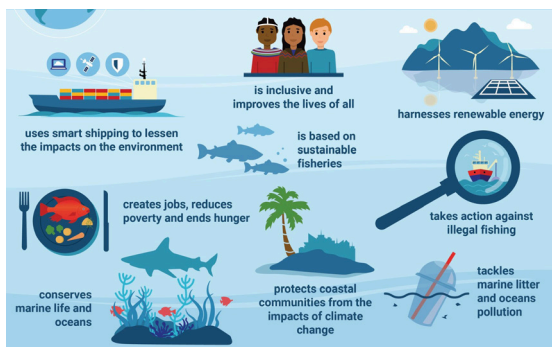


Climate Change and the Sustainable Ocean Economy

Introduction

The ocean plays an important role in shaping global climate and weather patterns, and is a fundamental part of the climate system representing the largest carbon sink on the planet. The oceans sustain life on Earth by cycling oxygen and CO₂, regulating climate and temperature, and providing millions of people with food and livelihood security. However, these benefits and services are in jeopardy due to climate change. Climate change has been linked to changes in ocean chemistry, extreme coral reef bleaching events, sea levels rise and ocean acidification. Changes to coastal and marine ecosystems threaten the physical security, economic security and food security of local communities. The ocean and adjoining coastlines are critical for Africa's economy and livelihoods and recognised as the 'new economic frontier for Africa'. The African ocean sectors and associated services are estimated to generate USD 296 billion in value creating more than 49 million jobs. This is projected to increase to 57 million jobs and USD 405 billion value in 2030, and while in 2063 would be 78 million jobs and USD 576 billion, respectively¹.



KEY MESSAGES

- 1. Ocean health and the sustainable use of ocean resources are critical to life, livelihoods and in meeting national development needs of the African Coastal and Island States.**
- 2. African coastal and the Island States have a significant opportunity to leapfrog toward a Sustainable Ocean Economy model that is both economically and environmentally sustainable, socially inclusive, and carbon neutral by design.**
- 3. Limited scientific knowledge, large scale data gaps in the oceans and lack of investment in ocean observations and data infrastructure remain the key challenge.**
- 4. International cooperation is important in leveraging ocean adaptation and mitigation strategies to its full potential, and to meet the Paris Agreement goals.**

Africa is the most vulnerable continent to the adverse impacts of climate change (both social and economic), yet its contribution to greenhouse gas (GHG) emissions is very low. The continent faces significant climate change impacts as temperatures are increasing faster than the global mean surface temperature. Sea-level rise has averaged 5 mm per year, exceeding the average global sea-level rise of 3–4 mm per year, and increasing frequency and magnitude of extreme weather events such as drought, tropical cyclones, and floods. The ocean's capacity to store ongoing carbon emissions is decreasing, a low carbon emissions trajectory is imperative for preserving the health of the ocean to support the needs of current and future generations.

Africa's Ocean Economy

The oceans' role in sustaining human life and diversification of livelihoods are recognised by Sustainable Development Goal 14 (life below water)

¹ AU (2019): African Blue Economy Strategy

and its trade-related targets and subsequent national and international declarations. Meeting these ambitious targets and objectives will require coherent policies at the sectoral, national, and international levels regarding production, trade, social inclusion and the environment. So far most initiatives for attaining SDG 14 have focused on the sustainability of ocean ecosystems and governance. Limited work has been done on identifying developed and potential ocean-based sectors and assessing their economic relevance within Africa in the face of a changing climate. Likewise, the potential economic opportunities presented by harnessing the resources of Areas Beyond National Jurisdiction (ABNJ) has not been fully addressed.

The concepts of a ‘sustainable ocean economy’ (SOE) or a ‘blue economy’ have gained prominence over recent years, although there is no agreement in the literature on what these concepts mean. An ocean economy refers to an economic model that “*sums up the economic activities of ocean-based industries, together with the assets, goods and services provided by marine ecosystems*”. In the context of Africa, SOE aims to maintain, enhance and, where necessary, rebuild ocean capital as a critical economic asset and source of public benefits, as well as being socially inclusive. This approach recognizes the interdependencies that exist between ocean-based industries and marine ecosystems. The African Union (AU), through several high-level policy documents such as the 2050 Africa Integrated Maritime Strategy (AIMS), the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (2014)², AU Agenda 2063 and the AU Blue Economy Strategy, espouse the concept of SOE.

Many African coastal and island states have recognized the importance of the ocean economy and are in the process of elaborating their SOE policies. At several high-level fora, many African countries have committed to developing SOE or blue economy. For example, at the Sustainable Blue Economy Conference held in December 2018 in Nairobi, Kenya, several African countries indicated commitments³ to develop various thematic areas critical for SOE, including infrastructure, research and capacity building, partnerships, marine conservation, maritime safety and security, finance,

policy and regulations and sustainable fisheries development. At a blue economy side event held during the 7th Tokyo International Conference on African Development (TICAD7) held on 28–30 August 2019 in Pacifico Yokohama, Japan, African government representatives reiterated the blue economy benefits from utilising seas, oceans, lakes, rivers and other water resources for sustainable socio-economic development. This was further reinforced during the African Consultation Workshop for the United Nations Decade of Ocean Science for Sustainable Development held in 27–29 January 2020 in Nairobi, Kenya. The Ocean Decade aims to catalyze action to achieve high-level scientific and technological breakthroughs, and thus realize a set of six priority societal outcomes for the world’s oceans: a clean ocean; a healthy & resilient ocean; a predicted ocean; a safe ocean, a sustainable & productive ocean; and a transparent & accessible ocean.

Case Study 1: Operation Phakisa Oceans Economy – The South African Ocean Economy Strategy

In 2014 South Africa launched the Operation Phakisa programme (Phakisa means ‘hurry up’ in Sesotho, one of South Africa’s official languages) to develop its oceans economy (or Oceans Phakisa to distinguish it from the other Operation Phakisa programmes). This saw delegates from various sectors workshoping over six weeks the identification of key areas of development for the maritime industry and the actions that would need to be realised to achieve this. The workshop saw the identification of a number of sectors for development with Marine Transport and Manufacturing; Offshore Oil and Gas Exploration; Aquaculture; and Marine Protection Services and Ocean Governance chosen as the initial focus areas. Marine and Coastal Tourism and Small Harbour Development were added in subsequent years.

While the goals of the programme are primarily focused on the economic development of sectors, the placement of the Oceans Phakisa Secretariat within the national Department of Forestry, Fisheries and the Environment, and the inclusion of Marine Protection Services and Ocean Governance as a sectoral development area provided emphasis on the need to protect the ocean environment while developing the ocean economy. Notable outcomes of the process were a national skills assessment to identify the existing skills capacity within the ocean sectors (and which higher education institutions offered this) and the skills needs and gaps, and the development of the national Ocean and Coastal Information Management System – which offers a number of decision support tools for ocean users – and the national Marine Information Management System – an open repository that archives

² https://au.int/web/sites/default/files/documents/30266-doc-au-ibar_-_fisheries_policy_framework_and_reform_strategy.pdf
³ <http://www.blueeconomyconference.go.ke/wp-content/uploads/2018/12/FINAL-SBEC-COMMITMENTS-14-Decemebr-2018-4pm.pdf>

and publishes collections and subsets of marine related datasets for the Department of Forestry Fisheries and the Environment. Also, recognising that oil and gas operations may not be in-line with climate commitments but identifying the opportunity exploration activities could provide for research, within the Oil and Gas Lab the opportunity for marine data gathering and sharing was recognised with the inclusion of Initiative B3: Exploiting the broader research opportunities presented by offshore oil and gas exploration.

The importance of developing and implementing SOE model for Africa’s economic development, in a changing climate, cannot be overemphasized. Through the current climate change response, some countries have included SOE strategies such as coastal blue carbon ecosystems into their national climate policies such as Long Term Low Emissions and Climate Resilient Development Strategies (LTSS), Nationally Determined Contributions (NDCs), National Appropriate Mitigation Actions (NAMAs) and National Adaptation Plans (NAPs). In many countries, ocean management and governance tools such as Integrated Coastal Zone Management (ICZM) and Marine Spatial Planning (MSP) have already been identified as one of the primary focal areas of their climate action.

Marine and coastal ecosystem services

Marine and coastal ecosystems provide important economic, social, cultural, and environmental benefits. Sustainably managing, restoring, and protecting the health of these ecosystems contributes to strengthening the resilience and adaptive capacity of both natural and human systems to climate change and other threats. For example, besides the coastal wetlands such as mangrove forests being very important for local communities livelihoods, they play a very critical role in the protection from climate-induced impacts such as shoreline erosion and sea level rise. Other marine ecosystems important in mitigation of climate change include: mudflats, seagrass meadows and seaweed beds (also called blue carbon habitats). It is estimated that the West Africa region contains 1.97 million hectares of mangroves which accounts for 14% of the world’s mangrove cover (Figure 1), 4.8 million hectares of seagrass (Figure 2) and 1.2 million hectares of salt marshes which together store a total of 1830 854 million

metric tons of carbon. Restoring coastal habitats such as mangroves, tidal wetlands and kelp forests may help capture and store carbon. In addition, coastal ecosystem restoration will help protect against floods or erosion, offsetting the impact of extreme weather events. This underscores the potential of blue carbon habitats in the continent’s climate actions.



Figure -1 A cross-section of mangrove forest in the Nigerian Niger-Delta. Source <https://www.environmentnewsigeria.com/preserving-mangrove-forest-ecosystem-in-cross-river/>

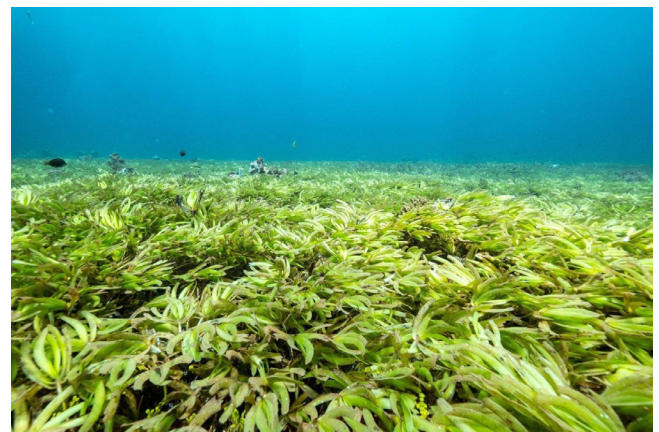


Figure -2 Seagrass, at the Saya de Malha Bank within the Mascarene plateau, Mauritius. Source: Tommy Trenchard/Greenpeace/Handout via Reuters)

Several blue carbon projects are underway in Africa, such as the “Plante ton arbre” (Plant Your Tree) project in Senegal; the Mikoko Pamoja blue carbon project in Kenya; the Tahiry Honko project, Bay of Assassins Madagascar; and several projects in Seychelles (Case study 2).

Case Study 2: Innovative Financing for the Seychelles Blue Economy

In 2015, the Seychelles established the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), an independent trust, to manage the proceeds of a debt restructuring programme they had been in discussion with their international creditors. This saw what was called a ‘debt-for nature swap’, with the Seychelles swapping a portion of its external debt in exchange for funding coastal and marine related conservation projects in an effort to strengthen its resilience to climate change. Seychelles blue economy strategy also saw it becoming

the first state to issue Blue Bonds, with a ceiling value of USD15 million, in partnership with the World Bank and the Global Environment Facility. The Blue Grant Fund to implement ocean research has so far had two funding calls valued at USD 800 000. SeYCATT is continuing to investigate innovative financing options to further support the Seychelles blue economy strategy. The Seychelles programme demonstrates how sustainable financing mechanisms can be directed towards the conservation and restoration of critical ecosystems to live up to their potential as significant carbon sinks and their capacity to deliver real value to local communities.

Fisheries and Aquaculture

Fisheries and aquaculture play an essential role in the economy and food security of many countries in Africa. In 2018, it is estimated that about 10 Million Tonnes of capture fisheries was produced accounting for 1.26% of the continent’s GDP and creating more 13 million jobs across the fisheries value chain. However, Illegal, Unregulated and Unreported (IUU) fishing poses a severe threat to the capacity of Africa’s fisheries sector to contribute to GDP and livelihoods development as African nations lose an estimated \$10 billion annually to illegal trawlers. Aquaculture in Africa has an estimated value of about USD 2.77 billion but it is highly vulnerable to adverse impacts of climate change due to warmer and more acidic seawater will at varying degrees influence the abundance, migratory patterns and mortality rates of wild fish stocks and determine what species can be farmed. These climatic effects on fish will hitherto have socio-economic consequences for people whose livelihood depends on these resources, especially small-scale fisheries, women, and coastal communities rising temperatures, sea level rise and increased frequency and magnitude of extreme weather events. While the fisheries and aquaculture sectors can be energy intensive (e.g. fishing vessels using fossil fuels) the SOE model presents significant opportunities to transform the sector to realise its potential in a manner that enhances sustainability.

Ocean-based renewable energy

The ocean-based renewable energy sector is a developing in Africa. Several offshore renewable

energy technologies, including wave power, tidal stream power, ocean current power, ocean thermal energy conversion (OTEC), offshore wind power, floating solar or photovoltaic power are deployed and/or planned in Africa. One-third of the African coastal states are potential for offshore wind energy, with Mozambique, South Africa, Somalia, Madagascar and Morocco exhibiting excellent resources. In addition, other countries such as Nigeria and Tanzania, have initiated processes to design their OTEC capacity, and South Africa has elaborated on how to harness wave energy. The relatively untapped ocean-based renewable energy sources in Africa present an opportunity to meet the increasing energy needs, while mitigating climate change. Table 1. Shows the Mitigation Potential of Offshore Wind and Other Ocean-based Renewable Energy Technologies in 2030 and 2050.

OCEAN-BASED CLIMATE ACTION AREA	MITIGATION OPTIONS	DESCRIPTION	2030 MITIGATION POTENTIAL (GtCO ₂ E/YEAR)	2050 MITIGATION POTENTIAL (GtCO ₂ E/YEAR)	
Ocean-based renewable energy	Scaling up offshore wind	Fixed and floating offshore wind installations	coal displacement	0.17-0.23	0.65-3.50
			displacing current generation mix	0.08-0.11	0.30-1.61
	Scaling up other forms of ocean energy	Energy carried by ocean waves, currents, tides, salinity, and ocean temperature differences	coal displacement	0.006-0.016	0.11-1.90
			displacing current generation mix	0.003-0.007	0.05-0.87
TOTAL		coal displacement	0.18-0.24	0.76-5.4	

Ocean-based transport operations

The ocean transport sector, and related operations, is growing rapidly in Africa. In 2018, Africa accounted for approximately 2.7% of global trade by value and contributed higher shares to global seaborne trade – 7% and 5% of maritime exports and imports by volume, respectively. However, ocean-based transport operations globally are responsible for around 940 million tonnes of CO₂ and 2.5% of global GHG emissions which are projected to increase significantly in the absence of timely mitigation measures. The United Nations International Maritime Organization (IMO) in 2018 adopted Resolution MEPC.304⁴ (Strategy on reduction of GHG emissions from ships) to reduce shipping GHG emissions by at least 50% in absolute terms by 2050, relative to 2008 emission levels. Also, IMO International Convention for the Prevention of Pollution from Ships (MARPOL) fuel requirements not only enforced 0.5% global sulphur cap on fuel content from the

⁴ [https://wwwcdn.imo.org/localresources/en/knowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.304\(72\).pdf](https://wwwcdn.imo.org/localresources/en/knowledgeCentre/IndexofIMOResolutions/MEPCDocuments/MEPC.304(72).pdf)

previous 3.5% limit, it mandates shipowners to i) install exhaust gas cleaning systems on their ships; ii) buy compliant fuels (which cost more), or iii) run on the cleaner liquid natural gas (LNG) as fuel. The introduction of other climate change mitigation options in the ocean-based transport sector, include: i) use of wind power, ii) a global levy scheme applicable to all ships engaged in international voyages, iii) mandatory limit on the Energy Efficiency Design Index (EEDI) for new ships and iv) establishing emissions trading scheme (ETS) among others.

Coastal and marine tourism

Coastal and marine tourism (CMT) is one of the key sectors contributing towards the development of the oceans economy. Several African countries, particularly the Small Island States rely on CMT as their primary source of revenue. CMT contribution to Africa’s GDP in 2018 was estimated at \$80 billion creating 24 million jobs, at an annual growth rate of 5.6% compared to the global average of 3.9%. CMT hotspots are significantly affected by the impacts of climate change in the form of extreme weather (e.g., storms, droughts, floods, heatwaves, hurricanes), leading to a potential reduction in visitor numbers. Other factors that would affect CMT, include beach erosion, beaches disappearing due to sea-level rise, salt water intrusion affecting freshwater sources, droughts, flash floods and landslides, coral-reef bleaching, and less productive ecosystems. The COVID-19 crisis is also an unprecedented opportunity to transform the relationship of CMT with nature, climate and the ocean economy and to advance the transition towards a carbon-neutral and resilient tourism economy.

Offshore oil and gas exploration and exploitation

While some African countries have substantial oil and gas reserves and production activities which contributes substantial amounts to their national incomes. However, there is a general global shift towards renewable energy with consequences to emerging investments in oil and gas in Africa. Several African countries such

as Nigeria, Mozambique, Angola, Ghana are now unlocking the potential of natural gas-fired power plants (which emit less CO2 per unit of energy produced than coal-fired plants) in the transition to a low carbon future. Energy companies are also starting to change their business models to be more climate-resilient. This transition is expected to have positive impacts on jobs, conservation and GDP earnings. Following the footsteps of the European Union and the United States, Ghana has signed the Global Methane Pledge, an initiative to reduce global methane emissions to be launched at the UN Climate Change Conference (COP26) in November in Glasgow.

Carbon storage in the seabed

Seabed carbon storage/capture (e.g., pumping CO2 extracted from the atmosphere or produced by power plants into tunnels/crevices in the seabed or containment vessels placed on the seafloor) has the potential to sequester GHG emissions. The volume stored could be more significant than all the CO2 pumped into the atmosphere from the planet’s coal-burning power stations. The approach is considered a viable climate change mitigation strategy, however the technical, ecological, economic, social and political challenges associated with it require much more research to be conducted.

Research and development

The research and development (R&D) is critical in generating technologies and innovations that would support SOE Understanding climate change processes and impacts require sound research and innovations to transition the SOE into a low carbon economy. While national investment in research and development is still low (0.47% of GDP in 2007 as per World Bank records), there have been some promising developments in ocean research investment, with efforts in some countries to engage society by introducing marine science at schools, increasing citizen science projects and programmes, acknowledging the value of the knowledge and experiences of local communities, and building solid evidence based on the social science of climate change to navigate the scale and complexity of the climate crisis. The input from many disciplines is being sought to drive solutions

and better understand the fundamental social, economic and political aspects of climate change. Africa can use the improvements in research and development to galvanise a regional effort to harness the necessary data and develop the innovative technological capacity needed for sustainable ocean economy in Africa.

Knowledge Gaps

The knowledge gaps are discussed below.

1. **Mainstreaming climate adaptation and sustainability into ocean economy** decision making, particularly in coastal communities, is vital to creating opportunities for genuine dialogue between stakeholders and enhancing adaptation action by local communities and resource users (including women and men)
2. **Research and monitoring for high-quality scientific information, including climate data**, is crucial to understanding the full range of threats as well as opportunities from ocean ecosystems (including the ABNJ-EEZ-Coastal zones connection) and traditional and emerging Ocean Economy sectors
3. **Assessment of projected climate change impacts on ocean resources and sectors in Africa**, including developing indicators and indices for these impacts on other socio-economic sectors, e.g., health, military defence, forestry, biodiversity, etc., is essential for the conceptualisation and implementation of SOE initiatives.
4. **Ensuring that SOE initiatives are country-driven/home-grown, responsive to national/local needs**, fosters country/local ownership, iterative, participatory, cross-cutting, and gender-responsive would be necessary to avoid “Ocean grabbing”, “helicopter development, etc.
5. **Leveraging private sector finance** to support adaptation by community “local blue enterprises” and in managing climate risks.

Conclusion

A sustainable ocean economy has the potential to provide many social and economic benefits to African states, while protecting the ocean environment for future generations. The impacts of climate change are already being experienced thus requiring investment in adaptation and mitigation actions. The strength of Africa’s blue potential has to be assessed more rigorously as some African States’ ocean economies are not well-developed or do not fully centre sustainable development pathways in their national development strategies. Developing national sustainable ocean economies will provide an opportunity to develop practical, inclusive, equitable strategies towards meeting the Paris agreement goals.

Recommendations

1. **Encourage innovative ocean data collection, mapping and collaboration with environmental and social dimensions:** Mapping the ocean, making predictions, and visualising information in real time is possible, African countries should work collaboratively and take advantage of available datasets and decision support tools to map the conditions of marine resources and ecosystems for better sustainable ocean economy decision-making.
2. **Promote the uptake of Area-based tools to enhance ocean resources management:** Several area-based management tools have been developed and implemented for marine planning and management. These include marine protected areas (MPAs), Ecosystem-based Management (EbM) and Marine Spatial Planning (MSP). Several African states are in the process of developing and extending their MSP strategies and frameworks (e.g., Seychelles, Mauritius, South Africa, Kenya, Namibia, Angola, Cote d’Ivoire), hence sharing best practices is encouraged.
3. **Enhance coordinated ocean research and monitoring:** African countries need to invest in long-term environmental monitoring systems and ocean modelling capabilities to better differentiate natural changes from human-induced changes. More coordinated actions from African states are needed within regional

and international programmes (e.g., Global Ocean Observing Systems) to pool resources and knowledge, identify processes to access historical ocean data and sharing of information. While global climate models help establish global trends, local information will be needed to complement climate modelling.

4. Enhance accounting for ocean wealth: African countries need to incorporate marine and coastal ecosystem services into national accounting systems using the Ocean Accounts Framework (OAF)⁵ through platforms such as the Africa Natural Capital Accounting Community of Practice and the Global Ocean Accounts Partnership Africa Community of Practice. This would provide evidence necessary to support formulation and implementation of sustainable ocean economy-oriented policies.

5. Promote participatory ocean governance by building on long-standing cooperation and commitments with various partners and stakeholders: Ocean governance requires a collective effort by government, business and civil society actors in the marine and coastal environment. It requires the actors to engage in collective and inclusive decision-making, planning, deliberation, and capacity building. Therefore, it will be necessary for African States to strengthen national and regional governance structures to increase synergies and coordination between relevant stakeholders, including the youth, and establish effective multi-stakeholder, public-private, cross-sectoral, and interdisciplinary partnerships, including by accelerating the sharing of good practices.

6. Leverage global, regional, and national commitments to provide accessible and climate-proof ocean finance mechanisms: Traditional public financing mechanisms will not be adequate to satisfy Africa’s ocean economy requirements.⁶ African countries and regional organisations need to explore ways of mobilising long term financing to support the transformation of the continent’s sustainable ocean economy in a changing climate.

7. Promote effective national and regional linkages with regards to Areas Beyond National Jurisdiction (ABNJ). To achieve a sustainable ocean economy, there is a need for African governments to improve their understanding of the interconnectedness of ecosystems from the nearshore to the EEZs and then to the ABNJ through information exchange, capacity development and an enhanced engagement of stakeholders at the global, regional and national levels.

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⁵ The Ocean Accounting Framework (OAF), developed by the Global Ocean Accounts Partnership aims to provide a mechanism for reporting not only the economic outputs but also providing a means to incorporate natural capital, environmental sustainability and social equity and inclusion into an internationally recognised standardised accounting framework to assess the wealth and human well-being of a country

⁶ Financing Sustainable and Climate-Resilient Ocean Economies in Africa (worldbank.org)

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This policy brief was prepared with technical and financial support of the following partners:



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