

Mainstreaming climate change dimensions and environmental sustainability

Situation statement

Climate change and environmental mismanagement are growing threats to the integrity, condition, and sustainability of the aquatic and marine resources on which the Blue Economy is based. Although subject to local variations, wide areas of Africa have seen climate impacts that include increasing floods and droughts, erratic and extreme weather, distinct seasonal changes, sea level rise, coastal erosion, saltwater intrusion, warming sea waters, ocean acidification, coral bleaching, and an upsurge of invasive species as a result of global warming. These impacts are expected to worsen and have already had negative effects on livelihoods dependent on ocean and freshwater resources, causing internal migrations, with potential for conflict, as well as putting at risk critical infrastructure and transportation systems.

Destructive environmental practices due to poor environmental governance and the failures of the market economy to value the costs of degradation have contributed to problems such as: industrial pollution; agricultural runoff; deforestation; sedimentation of rivers and lakes; eutrophication; habitat loss; decreasing biodiversity; overfishing; IUU fishing; pollution from maritime and riparian transport; and dumping of toxic waste. Additionally, unsustainable development practices have already started to deplete Africa's natural capital and have resulted in societal costs constraining national efforts to achieve transformative development.

In order to realize the full potential of the Blue Economy, the twin issues of climate change impacts and environmental mismanagement must be effectively addressed. This is imperative, given that the knowledge, adaptation, reforms, and enforcement mechanisms that are produced will contain opportunities for building resilience, which is, in turn, key to creating a dynamic and durable Blue Economy.

Africa is highly vulnerable to the adverse impacts of human-induced climate change. Based on existing emissions trends and mitigation pledges, the science

shows the world is on course to a 4°C increase in global temperature by 2100.²⁸ At such warming levels, impacts for Africa are expected to be substantially greater. The need for adaptation measures to cope with these projected impacts is significant even at 1.5–2°C warming, the threshold beyond which Africa's capacity to cope with impacts of climate change would be severely curtailed. Adaptation measures such as early warning systems and coastal zone management to counter sea level rise offer a possibility of minimizing these impacts, but Africa's capacity to adapt depends critically on access to funding, as many countries have limited adaptive capacity. Under all mitigation and adaptation scenarios, Africa will continue to experience residual loss and damage.²⁹

Loss and damage is defined as the negative effects of extreme weather events and slow-onset climatic changes that people have not been able to cope with or adapt to. This includes not only economic losses but also social and cultural loss. Addressing loss and damage requires building preventative resilience, managing risk, assisting in rehabilitation, and providing redress in the event of permanent loss. The level of loss and damage and, therefore, the costs incurred, will depend, among other elements, on the level of ambition of global mitigation actions and commitments to raise the level of investment in adaptation at the local level. To reduce the magnitude of the impacts and their repercussions for African livelihoods, adaptation measures at different levels, from households to national and regional levels, are being planned and implemented and need to be further supported and strengthened.

Challenges

Climate change and environmental management challenges affect the livelihoods, health, water, energy security, food security, and overall well-being of communities throughout Africa.

The effects of rising ocean temperatures, ocean acidification, and habitat destruction are already affecting the quantity and quality of fish stocks and consequently livelihoods that depend on it. Additional challenges, such as overfishing; IUU fishing, industrial discharge, and effects of other marine activities hinder the productive potential and sustainable use of the seas and oceans. Water quality and security challenges in the context of climate change

28 Intergovernmental Panel on Climate Change (IPCC), 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the IPCC [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)].

29 http://www.climdev-africa.org/sites/default/files/DocumentAttachments/UNECA-ACPC%20Africa%20Loss%20%26%20Damage%20Report_0.pdf (accessed 27 November 2015)

and environmental management also require attention, since industrialization and expanding and intensifying food production are putting pressure on water resources, which affects human health and food security.³⁰ Innovation and resource mobilization which could shape creative solutions to tackle these challenges are inadequate.

The adoption of green and Blue technological strategies in the Blue Economy context remains a challenge, though one that is already showing signs of being overcome. Within the ocean energy sector, for example, there are key constraints to overcome, including absence of assessment and mapping of ocean energy resources; remaining maturity challenges in ocean energy technologies; a declining but still high cost of ocean energy; and limited expertise and knowledge in development and operation of ocean energy facilities.

Increasing knowledge and raising awareness about climate change, environmental stewardship that includes the timely sharing of climate information, and encouragement of environment-friendly business practices are key challenges that a Blue Economy approach could help overcome. Observers have frequently noted the large gap between the generally good quality of environmental regulatory regimes in many countries in Africa compared to the weak implementation and enforcement of what otherwise should be effective mechanisms for environmental stewardship.

The principal climate and environmental threats, their resulting impacts, and the responses necessary to move toward greater resilience are shown in Figure 8 (see page 44).

30 Corcoran, E., C. Nellemann, E. Baker, R. Bos, D. Osborn, H. Savelli (eds.). UNEP, UN-Habitat, GRID-Arendal. 2010. Sick Water? The central role of wastewater management in sustainable development. A Rapid Response Assessment. United Nations Environment Programme.

Figure 8: *Climate and environmental threats, impacts, and responses for resilience*



Source: Authors.

Opportunities

The severity of challenges brought about by the climate change phenomenon has obscured many of the potential opportunities that exist in Africa. Indeed, the emphasis has been mainly on designing adaptation and implementing mitigation plans, with little attention directed at maximizing such opportunities. These opportunities range from low-carbon technological innovation to shifting mindsets to redefine our relationship with nature. The growing costs of carbon-based sources of energy, such as coal, have meant that States are increasingly

having to explore alternative energy sources to meet their respective national demands. This situation has, for instance, led to an increase in the exploration of the potential of hydropower and ocean energy.

Ocean energy is a new frontier for energy development in coastal and island States³¹. Until now, the maturity of available ocean energy technologies, the high cost of energy from the ocean, and policy factors have limited access to ocean renewable energy. However, the International Energy Agency (IEA) estimates that ocean renewable energy has a power output potential equivalent to 100–400 percent of the global current energy demand.³² Owing to a more favorable environment, ocean and sea energy are now opening up for development. Cape Verde, for example, is engaged in small-scale application of wave energy suitable for lighting remote and isolated areas. The Mauritius Research Council indicates that ocean-based energy sources could provide significant power supply to the country's energy needs.

In addition, current and ongoing research on Blue energy systems, such as production from tidal power and designing more efficient decentralized energy networks, all present opportunities that could benefit States through the reduction of related costs, thereby enhancing overall competitiveness.

The existing protocols on climate change, such as certain elements of the Kyoto Protocol, present African States with opportunities that could promote an economic development-related voluntary emissions reduction scheme. In addition, outcomes of various Conferences of Parties (COPs) of the United Nations Framework Convention on Climate Change Conference (UNFCCC) such as the establishment of the Green Climate Fund, offer avenues through which African States could address their respective development priorities vis-à-vis climate change issues. Benefits accruing from such plans could, for instance, be utilized in the production of green energy from the Blue environment, including rivers and oceans.

In recent years, there has also been increasing attention to the protection of marine and coastal ecosystems as a climate change adaptation strategy. The UNFCCC has developed strategies and mechanisms to enhance terrestrial “green carbon” sinks. These include the “blue forests” and “Blue carbon” concepts, which have recently gained traction. Blue forests are marine and coastal ecosystems that are particularly valuable through their provision of multiple ecosystem services. Blue carbon is the carbon stored and sequestered

31 Hammer, L., A. Ehnberg, A. Mavume, B. Cuamba, S. Molander. *Renewable and Sustainable Energy Reviews*. Vol. 16, 4938-4950, 2012. Renewable ocean energy in the Western Indian Ocean.

32 *Energy Technology Perspectives*. IEA, 2012. Pathways to a Clean Energy System.

in Blue Forest habitats, such as mangrove forests, seagrass meadows, intertidal salt marshes, and kelp forests and beds.

Blue carbon sums up the idea of procuring the benefits of Blue forest habitats in order to help mitigate climate change. In Africa, coastal habitats are abundant, which makes Blue carbon important for climate-change strategies and development programs that include a commitment to reduction of carbon emissions. The rates of Blue carbon sequestration and storage are comparable to (and often higher than) the sequestration rates in carbon-rich terrestrial ecosystems, such as tropical rainforests. Unlike most terrestrial systems, which reach soil carbon equilibrium within decades, depositing of carbon dioxide in coastal ecosystem sediments can continue over millennia. However, when these coastal ecosystems are degraded or destroyed, they can become carbon dioxide sources. In addition to carbon, coastal ecosystems are also highly valuable for the range of services they provide.³³ They protect people from coastal erosion, storms, and flooding, making them valuable for climate change adaptation. Unfortunately, however, the rate of loss of mangroves, seagrasses, and salt marshes (driven mostly by human activities) is estimated to be among the highest of any ecosystem on the planet. Therefore, it is important to prompt international interest in preserving, protecting, and restoring coastal habitats more effectively for their carbon benefits.

In addition, Blue carbon markets may offer African countries additional economic incentives to manage resources sustainably and to restore their coastal and marine ecosystems. Case study 6 highlights related opportunities and constraints.

33 <http://www.grida.no/publications/rr/blue-carbon/> and <http://bluecarbonportal.org/> (accessed 27 November 2015)

Case study 6

Opportunities and constraints related to Blue Carbon**The Abu Dhabi Blue Carbon Demonstration Project**

This was the world's first national-level Blue carbon project.¹ It helped improve understanding of carbon sequestration and other ecosystem services that coastal Blue carbon ecosystems provide in Abu Dhabi. The project identified options for the incorporation of these values into policy and management. Experience and knowledge gained from the project helped guide other national Blue carbon projects and international efforts. The Abu Dhabi Blue Carbon Demonstration Project empowered the emirate with robust, qualitative analysis and methodology to support informed decisions on the well-being of the coastal and marine ecosystems for enhanced sustainability, in turn contributing to the international efforts of the Blue carbon movement and its push toward shared global sustainable goals for the future.

Blue Carbon Projects in Kenya and Madagascar

In Kenya, the project 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 CO₂-equivalent of carbon credits, to be sold on the voluntary carbon market and generating approximately USD 12,000 per year 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 anticipated soon that will allow the start of 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 equitably participate in a mangrove Reducing Emissions from Deforestation and Forest Degradation (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 a terrestrial forest, the project will contribute to Blue carbon projects through mangrove REDD+, not only in Madagascar but also elsewhere.

- 1 Abu Dhabi Global Environmental Data Initiative (AGEDI), 2014. Building Blue Carbon Projects — An Introductory Guide.
- 2 Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. "REDD+" goes beyond deforestation and forest degradation and includes the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks. <http://www.un-redd.org/AboutREDD/tabid/102614/Default.aspx> (accessed 18 December 2015)

Case study 6 (cntd.)

Although many advances have been made in the past few years, there are still several constraints associated with unlocking the values of coastal carbon and ecosystem services and converting them into options for improved ecosystem management revenue. Blue carbon benefits have not yet been fully integrated into policy discussions within the financial mechanisms for climate mitigation.¹

Lesson

The above initiatives were made possible due to the initial recognition of the importance of Blue forests and Blue carbon to climate change adaptation. This was supported by demonstrated political will and action by governments and development partners. Blue carbon projects are thus an opportunity for some countries to address climate change mitigation strategies, provide sound environmental stewardship on the coast, and support community benefits.

1 Ulman R., V. Bilabao-Bastida, G. Grimsditch. *Ocean and Coastal Management*. Vol. 83, 15-18, 2013.

Policy guidance

States could consider the following options for action to ensure appropriate mainstreaming of climate change and environmental considerations in a Blue Economy approach:

- Mainstreaming of climate change and environmental sustainability into existing and new Blue Economy continental, subregional, and national plans, policies, and relevant legislation (see information available provided by leading institutions such as UNFCCC³⁴, UNEP³⁵, GRID-Arendal³⁶, and International Maritime Organization [IMO]³⁷).
- Increasing investments in climate and environmental information services to ease access to and enhance availability of climate and environmental information.
- Development and strengthening of a framework to promote climate-proofed and environmentally sustainable infrastructure (e.g., green ports, use of renewable energy technologies).

34 www.unfccc.int

35 www.unep.org

36 www.grida.no

37 www.imo.org

- Linking development of ocean energy with other high-value economic activities, such as tourism; improving awareness; conducting rigorous resource assessment; and engaging public and private sector investment.
- Incorporation of the use and effective implementation of Environmental Impact Assessments (EIAs) and Strategic Environment Assessments (SEAs) to mainstream and streamline climate and environmental considerations and the Blue Economy principles at policy, program, and project levels.
- Enhancing of disaster risk reduction by developing and/or strengthening early warning systems (e.g., knowledge platforms, training and capacity building, identification of most vulnerable areas, public awareness).
- Development of a framework to build or strengthen national capacity to examine the possibilities to cooperate with international agencies (e.g., the International Union for the Conservation of Nature (IUCN), GRID-Arendal, and UNEP) for the establishment of Blue carbon natural infrastructure projects to help restore and improve mangroves, seagrass beds, and salt marshes that provide critical climate mitigation and adaptation services.
- Development of a framework to initiate, expand, and/or improve the management effectiveness of Marine Protected Areas (MPAs) in safeguarding ecosystem health.
- Establishment of a program to raise awareness of populations and stakeholders about climate change and environmental threats, while building on existing indigenous knowledge and value systems to build a strong basis for further empowerment, resource rights, and focused action.
- Exploration of the possible application of tools such as the Drivers-Pressures-State-Impact-Response (DPSIR) tool to identify, analyze, and propose responses to sustainably address conflicting and competing uses of water resources and other natural resources, as well as uses of these resources beyond sustainable thresholds and ecological boundaries.
- Development and/or strengthening of legislation and policies for the promotion of green and Blue technologies.
- Creation of Natural Capital Accounting systems (NCAs) that would enable States to promote Blue energy, such as hydropower and ocean energy, and establishment of carbon taxes to support Blue and green technology investment.
- Establishment of a harmonized regional or continental approach for review of National Adaptation Programmes of Action (NAPAs) and other UNFCCC instruments within the context of the Blue Economy.

- Development of a framework for increased capacity building of government officials of RECs, IGOs, and States to strengthen their negotiation skills within international fora to fully and fairly benefit from related provisions on climate change and environmental issues. This could enhance the awareness of the shared Blue Economy vision at continental level within the framework of the AU Agenda 2063, Agenda 2030 for Sustainable Development, AU 2050 AIMS, and the Small Island Developing States (SIDS) Accelerated Modalities of Action (SAMOA) Pathway.