and capacity building should be offered to officials involved in relevant Blue Economy sectors on applicable international law and legislation, regional and sub-regional instruments and policies. Regional harmonisation of legal and policy frameworks is essential. Improved governance of areas beyond national jurisdiction requires co-operation between countries, building on existing regional institutions such as the Nairobi Convention.

Additionally, to address the intricacies of security challenges in the WIO Region, there is a need for innovative geostrategic solutions, in which African diplomacy plays a central role as well as to develop and strengthen the capacity of States to negotiate fair and robust contracts and agreements in relation to the Blue Economy at all levels.

9.5 Partnerships and a Shared Vision on the Blue Economy

The Blue Economy spans a number of different sectors, with significant potential synergies. A holistic Eastern African perspective within a shared Blue Economy approach will be crucial in achieving the various objectives of the Blue Economy. This can only be achieved through innovative and equal partnerships among all parties involved. Public-sector stakeholders, including policy makers and administrators at national and local levels, are charged with developing and implementing the policies that frame the transition to Blue Economy development. Concerns at the political level include the challenge of building consensus on a Blue Economy strategy, on the

transition process, and on the compromises that might be required. At the technical level, coherence between sectorial policies and plans requires co-ordination between ministries, while, at local levels, difficulties created by administrative and marine ecosystem boundaries need to be overcome. At the same time, partnerships need to be made, not only across sectors but also with civil society actors (including academia) and private parties, that emphasise the importance of enhancing scientific and technical co-operation in areas of interest. There is a continued need for capacity building, technology transfer, research and development which would of necessity require integrated, innovative and effective partnerships.

To develop opportunities within the Blue Economy further, and to meet its challenges, a plan of action needs to build on existing regional co-operation and partnerships. RECs and IGO – such as the Northern Corridor Transit and Transport Coordination Authority (NCTTCA), the Central Corridor Transit Transport and Facilitation Agency (CCTTFA), the Economic Community of the Great Lake Countries (CEPGL), the West Indian Ocean Marine Science Association (WIOMSA), and the International Conference on the Great Lakes region (ICGLR) – have a critical role to play in facilitating this co-operation process through consolidated inter-REC/IGO and inter-country partnership agreements and processes. States, RECs, IGOs and Pan-African organisations can overcome existing challenges in forging partnerships for the Blue Economy by effectively participating in partnership mapping, bridging sensitisation and information gaps, including through existing frameworks such as the Regional Coordination Mechanism (RCM) and Sub-Regional Coordination Mechanism (SRCM). Such co-operation forms the basis for the promotion and development of the Blue Economy through socio-economic and strategic partnerships to the advantage of regional States.

Other important actors are the Common Market for Eastern and Southern Africa (COMESA), and the Intergovernmental Authority on Development (IGAD). No single organisation has either the financial resources or the human capacity to implement projects and programmes on its own; co-operation is, therefore, crucial. It is important to promote South-South and Triangular co-operation, including through collaboration with traditional donor countries and multilateral organisations to facilitate South-South initiatives by accessing funding, training and management, technology transfer as well as other forms of support of development of the Blue Economy.

Box 9.1 Regulatory frameworks

The development of the Blue Economy will be interpreted and implemented in conjunction with all relevant national, regional and international regulatory frameworks and on-going maritime initiatives in Eastern Africa, which include, but are not limited to (based partly on the AIMS 2050 Strategy) to:

- The UN Convention on the Law of the Sea;
- The UN Convention on Biological Diversity;
- The Convention on Wetlands of International Importance (Ramsar Convention);

- The Indian Ocean Memorandum of Understanding (MoU), Mediterranean MoU and the West and Central Africa MoU on Port State Control (Abuja MoU);
- The UN Convention on The Contract of International Goods transported wholly or partially by Sea (2009 Rotterdam Rules);
- The UN Convention on Transit Trade of Landlocked States (1965);
- The Convention on The Facilitation of International Maritime Transport (FAL Convention-1965);
- The International Convention for the Prevention of Marine Pollution from Ships (MARPOL);
- The Maritime Organisation of West and Central Africa (MOWCA) MoU on Establishment of an Integrated Coast Guard Function Network;
- The Abuja Declaration on Sustainable Fisheries and Aquaculture in Africa (2005);
- The Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing;
- The United Nations Convention on Law of the Sea (UNCLOS);
- The United Nations Fish Stocks Agreement;
- The Food and Agriculture Organisation (FAO) Code of Conduct of Responsible Fisheries;
- The Convention on Sustainable Management of Lake Tanganyika;
- The Convention for the Establishment of the Lake Victoria Fisheries Organisation (LVFO);
- The South West Indian Ocean Fisheries Commission (SWIOFC);
- The Agreement of the Indian Ocean Tuna Commission (IOTC);
- The South Indian Ocean Fisheries Agreement (SIOFA);
- The African Maritime Transport Charter (AMTC), 2010, as well as the Durban Resolution on Maritime Safety, Maritime Security and Protection of the Marine Environment in Africa;
- ECCAS and ECOWAS Merchant Marine Code agreement (nations from the Economic Community of Central African States (ECCAS) and Economic Community of West African States (ECOWAS) signed an agreement on the improvement of maritime security during their Maritime Safety and Security Conference in 2012 that could serve as an example for Eastern African region);
- The Nile Basin Initiative (NBI) (a regional intergovernmental partnership led by 10 Nile riparian countries);
- The Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region; and
- Other significant initiatives such as frameworks established by the Northern Corridor and Transport Coordination Facility Authority (NC-TCFA) and the Central Corridor Transit Transport Facilitation Agency (CCTTFA): International counter-piracy operations and maritime capacity-building programmes (e.g. I-Fish).

9.6 Financing the Blue Economy

Financing the transition, as well as funding for capacity and knowledge building, is a concern at all levels, while tracking progress on Blue Economy development requires new sets of indicators on human well-being and natural capital. While private-sector investment in innovation will be a key driver of blue growth, complementary public investment in knowledge and applied research to adapt technologies to local conditions will help build the foundations. With respect to the use of non-renewable capital, such as offshore oil and gas and other extractive industries, ideally a substantial proportion of the returns will be captured in Sovereign Wealth Funds and used to support the transition to blue growth.

There is a wide range of possibilities for financing the Blue Economy. Investments can be divided into two categories based on the origin of the finance: (1) national-level investment largely from domestic or national resources; and (2) large-scale schemes requiring external investment. The relatively smaller domestic investments can be supported by national blue- and green-growth funds, capacity development schemes and national planning frameworks with possible support from development agencies and international or local-level NGOs. However, the larger investments often imply significant Foreign Direct Investment (FDI) and can involve an important knowledge gap (for example in the case of mineral extraction) that limits local and national involvement.

Public-sector funding will benefit from a review of existing expenditure plans to ensure coherence and the alignment of investments at local and national levels. Private-sector investments – for example in offshore and coastal extractive industries, shipping, tourism, fisheries and aquaculture – involving both domestic and foreign capital, are an important source of Blue Economy funding. For emerging technologies, such as marine renewable energy or marine biotechnology, impact investment, backed by grant funding from innovation funds and private-sector parties, offers great potential. However, they will require rigorous evaluation of risks and sustainable returns at the national level.

Donor funding for new Blue Economy projects also offers the necessary opportunities for improving the environmental sustainability of aquatic management as well as addressing climate-change adaptation and meeting social development needs which are essential in Blue Economy development. Where external financing is required for public investments, NGOs and large environmental funds (e.g. the GEF) can support national and regional investments in healthy oceans and ecosystems. Climate finance, funding directed towards disaster preparedness and financial assistance from international financial institutions (for example, the World Bank, AfDB, and IFAD) can support a range of public goods and community efforts that are already taking place or are in preparation. South-South co-operation supported by NGOs (e.g. debt-for-nature financing) offers significant potential.

9.7 Main Recommendations and Principles to Harness the Blue Economy

The Blue Economy could provide a paradigm shift embedded into transformative policy thinking, considering the inherent interconnections across sectors. It could represent a powerful engine for sustainable development in Eastern Africa through targeted policy action in the following areas:

(i) *Integration of geopolitical dimensions* by focusing on the interdependence of security and development, as they are mutually supportive in achieving sustainable peace; and strengthening of continental, sub-regional and transnational co-operation mechanisms in preventive diplomacy. Ratification and implementation of relevant international, regional and sub-regional instruments related to maritime safety and security as well as the harmonisation of national legislations, and emulation of good practices of south-south co-operation for peace are essential.

(ii) *Development and implementation of effective national and sub-regional legal, regulatory and institutional frameworks* building on existing applicable instruments. As an example, the Blue Economy could galvanise those African states that are not yet parties to UNCLOS to ratify it in order for them to profit from the Area as well as other resources of the oceans. It would also provide an opportunity for participation in the ISA, which regulates all activities in the Area. In addition, harmonising the protocols and policies of overlapping mandates of sub-regional bodies in place would also contribute to policy coherence.

(iii) *Mainstreaming climate-change mitigation and adaptation, as well as environmental sustainability* – such as the protection, conservation, preservation, sustainable use and management of marine and aquatic resources – into Blue Economy policy development.

(iv) *Fostering social inclusion* through effective involvement of key societal groups (women, youth, local communities and marginalised/underrepresented groups) in all Blue Economy sectors ensuring equitable benefit sharing, as well as multi-stakeholder policy development processes at all levels. Blue Economy labelling and marketing could foster business opportunities encouraging entrepreneurship for competitiveness, job creation and supporting innovation and technological transfer.

(v) *Promotion of inclusive and innovative partnerships* including public-private partnerships as well as South-South and Triangular partnerships. Co-ordinating all public-sector parties, donors and development partners would be necessary for sound and consistent policy making.

(vi) *Continued capacity building and development* through national and regional programmes with the co-operation of academic and research institutions. Enhanced knowledge and its dissemination at all levels is essential for the better implementation of Blue Economy policies.

(vii) *Communicating of* potential benefits from the Blue Economy and developing outreach strategies for participatory policy making processes.

(viii) *Monitoring and evaluation* of Blue Economy policies, strategies and action programmes as a way of reviewing their relevance, updating them based on stakeholders' adjustments and identifying new emerging issues and priorities.

Based on these recommendations, a *Blue Economy Policy Handbook* [1], containing a step-by-step guide integrating the above entry points for policy action was developed. It aims to help sub-regional institutions and countries to mainstream the Blue Economy into sub-regional and national policies, laws, regulations and practices.

Conclusions

The concept of the Blue Economy has gained attention as an avenue for development in Africa. This report has highlighted the importance of the traditional and newly emerging Blue Economy sectors and has identified the issues involved in the effective development of the Blue Economy in Eastern Africa.

Traditional and non-traditional Blue Economy sectors still face many challenges highlighted in this report. However, aligning different sectors and ensuring coherence between them requires significant investments of time and energy by decision makers who need to build stakeholder consensus and promote corporate social responsibility through the engagement of private-sector associations.

The findings of the report demonstrate that the Blue Economy approach could reconcile economic growth with climate resilience and environmental sustainability by harnessing the full array of aquatic-ecosystem wealth to accelerate countries' ability to produce goods, food and energy in Eastern Africa. The adoption of a Blue Economy agenda should underpin the development of human activities that promote economic development and poverty alleviation.

Acquiring data for Blue Economy strategies is crucial as is developing platforms where stakeholders (public-private and civil society) can share information and lessons learned. Blue Economy development needs to ensure participation of stakeholders at all levels and at all stages.

The Blue Economy provides an opportunity for strengthened partnerships which build on existing maritime, riparian, lacustrine and river basin co-operation mechanisms. Sector development needs to ensure the use cutting-edge technology that involves developments in 'blue' sectors. Such innovations entail the pursuit of economic forms that promote a healthy environment and ecological conservation as a means of sustaining livelihoods. It endorses principles of low carbon use, resource efficiency and social inclusion. Social inclusion in the distribution of benefits is essential, as is a focus on small-scale and medium-sized producers. Assessing the possibilities for further

[1] ECA, 2016. Africa's Blue Economy: A policy Handbook. Available on-line at www.uneca.org (publications)

financing Blue Economy activities in the region is crucial to sustaining further growth and improving human wellbeing with ecological balance.

The strong economic growth in the region since the beginning of the century has not erased poverty. Where it has occurred, it has rarely been sustainable and inclusive. This report has highlighted the potential impact of applying Blue Economy principles to growth strategies and the positive effect on inclusive growth and prosperity.

Political leaders in the Eastern African region will need to articulate a clear vision of the Blue Economy, including the transition paths and the distribution of costs and benefits, as well as the environmental challenges and opportunities that will follow. A Blue Economy 'vision' of Eastern African countries – guided by a Blue Economy handbook – can help build consensus on a national vision and establish a framework for investments, for business operations, and for the cataloguing and stewardship of natural capital. An overarching Blue Economy framework will require establishing principles and practices for the sustainable management and use of freshwater, marine and coastal resources, for marine and freshwater spatial planning and for the allocation of rights and concessions to use public natural capital. It can also lay down principles for the allocation of rents and revenues from the exploitation of these resources.

Several external Blue Economy financing opportunities are identified in this report. However, it is also important to assess the potential of domestic resource mobilisation as well as of the opportunities offered by existing public-finance modalities for the Blue Economy. This may require re-examination of sector plans and existing national programmes, such as those for decentralisation, poverty reduction, climate-change adaptation or disaster preparedness. The government's role in the Blue Economy's development is essential but the private sector and civil society are also fundamental actors. Opportunities can be identified with a range of new market initiatives related to the Blue Economy such as blue-carbon projects; "blue bonds"; seafood certification schemes, 'green fees'; new fishery agreements; payment for ecosystem services and debt swaps.

A Blue Economy policy response favours those freshwater and maritime economic activities that contribute to the overall sustainability of the lakes, rivers, oceans, seas and coasts. It also promotes a transformation of business models within traditional activities towards sustainability. Equally, it promotes local, regional and water/sea-basin specific actors to develop and implement integrated strategies that contribute to the long-term values of lakes, rivers, coast lines and seashores. Solutions may require a range of long-term measures including education and employment schemes, community support, microfinance and development of non-marine/aquatic enterprises. Though these areas may technically lie outside the Blue Economy, they are nonetheless vital to its development.

For the first time, in this volume, the general and the specialist reader can both access important and comprehensive information about the next development frontier: the Blue Economy. Presented in every-day language but written by a team of experts, this book covers all aspects and implications of the Blue Economy approach to economic and social development including natural-resource management, geopolitics, transport, mining, energy, fisheries and tourism. It concludes by outlining options for policy makers, concerned communities and the private sector.

The Blue Economy concerns everything aquatic, including oceans, lakes, rivers, islands and shorelines. It covers the communities that live close to these resources and those who use them for economic or social activities. The book's authors explain the opportunities presented by good management and exploitation of these resources, while, at the same time, identifying the risks associated with over-use of them.

The geographical focus is on Eastern Africa, a region that stretches from the Congo delta in the West to the Seychelles island republic in the East and from the Red Sea to the borders of Mozambique. The lessons and recommendations, however, have a far wider reach. This book, produced by the Eastern African regional office of the United Nations Economic Commission for Africa, should be required reading for policy makers and the international development community everywhere.

United Nations
Economic Commission for Africa