Exploring the 'Oceans Economies' of Western Indian Ocean Coastal States

by Nicole du Plessis

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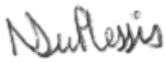
DECLARATION

I, Nicole du Plessis, declare that the contents of this thesis/dissertation represent my unaided work, and that the thesis/dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

This thesis contains a single bibliography to minimise duplication of referencing across chapters.



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ABSTRACT

As countries seek to diversify their economies and advance economic growth, ocean industry sectors and activities are expanding within the ocean and coastal areas. Such expansion has the potential to place increasing pressure on the health of the ocean ecosystems. The ocean development discourse has been referred to under various terms, such as “oceans economy”, “blue economy”, “maritime economy, “blue growth” and “marine economy”. Due to differing national development priorities and economic considerations, the resources and policies governments and international bodies provide to maintain the balance between ocean development and ocean ecosystem health are varied. Understanding the national priorities and the implementation plans can indicate how seriously governments are taking their commitments to international agreements, such as the Sustainable Development Goals (SDGs) or the Global Biodiversity Framework (GBF) commitments.

This study aimed to describe and evaluate the status of ocean economic development programmes within Western Indian Ocean coastal states. A literature review (Chapter 1) was undertaken to describe and highlight the growing importance of the ocean as an economic development space, with a focus on Africa. This was followed by three analytical chapters - a systematic review of the term ‘blue economy’ to understand the development and differing uses of the term in the global policy and research discussions (Chapter 2), the national ocean development agendas of African coastal states in the Western Indian Ocean (WIO) region (Chapter 3), and the ocean governance priorities within international programmes within the WIO region which may be incorporated into, or influence, national policies (Chapter 4). The countries assessed in this study (Chapter 3 and 4) included South Africa, Mozambique, Tanzania, Kenya, Seychelles, Comoros, Somalia, Madagascar, and Mauritius. Chapter 5 provides a general discussion of the preceding chapters to synthesise the important outcomes and conclusions.

The results from the systematic review (Chapter 2) indicated the term ‘blue economy’, in the context of ocean development, was first mentioned in the peer-reviewed literature in 2011 in one journal article, which increased to fifty-two articles in 2020. There was no consensus on the meaning of the term with a variable focus on economic, social and environmental aspects. However, consensus on the term, based on the integration of 1) economic development, 2) environmental sustainability, and 3) social equality, equity and inclusivity priorities is proposed, and must be considered by national policymakers, especially within developing states as they expand their ocean sectors. Integration of these three priorities will be important to realising the SDGs.

Through investigating the national ocean development programmes of the WIO African coastal states (Chapter 3) it was found that several of the countries had developed national/governmental ocean economy or blue economy structures or programmes. Although the ‘blue economy’ discourse has been integrated into the policy documents and platforms of African states, there has been limited

reporting or acknowledgement of this within reports on national contributions to the SDGs, within the coastal states of the WIO region.

The review of ocean governance programmes in the WIO region (Chapter 4) indicated that many, and varied, organisations are operating in the region, focused on various topics related to ocean governance. Therefore, states can draw from substantial resources to develop their national priorities on ocean governance, incorporating and integrating the blue economy pillars.

The opportunity for international collaboration provided by the SDGs, other ocean health commitments such as the GBF and the UN Ocean Science Decade for Sustainable Development 2021-2030 provides an opportune time to accelerate the development of African knowledge and capacities in ocean governance to support tangible benefits to society. Considering it is less than a decade until the SDGs are to be met, innovative mechanisms for integration of development, society and the environment are needed, and Africa can play a meaningful role in these.

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Opinions expressed in this thesis and the conclusions arrived at, are those of the author, and are not necessarily to be attributed to the University**.**

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ABBREVIATIONS AND ACRONYMS

ABNJ	Areas Beyond National Jurisdiction
AFD	French Development Agency
Africa NCA	Africa Natural Capital Accounts
AIM	Integrated Maritime Strategy
AIR Centre	Atlantic International Research Centre
AMCEN	African Ministerial Conference on the Environment
ASCLME	Agulhas and Somali Current Large Marine Ecosystems
AU	African Union
AUD	Australian Dollar
BE	Blue Economy
CARICOM	Pacific Islands and the Caribbean Community
CEN-SAD	Community of Sahel–Saharan States
CICES	Common International Classification of Ecosystem Services
CLCS	Commission on the Limits of the Continental Shelf
COMESA	Common Market for Eastern and Southern Africa
CoP	Community of Practice
CPUT	Cape Peninsula University of Technology
DAPSI(W)R(M)	Drivers- Activities-Pressures-State changes-Impacts (on Welfare)-Responses (as Measures)
DSI	Department of Science and Innovation
DST	Decision Support Tools
EAC	East African Community
EC	European Commission
ECSN	Early Career Scientists Network
EEZ	Exclusive Economic Zone
EU	European Union
FARI	Forum of Academic and Research Institutions in the Western Indian Ocean Region
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GOAP	Global Ocean Accounts Partnership
ICE	Inter-Governmental Committee of Experts
ICMZ	Integrated Coastal Zone Management
ICT	Information and Communication Technology
IGAD	Intergovernmental Authority on Development
IOC	Indian Ocean Commission
IODE	International Oceanographic Data and Information Exchange
IOI-SA	International Ocean Institute-South Africa

IORA	Indian Ocean Rim Association
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unregulated and Unreported
MASE	Program to Promote Regional Maritime Security
MDA	Maritime Domain Awareness
MEA	Millennium Ecosystem Assessment
MPAs	Marine Protected Area
MSP	Marine Spatial Plan
NC	Nairobi Convention
NCP	Nature's Contributions to People
NOAA	National Oceanic and Atmospheric Administration
OAF	Ocean Accounting Framework
ODINAFRICA	Ocean Data and Information Network for Africa
OE	Ocean Economy
OECD	Organisation for Economic Co-operation and Development
OG	Ocean Governance
R&D	Research and Development
RECs	Regional Economic Communities
Rio+20	United Nations Conference on Sustainable Development 2012
RISDP	Regional Indicative Strategic Development Plan
SA IORAG	South African Chapter of the Indian Ocean Rim Association Academic Group
SADC	Southern African Development Community
SAEON	South African Environmental Observation Network
SAPPHIRE	Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms
SDG	Sustainable Development Goal
SEEA	System of Environmental-Economic Accounting
SIF	Stop Illegal Fishing
SWIOFP	The Southwest Indian Ocean Fisheries Project
TEEB	The Economics of Ecosystems and Biodiversity
TEV	Total Economic value
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNCSD	United Nations Conference on Sustainable Development
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNEP	United National Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

UNESCO/IOC	United Nations Educational, Scientific and Cultural Organization-Intergovernmental Oceanographic Commission
USA	United States of America
USD	United States Dollar
WB	World Bank
WGBE	Working Group on the Blue Economy
WIO	Western Indian Ocean
WIOGEN	Western Indian Ocean Governance Network
WIOLaB	Strategic Action Programme for the Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities
WIO-LME	Strategic Action Programme for Sustainable Management of the Western Indian Ocean Large Marine Ecosystems
WIOMSA	Western Indian Ocean Marine Science Association
WIO-SAP	Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities
WWF	World Wildlife Fund
ZAR	South African Rand

CHAPTER 1: INTRODUCTION TO BLUE ECONOMY NARRATIVES IN THE WESTERN INDIAN OCEAN

This Chapter will focus on contextualising the development of the ocean economy and blue economy narratives in the Western Indian Ocean (WIO) through a literature review of the international ocean development themes and challenges, before focusing on the ocean development actions within Africa. This will highlight the need for, and contextualise, the understanding of the global and national ocean development actions in the data chapters which follow.

The recent and growing global advancement in the economic development of the world's oceans has been referred to by various terms, such as "oceans economy" (Colgan, 2003a; Vega et al., 2013; Park and Kildow, 2015), "blue economy" (UN, 2014; Roberts and Ali, 2016; World Bank and UNDESA, 2017), "maritime economy" (Fernandez-Macho, 2016; Kalaydjian, 2016), "blue growth" (Brent et al., 2018; Soma et al., 2018) or "marine economy" (Georgianna, 2000; Gogoberidze, 2012). While these terms are often used interchangeably (Talento, 2016; Wang, 2016), there are considerable differences in the activities ascribed to these terms by various actors (e.g., Colgan, 2003; WWF, 2015b; OECD, 2016; UNECA, 2016) concerning aspects such as geographic extent, economic development, environmental protection, maritime innovations, sustainability, social equity[1], and social inclusion[2].

As countries seek to diversify their economies and advance economic growth, expansion of ocean economy industry sectors and activities[3] are occurring within the ocean realm or as sectors and industries associated with, or as support services of, ocean industries[4]. Such expansion has the potential to place increasing pressure on the health of the ocean ecosystems. While not all ocean industry sectors are reliant on healthy ocean ecosystems (for example transport and related services and deep-sea mining activities which are viewed as abiotic ecosystem services that are not dependent on ocean ecosystem function), the impacts of ocean degradation arising from both economic production and consumption activities can affect several important direct market industry sectors that arise from ecosystem services (e.g., wild-caught fisheries, tourism) (Gregory, 2009; Slabbekoorn et al., 2010), as well as indirect non-market services encapsulated in regulatory or cultural ecosystem services. Furthermore, as most national economic activities occur within the country's sovereign Exclusive Economic Zones (EEZ), and more specifically within the accessible

[1] Social equity as a concept puts forward the idea that all members of society should share the benefits of development, as well as the burdens, fairly, both for the current generation, as well as future generations (Monnapula-Mapesela, 2014; Summers and Smith, 2014; Trudeau, 2018).
[2] Social inclusion is the idea that all members of society must have access to and participate in, and be empowered to participate in, development activities (Rawal, 2007; Gidley et al., 2010; World Bank, 2013).
[3] Such as recreation; eco-tourism; fisheries; aquaculture; shipping and associated infrastructure; renewable energy development; deep sea and coastal mining; offshore oil and gas exploration and production.
[4] Such as ocean insurance; financing; legal consultation; management and governance.

coastal areas of these, access to ocean space or acreage can become highly contested areas as industries compete for accessible ocean space if not adequately spatially managed (Douvere et al., 2007; Lester et al., 2013).

With the recognition of the importance of ecosystem integrity and natural capital (and the continued delivery of ecosystem services) to human well-being, the goods and service benefits that the oceans provide to human well-being can be identified and to some extent quantified, both in terms of physical and monetarised values (UN, 2021). This may be through marine ecosystem accounting, which accounts for identification and measures of asset stocks and benefit flows to society (UN, 2021), and the more holistic ocean accounting frameworks (OAF) which incorporate economic, environmental and social aspects (GOAP, 2019). The OAF includes inclusivity of access, environmental sustainability and environmental risks to be monitored and accounted for within national reporting (GOAP, 2019).

National governance priorities that advance sustainable and inclusive ocean economies need to emphasise the maintenance of ecosystem integrity and ocean health as the associated ocean wealth is dependent on these factors. The development of the required human capacity and skills to assess and monitor the ocean status is, therefore, also important. The commitment by the international community to the 17 Sustainable Development Goals (SDGs) of the United Nations (UN) 2030 Agenda (UNDP, 2018), the development of the Blue Economy Principles (WWF, 2015a), and the concurrent UN Decade of Ocean Science for Sustainable Development 2021-2030 (Claudet et al., 2020; UNESCO-IOC, 2022) and UN Decade for Ecosystem Restoration 2021-2030 (Farrel et al., 2022), have created an opportunity to address major challenges faced by the world's oceans. These high-level programmes highlight the recognition by governments of the goods and services which ocean environments provide to humanity. Furthermore, although the SDGs recognised the importance of marine ecosystems through SDG 14: Life Below Water, there are synergies between the SDGs and blue economies in areas for which ocean health and resources are vital, including reducing poverty (SDG1), eliminating hunger (SDG2), economic development (SDG8), reducing inequality (SDG10) and addressing climate change impacts (SDG13)[5].

Five priority pressures on ecosystem health and ocean integrity that arise from ocean economy production and consumption activities include, a) Unsustainable resource extraction; b) Degradation and/or modification of habitat; c) Translocation of invasive alien marine species; d) Pollution and e) Consequences arising from consumer resource uses (e.g., fossil fuel use leading to climate change and ocean acidification, and plastic pollution) (OECD, 2016). The responses (and measures introduced) to manage pressures and resulting welfare impacts are developed as policies across a broad range of disciplines and by different agenda-centred actors. Due to national development

[5] The SDGs and the concerns around sustainable development will be addressed below.

priorities, and economic considerations, the resources provided by governments and international bodies to maintain ecosystem integrity and functioning are varied. Understanding the national priorities and the implementation plans and strategies can provide an important indication of how seriously governments are taking their commitments to international agreements, such as the SDGs.

Research Aims and Objectives, and Research Design

What follows in Chapter 1 is a literature review that aims to introduce the current state of international ocean economic development to provide context to the ongoing efforts to a) consider the value of services provided by the ocean, b) identify the governance frameworks, policies and tools needed to balance ocean economic development and ocean health, and c) provide an overview of the actions taken by the African coastal states of the WIO region to address policy priorities identified and information needs. The African Union (AU) has adopted the Africa Blue Economy Strategy (AU-IBAR, 2019) through which it guides ocean development activities across the continent. Therefore, it is important to understand the framing of the blue economy, and related terms, and how it is being used and implemented.

Chapter 1 provides the background for the research aims which were to:

1. Understand the development of the blue economy concept in the context of the economic development of the ocean, and how the term may be used in comparison to the term 'ocean economy' and other related terms. The various uses of the term 'blue economy' will be reviewed and a definition for blue economy proposed.
2. Establish how African States of the WIO region are developing national ocean economy (or blue economy) programmes and which sectors are being given priority in terms of national government commitment. This will be especially important in the context of the Sustainable Development Goals reporting and understanding progress on SDG14 - Life below Water.
3. Understand the regional programmes focused on the development of ocean economies or blue economies in the WIO region, and what the programme objectives are. This would indicate what the development and sustainability priorities were.

The research objectives were to:

1. Gain a better understanding of the development of the terms 'blue economy' and 'ocean economy',
2. review and assess the ocean economies within each of the countries of the WIO with respect to,
    i) The extent to which coastal countries of the WIO region are developing or have developed ocean-based industries as a means to economic security.

ii) How each country classifies its ocean-based economic development programmes (i.e. as an Ocean Economy, Blue Economy, Maritime Economy or Blue Growth), their definition of their preferred term of use, the method used to calculate the ocean economy, if any.

iii) Which ocean industry sectors do such countries advance within their ocean-based economy and what do such sectors contribute to their economy (in terms of both GDP and natural capital accounting), as well as the total value of the ocean economy.

iv) To what extent do national programmes adhere to sustainability principles.

v) To what extend are they undertaking to meet the SDGs, especially in respect to SDG 14.

vi) Understand the ocean governance priorities within the WIO region.

3. Provide evidence-based policy information for national governments for consideration in respect of their ocean development programmes.

The Research Design followed a qualitative research approach through the following components,

1. Systematic Review: of peer-reviewed literature focused on the term 'blue economy'. This would contextualise the term for comparison with uses in the succeeding data chapters.

2. Online Questionnaire: this research component would be focused on the specific ocean economy policies and programmes of each country and how the development of the ocean-based/related industries is viewed. As such, data collection shall consist of an electronic questionnaire circulated to relevant African academic and policy networks including the Western Indian Ocean Marine Science Association (WIOMSA) and the Global Ocean Accounts Partnership (GOAP) African Community of Practise.

3. Desktop Review of Grey Literature on Regional Ocean Governance Programmes in WIO: this component would focus on the programmes, actors, objectives and outputs that are currently available in support of ocean economy or blue economy development in the WIO region.

In summary, this thesis aimed to describe and evaluate the status of ocean development by providing, 1) a literature review of the importance of the benefits of nature to people, relevant international development programmes, and the current status of ocean governance in a global and African context (Chapter 1), 2) undertaking a systematic review of the peer-reviewed literature on the blue economy (Chapter 2), 3) focusing on the national ocean development agendas and progress on SDGs of coastal African states of the WIO region (Chapter 3), and 4) focusing on the regional

ocean governance priorities of coastal African states of the WIO region (Chapter 4). A key outcome of Chapters 2-4 was to understand how WIO countries are prioritising positive economic, social and environmental developments to support ongoing regional policy development initiatives. These countries include South Africa, Mozambique, Tanzania, Kenya, Seychelles, Comoros, Somalia, Madagascar, and Mauritius. Chapter 5 will provide a general discussion and conclusions of the preceding chapters to summarise and highlight key outcomes and provide policy recommendations.

1.1 People's dependence on the environment

Human well-being is inherently linked to the meeting or satisfaction of their needs, including those provided by their environments, with the benefits people obtain from nature often described as ecosystem services (Ansink et al., 2008; Carpenter and Turner, 2017) or nature's contribution to people (Díaz et al., 2018). Accounting for nature, or the valuation of nature (and natural capital accounting) has gained prominence in the past decade to capture the importance of species, natural environments and benefits people gain from the environment, whether quantified in monetary or non-monetary terms or even qualified in non-quantified terms.

The Millennium Ecosystem Assessment (MEA; Millennium Ecosystem Assessment, 2005), was the first international assessment to highlight the linkages between the environment and human well-being, with the key findings as relevant today as they were then, particularly in noting,

"The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems" (Millenium Ecosystem Assessment, 2005; page 5).

Human well-being has been conceptualised as comprised of several components. This includes - basic material for a good life (e.g., having enough food, secure shelter and clothes), health (i.e., having good mental and physical health and living in an unpolluted environment), good social relations (i.e., having the ability to help others and provide for your children), security (e.g., being safe from man-made and natural disasters), freedom of choice and action (i.e., the opportunity to achieve personal goals), and cultural identity (e.g., shared communal history, beliefs and values) (Millennium Ecosystem Assessment, 2005; Díaz et al., 2006).

The MEA defined ecosystem services as *"the benefits that people obtain from ecosystems",* and provided a framework in which to classify different ecosystem services, as provisioning services, regulatory services, cultural services and supporting services (Millennium Ecosystem Assessment, 2005). However, considerable discussions on defining ecosystem services continued (see Fisher et al., 2007; Daily and Matson, 2008; Braat and de Groot, 2012; Ruckelshaus et al., 2015), including

methods for consistently classifying the different services to provide internationally comparable metrics.

After the reports from the MEA, 'The Economics of Ecosystems and Biodiversity (TEEB)' programme, initiated in 2007, focused on highlighting the dependence of industry on inputs of natural resources, as a means to promote better management practices (TEEB, 2010a). Through this approach, nature (e.g., ecosystems, species, natural resources) was viewed as natural capital and *'the flows of ecosystem services can be seen as the 'dividend' that society receives from natural capital'* (TEEB, 2010a) through either ecosystem or direct assets. TEEB recognised the need to avoid doubling counting and tried to resolve this by focusing only on the final benefits received by people.

Another international programme to classify ecosystem services includes the Common International Classification of Ecosystem Services (CICES) programme, led by the European Environment Agency[6], which provides a framework for incorporating ecosystem services into the System of Environmental-Economic Accounting (SEEA). Importantly, the CICES is focused on the final contributions that ecosystems provide to human well-being to avoid double counting of services and *'seeks to classify final ecosystem services, which are defined as the contributions that ecosystems (i.e. living systems[7]) make to human well-being. These services are final in that they are the outputs of ecosystems (whether natural, semi-natural or highly modified) that most directly affect the well-being of people*' (Haines-Young and Potschin, 2011; Haines-Young and Potschin, 2018). The CICES framework provides a list of the CICES categories, and the services ascribed to them, which also includes abiotic services, as well as a comparison with the other classification systems, such as the MEA and TEEB.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)[8] released the report 'Global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' (IPBES, 2019a), providing an assessment of the global status of biodiversity and ecosystem services. This was the first such assessment since the MEA (also see Díaz et al., 2015a; Díaz et al., 2015b; Pascual et al., 2017). This introduced what the authors considered to be a more holistic framing for humanity's dependence on nature as '*Nature's Contributions to People (NCP)'*, to

'embrace a fuller and more symmetric consideration of diverse stakeholders and world views, and a richer evidence base for action, i.e., the knowledge base offered by the natural and social sciences,

[6] CICES, https://cices.eu/. Accessed 28-04-2022.
[7] This is the definition provided by the authors, however, the CICES classification does include abiotic ecosystem services.
[8] The IPBES website indicates that this was established by close to 140 governments, https://ipbes.net/members-observers. Accessed 28-04-2022.

the humanities, and the knowledge of practitioners and indigenous and local communities' (IPBES, 2019d).

Table 1.1 describes the different ecosystem services classification systems: MEA, TEEB, CICES and IPBES and shows a change in terminology from the MEA, with ecosystems services as the 'benefits' obtained, with the other classifications indicating this as the 'contributions' made. The distinction between these terms allows for recognition that the services provided by ecosystems may affect people in different direct and indirect ways, and may not always be positive contributions (TEEB, 2010b; Díaz et al., 2018). However, the diversion of the IPBES model from the previous ecosystem service categories, and the introduction of a new framing for this model, has sparked considerable debate among the ecosystem service research community (see Braat, 2018; Díaz et al., 2018; Faith, 2018; Kenter, 2018; Maes et al., 2018; Peterson et al., 2018; Stålhammar, 2021), with the main criticism being that the IPBES model has overlooked the fact that researchers using the older models have recognised that more needs to be done to identify and quantify cultural services and include social sciences, and interdisciplinary and transdisciplinary teams, in ecosystem service research (Carpenter and Turner, 2017; Costanza et al., 2017). Using this relative lack of social and cultural research and participation from local and indigenous peoples to justify introducing a new research methodology could lead to confusion on the messaging or advice to policymakers.

Cultural services, including religious, spiritual or heritage use and values, are considered very difficult to value (Small et al., 2017), as these are dependent on cultural norms and personal values, which could have demographic, gender, location or community-specific biases, and for which economic

Table 1.1: Summary of the different ecosystem services classification systems: MEA, TEEB, CICES and IPBES. The definitions and highest-level categorisation for each system are provided, along with examples for each category.

	Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005)	**The Economics of Ecosystems & Biodiversity** (TEEB 2010a)	**Common International Classification of Ecosystem Services** (Haines-Young and Potschin 2018)	**Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services** (IPBES 2019b)
Definition	Ecosystem services are the **benefits** people obtain from ecosystems	The direct and indirect **contributions** of ecosystems to human well-being.	Ecosystem Services are defined as the **contributions** that ecosystems make to human well-being, and distinct from the goods and benefits that people subsequently derive from them	Nature's **contributions** to people
Categorisation and Examples	**Provisioning Services**: the products obtained from ecosystems e.g. food, water, timber, and fibre	**Provisioning Services:** ecosystem services that describe the material outputs from ecosystems. This includes food, water and other resources	**Provisioning Services:** all nutritional, non-nutritional material and energetic outputs from living systems as well as abiotic outputs (including water)	**Material Contributions:** substances, objects or other material elements from nature that directly sustain people's physical existence and material assets e.g., food, energy, or materials for clothing

Table 1.1 (cont.): Summary of the different ecosystem services classification systems: MEA, TEEB, CICES and IPBES. The definitions and highest-level categorisation for each system are provided, along with examples for each category.

	Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005)	**The Economics of Ecosystems & Biodiversity** (TEEB 2010a)	**Common International Classification of Ecosystem Services** (Haines-Young and Potschin 2018)	**Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services** (IPBES 2019b)
Categorisation and Examples	**Regulating Services**: the benefits obtained from the regulation of ecosystem processes e.g., climate regulation, water regulation, disease regulation	**Regulating Services**: the services that ecosystems provide by acting as regulators e.g., regulating the quality of air and soil or by providing flood and disease control	**Regulating and Maintenance Services:** All the ways in which living organisms can mediate or moderate the ambient environment that affects human health, safety or comfort, together with abiotic equivalents	**Non-material Contributions:** Nature's effects on subjective or psychological aspects underpinning people's quality of life, both individually and collectively e.g., forests and coral reefs providing opportunities for recreation and inspiration, or particular organism (animals, plants, fungi) or habitat (mountains, lakes) being the basis of spiritual or social-cohesion experiences

Table 1.1 (cont.): Summary of the different ecosystem services classification systems: MEA, TEEB, CICES and IPBES. The definitions and highest-level categorisation for each system are provided, along with examples for each category.

	Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005)	**The Economics of Ecosystems & Biodiversity** (TEEB 2010a)	**Common International Classification of Ecosystem Services** (Haines-Young and Potschin 2018)	**Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services** (IPBES 2019b)
Categorisation and Examples	**Cultural Services:** the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences e.g., recreational, aesthetic, and spiritual benefit	**Cultural Services:** the non-material benefits people obtain from contact with ecosystems. This includes aesthetic, spiritual and psychological benefits	**Cultural Services:** All the non-material, and normally non-rival and non-consumptive, outputs of ecosystems (biotic and abiotic) that affect physical and mental States of people	**Regulating Contributions:** Functional and structural aspects of organisms and ecosystems that modify environmental conditions experienced by people, and/or regulate the generation of material and non-material contributions e.g., people directly enjoy useful or beautiful plants, but only indirectly the soil organisms that are essential for the supply of nutrients to such plants

Table 1.1 (cont.): Summary of the different ecosystem services classification systems: MEA, TEEB, CICES and IPBES. The definitions and highest-level categorisation for each system are provided, along with examples for each category.

	Millennium Ecosystem Assessment (Millennium Ecosystem Assessment 2005)	**The Economics of Ecosystems & Biodiversity** (TEEB 2010a)	**Common International Classification of Ecosystem Services** (Haines-Young and Potschin 2018)	**Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services** (IPBES 2019b)
Categorisation and Examples	**Supporting Services**: those that are necessary for the production of all other ecosystem services e.g., soil formation, photosynthesis, and nutrient cycling	**Habitat or Supporting Services:** These underpin almost all other services. Ecosystems provide living spaces for plants or animals; they also maintain a diversity of different breeds of plants and animals		

valuation methods may not be the correct approach (Barnes-Mauthe et al., 2015; Bryce et al., 2016; Chakraborty and Gasparatos, 2019; Outeiro et al., 2019; Rowland, 2019; Cabana et al., 2020).

Different methodologies have been developed to quantify the monetary value of the non-market-related services using adjacent, or proxy, costs (De Groot et al., 2002; National Academy of Sciences, 2005). Such information may be better captured as qualitative metrics, e.g., personal experiences, spiritual affinity, and heritage value, which could be synthesised as relative quantitative metrics (Bryce et al., 2016; Ainsworth et al., 2019), but methodologies of how to consider the trade-offs against economic or environmental considerations (that may have more quantitative metrics) are still needed.

Recognising that ecosystem services should be incorporated into a country's assessment of its assets and production values, the UN SEEA 2003 (SEEA, 2003) developed a framework for compiling environmental information into national accounting systems (Smith, 2007), followed by the adoption of the SEEA Central Framework in 2012 as the first global environmental-economic accounting statistical standard. The SEEA Central Framework follows the recognised accounting concepts, structures, rules and principles of the System of National Accounts[9], and provides methodologies for assessing environmental stocks (or natural capital) and flows to and from the economy, including the positive economic contributions and externality residual emissions or discharges from industry sectors (UN, 2012). In 2021, the SEEA Ecosystem Accounting (EA) statistical framework was adopted[10] from the SEEA Experimental Ecosystem Accounting (UN, 2014). The SEEA-EA assesses ecosystems stocks and their uses, and provides a '*spatially-based, integrated statistical framework for organizing biophysical information about ecosystems, measuring ecosystem services, tracking changes in ecosystem extent and condition, valuing ecosystem services and assets and linking this information to measures of economic and human activity'* (UN, 2021). Together, the SEEA documents, discussed above, set out how nations can incorporate and link nature and natural input to their national accounts and reporting, thereby going beyond GDP and economic considerations in national accounting practices and associated decision-making processes. In understanding the ocean space, environmental inputs to, and downstream use in the economy , ocean industries need to be identified, just as they need to be identified within the System of National Accounts practices (Surís-Regueiro et al., 2013; Zhao et al., 2013; Colgan, 2016; OECD, 2016; Wang, 2016) and the geographical extent of

[9] The System of National Accounts (SNA) is the internationally agreed standard for compiling measures of economic indicators, such as gross domestic product (GDP), and allows for information to be presented for different uses, i.e., economic analysis, decision-making and policymaking (EC et al., 2009).

[10] Prior to the adoption as an international standard, this was known as SEEA Experimental Ecosystem Accounting 2012.

the industry operations or value chains needs to be identified (Colgan, 2003b; Park and Kildow, 2015; Suparmoko, 2016; OECD, 2016; Wang, 2016; Fenichel et al., 2020).

Considering the value of the ocean from an economic perspective, the OECD calculated the value added of the global ocean economy at USD1.5 trillion, with the potential to reach USD 3 trillion by 2030 (OECD, 2016). However, it is important to note that such estimations fall far short of the total economic value (TEV) of the ocean to humans, see Figure 1.1 below. Noting that this was a conservative value, as non-economic aspects could not be included, the OECD's 2030 projection was based on a 'business-as-usual' approach and dependent on yet-to-be-developed technological advancements (OECD, 2016).

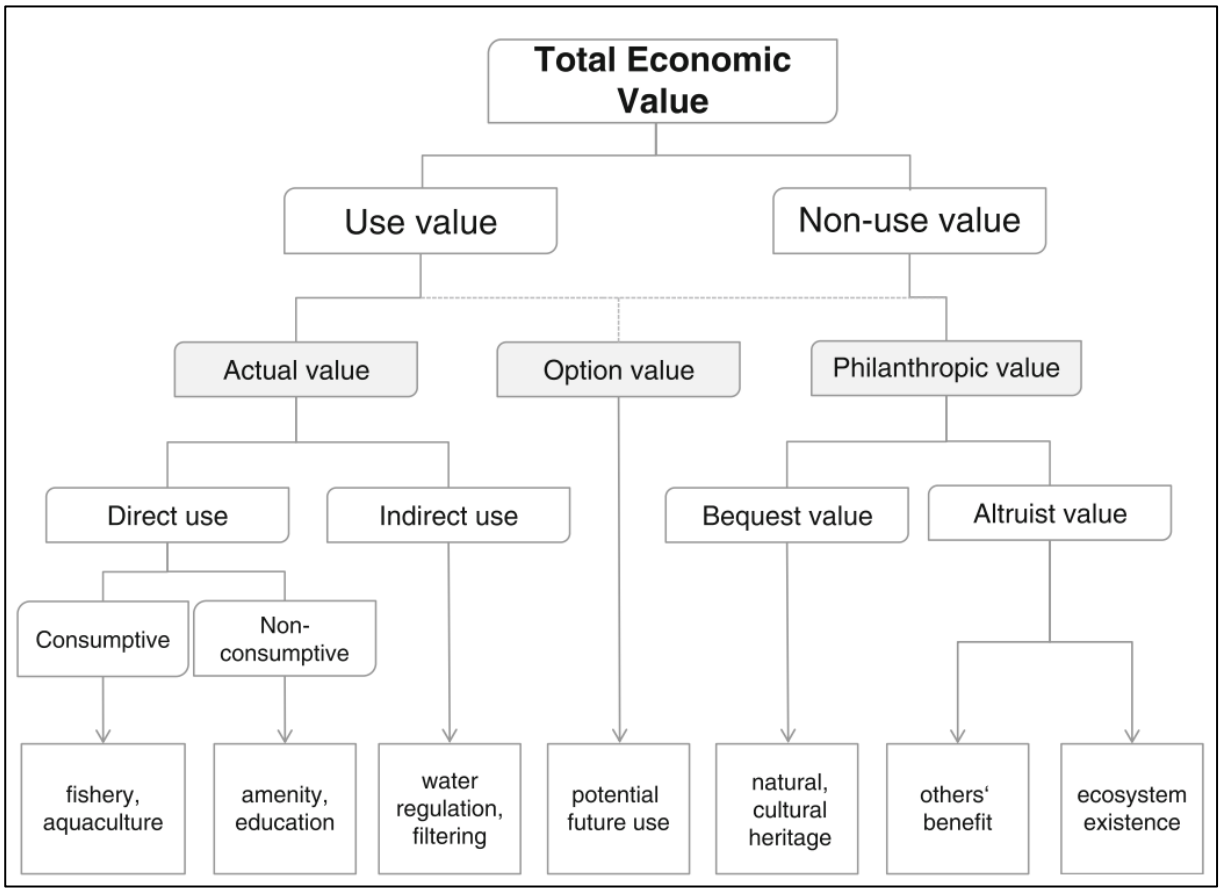

Figure 1.1: Model for the Total Economic Value (TEV) of ecosystems (Taken from Hüttl et al., 2016, pg. 71).

Examples of regional and national economic studies that promote the ocean as an area of high economic value include - an estimate of USD 333.8 billion for ocean assets of the coastal States of the WIO (WWF, 2017); generation of EUR 360 billion of production value in the Mediterranean for a specified number of industries between 2000 and 2011 (Mulazzani and Malorgio, 2017); contributing AUD 74.2 billion of value add to Australia's economy (or 4.8% of GDP) (Voyer et al., 2017); and contributing ZAR 54 billion in 2010, and potentially ZAR 177

billion in twenty years, to South Africa's GDP as reported in various national news sources (Masie and Bond, 2018)[11]. These have often been used to motivate the expansion and development of marine spaces, as well as to justify the proactive implementation of ecosystem protection. However, despite being impressive such values are not a true reflection of value as opined by Toman (1998) and Simpson (2016), with Toman (1998) noting that calculating a value on nature was *'a serious underestimate of infinity'*.

An ongoing initiative to holistically assess the contributions of the oceans to human well-being, considering not only the direct economic contributions but also the sustainability of ocean activities and their contributions to social welfare, is the Global Ocean Accounts Partnership (GOAP) co-chaired by UNESCAP and Fisheries and Oceans, Canada (UNESCAP, n.d.). The GOAP Secretariat is hosted by the Sustainability Development Reform Hub of the University of New South Wales, Australia. UNESCAP, the World Bank and the University of New South Wales co-hosted the 'First International Global Dialogue on Ocean Accounting and First Annual Meeting of the Global Ocean Accounts Partnership' in November 2019 to discuss the progress of the 'Technical Guidance on Ocean Accounting for Sustainable Development' document (UNESCAP, n.d.; GOAP, 2019), followed by the 2nd, 3rd and 4th meetings in 2021, 2022, and 2023, respectively, to discuss progress and share experiences. The technical guidance introduces the ocean accounts framework as a holistic systems approach for organising information on the oceans through the development of economic, environmental, social and governance accounts (GOAP, 2019) using both accepted and novel environmental, economic and social accounting systems. The inclusion of social, risk and governance accounts within the ocean accounts framework allows for assessing the responses to management interventions (e.g., new legislation, regulations or adoption of marine protected areas) or pressures (e.g., the establishment of an aquaculture farm or shipping port) and how this affects society and/or local communities (Perkiss et al., 2022), and would move beyond economic indicators to qualitative and subjective indicators (Loureiro et al., 2022). Similar to identifying and resolving cultural services, examples of the social and governance aspects of social accounts are underrepresented in research. It is possible to undertake accounts for those areas for which data are available, and depending on resources and available expertise, to include these in national accounts. However, limitations to conducting accounts include lack of human capacity, lack of financial resources, and limited or unsuitable data (which may not have been stored appropriately or data sharing is limited by institutional policies).

The GOAP includes important regional Communities of Practice, including an African Community of Practice (CoP) which aims at:

[11] These values highlight the large financial values attributed to the oceans and are not meant for comparison.

i. Pro-active communication programmes to share “success stories” from African pilot studies, create awareness, appetite, engagement, and capacity building[12].
ii. Identifying and positioning the importance of ocean accounting for the advancement of blue economies in Africa, including its links to other ocean governance instruments such as Marine Spatial Planning or Integrated Coastal Zone Management.
iii. Strengthening the role of African National Statistics Offices in ocean accounting.
iv. Developing a common data architecture and infrastructure for spatial and temporal comparative purposes.

The Cape Peninsula University of Technology’s Centre for Sustainable Oceans, the South African Environmental Observation Network, the Government of Togo, and Mozambique’s ProAzul Programme are Members of the GOAP, while Membership applications from further institutions in South Africa and institutions in Ghana, Kenya (both Members of the Ocean Panel) and Madagascar are under review. These institutions are trialling ocean accounting methodologies under the Africa CoP, along with government, non-government, and academic institutional partners in their countries, including within a South African National Research Foundation Community of Practice.

1.2 Ocean Governance and Maritime Safety and Security

With the potentially large financial gains to be leveraged through the exclusive ownership of ocean resources, there is the potential for conflict surrounding the use of the ocean, especially in areas of territorial seas where the boundary between neighbouring States may be contested, in Areas Beyond National Jurisdiction (ABNJ) over which no state has ownership or where straddling resource stocks may be transboundary.

The concept of ocean governance has been developed to understand the processes for managing the human-ocean nexus. Turton et al. (2007) proposed ecosystem governance as both a process and a product of the interactions between the three spheres of government, society, and science. Ocean Governance as a subset of ecosystem governance can therefore be understood as the set of rules, policies, practices, legal instruments, institutions, and governance structures which interact at all levels to enable relevant actors to make decisions, share power, assign responsibility, and pursue accountability in the management of the marine environment to ensure ocean health, productivity and resilience for human well-being (Bailet, 2002; Pyc, 2016; Blythe et al., 2021; Tsioumanis, 2021). Activities in the ocean is governed by many binding and non-binding legal instruments and international and regional agreements

[12] The capacity building component includes projects involving tertiary education entities across the continent to establish research, training curricula and outreach opportunities.

and norms and standards that focus on areas such as rules of navigation, resource-use and scientific endeavours, as shown in Figure 1.2.

The primary international agreement governing the oceans is the United Nations Convention on the Law of the Sea (UNCLOS) of 1982 (UNGA, 1984) which defines a nation's territorial waters (up to 12 nautical miles from a baseline which is usually the low-water mark) over which the state has full sovereignty; a nations EEZ (200 nautical miles) over which the state has a sovereign rights below the surface of the sea; and ABNJ over which no States have exclusive use and which can be considered the global commons. Not all coastal States are party to UNCLOS, with the United States of America being the most notable exception.

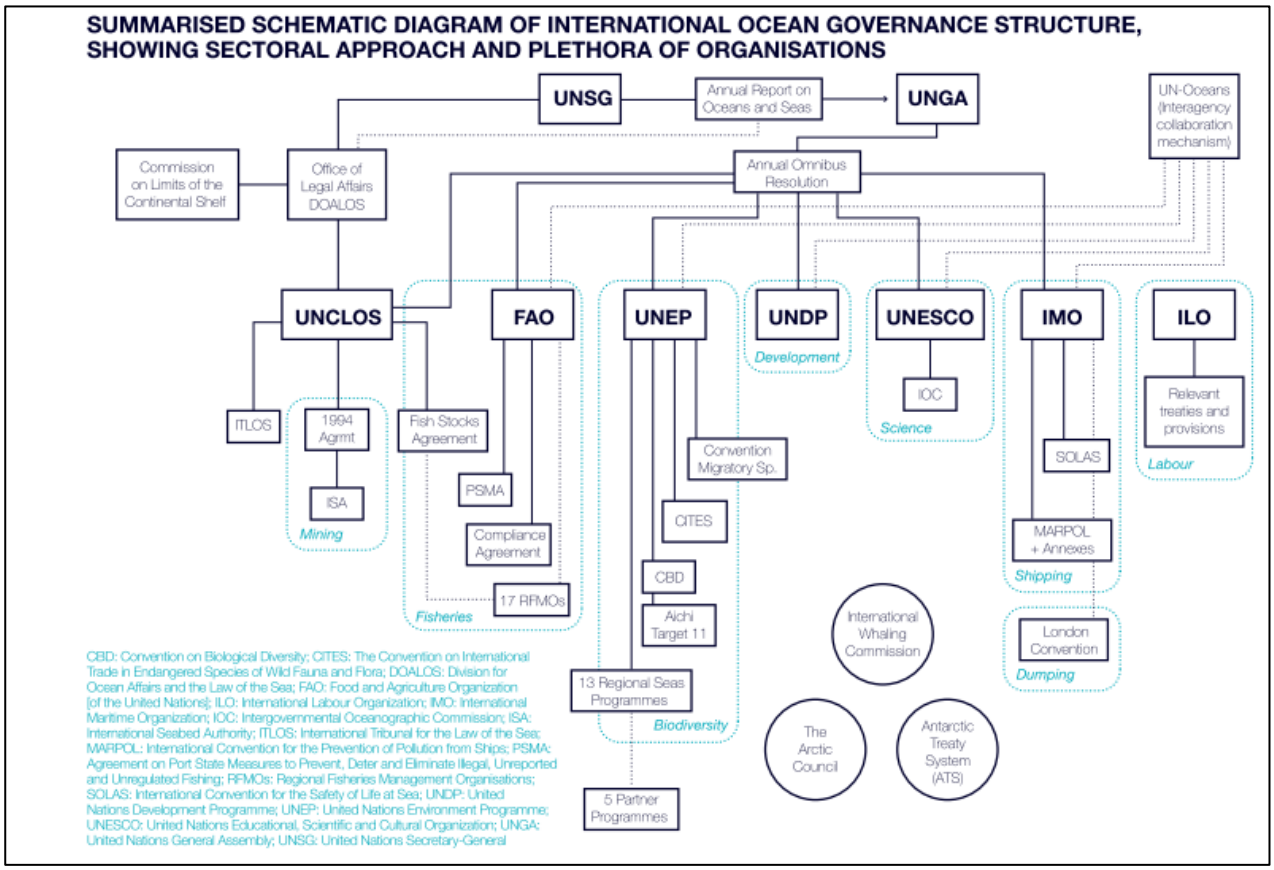

Figure 1.2: International ocean governance instruments and their relationship with and within the United Nations. After Global Ocean Commission, 2014.

While there are States that have access to large uncontested ocean EEZ areas (e.g., South Africa), there are 200 nm limits from nation's coasts that overlap with others requiring smaller EEZs or negotiation needed to reach consensus on sharing of resources on and under the seabed (e.g., Australia and Timor-Leste (The Commonwealth, n.d.), and Kenya and Somalia (Kadagi et al., 2020).

States may submit applications to the Commission on the Limits of the Continental Shelf (CLCS) to extend their continental shelf area (beyond the 200nm limit), to apply for joint extended continental shelf claims, or where restricted by proximity, to have joint management of areas to share both living and mineral resources, (e.g., Mauritius and Seychelles that successfully applied for an extended continental shelf claim which secured these countries a combined additional 400,000 square kilometres of ocean resource space (The Commonwealth, n.d.). Such a process would in theory provide a state with a much larger ocean resource space from which to benefit – if they have the technology to access this.

Other areas have more conflicted outcomes such as in the South China Sea, where China is staking claim to most of the area, even going so far as extending artificial islands and military deployment to limit EEZ activities of other States (i.e., Brunei, Indonesia, Malaysia, Philippines and Vietnam) that have overlapping claims in the area (Rowan, 2005; Fravel, 2011; Chan and Li, 2015; Panda, 2020). Such conflicts can have global repercussions for maritime security, as well as for collaborative global programmes that aim to benefit all of humanity.

The ocean is, however, a dynamic shared space, so that both resources and harmful or potentially harmful activities or pressures that occur within the EEZ of one country may benefit or impact neighbouring coastal and island States. Fisheries and mineral resources in ABNJ are also recognised as shared resources/straddling stocks. Hence, the establishment of Regional Fisheries Management Organisations, which regulate shared fisheries resources in the high seas; the International Seabed Authority established to manage the development of deep-sea mining in ABNJ; and the Benguela Current Commission, established to manage shared marine resources across the EEZs of Angola, Namibia and South Africa (BCC, 2021), to provide a platform for affiliated States to collaborate on shared ocean governance priorities.

Security of ocean territory and the natural resources of States is imperative for developing sustainable and inclusive ocean-based industries and ensuring the safety of coastal citizens and activities. Focusing national priorities on Maritime Domain Awareness (MDA), which the International Maritime Organisation defines as '*the effective understanding of any activity associated with the maritime environment that could impact upon the security, safety, economy or environment*' (IMO, 2010), is, therefore, a much-needed component to realising ocean development goals. MDA has the value addition of creating employment opportunities in this sector, e.g., establishing national coast guards to combat maritime crime. While the piracy off the coast of Somalia in the 2000s gained international recognition and response (UNECA, 2016), challenges around maritime piracy, armed robbery and kidnapping are an ongoing concern for African coastal States (AUC, 2012; Brits and Nel, 2016; Bell et al., 2021), and highlight the need for effective development strategies to address the social origins of these crimes (Owolabi and Okwechime, 2007; Ajala, 2016; Lindley, 2020). Ongoing challenges of transnational crime include piracy, terrorism, smuggling of goods (e.g., weapons, counterfeit

products, mineral resources and environmental resources such as ivory, live animals and plants), drug trafficking and human trafficking (UNECA, 2016), as well as Illegal, Unregulated and Unreported (IUU) fishing by foreign vessels.

New ship tracking[13], earth observation technologies, and data processing and storage developments, have facilitated the monitoring of large areas within a nation's jurisdiction (Creech and Ryan, 2003; Snyder et al., 2020; Walker and Reva, 2020; Syms et al., 2021), however the human and technological capacity to maintain these systems remains a need in many countries of the WIO. Creating bespoke monitoring platforms and the cost of data and processing requirements may also be prohibitive for many African States (Walker, 2015; Walker and Reva, 2020).

Being able to support safety activities at sea and providing maritime security (including disaster response) will be an important milestone for African States in ensuring sustainable development outcomes.

1.3 Sustainable Development and the UN Agenda 2030 Sustainable Development Goals

In 2015 the United Nations adopted the 2030 Agenda for Sustainable Development, which listed 17 goals (UNDP, 2016) as an extension of the UN's 8 Millennium Development Goals which ended in 2015 (Table 1.2). The 17 SDGs have a set of 169 targets and 231[14] unique measurable indicators that can be used to track a country's progress in terms of human well-being, economic growth and environmental sustainability. Of these goals, Goal 14 – Life below water gives recognition to the value of maintaining a healthy ocean environment and calls for the *'conservation and sustainable use of the oceans, seas and marine resources for sustainable development'* (ICSU, 2017), through ten targets[15].:

- 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

[13] E.g., VesselFinder (https://www.vesselfinder.com/) is a free to use online real time vessel tracking platform.

[14] SDG Indicators. Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. Accessed at https://unstats.un.org/sdgs/indicators/indicators-list/#:~:text=The%20global%20indicator%20framework%20includes,of%20SDG%20indicators%20is%20248., 08 February 2022.

[15] View https://sdgs.un.org/goals/goal14, for a full list of indicators and status update on ongoing progress.

- 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.
- 14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.
- 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.
- 14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation.
- 14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable manage. of fisheries, aquaculture and tourism
- 14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries.
- 14.b Provide access for small-scale artisanal fishers to marine resources and markets.
- 14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”.

The goals of the SDGs are interlinked (Bann, 2016; ICSU, 2017) and achieving one goal can have an impact (positive or negative) on the achievement of one or more of the other goals.

SDG14 compliments or conflicts with several societal needs within developing countries such as SDG1 – ending poverty (hence the focus on new avenues for job creation that can boost employment), SDG2 - ending hunger (many coastal and island States rely on small-scale fisheries to provide food for their communities) and SDG8 – sustainable economic growth (the

ocean being called the ‘new economic frontier’ and being seen as a new development space within Africa). These societal needs can be considered the drivers of ocean economic development that can conflict with SDG 14 if economic priorities are given preference over environmental integrity.

This conflict between sustainability (maintaining the natural environment in a functional state to ensure ongoing benefit) and development (meeting the current well-being needs of people) is an ongoing challenge. Sustainable Development was defined by the World

Table 1.2: Lists of the Millennium Development Goals and the new Sustainable Development Goals.

Goals No.	Millennium Development Goals	Sustainable Development Goals
1	Eradicate extreme poverty and hunger	No poverty
2	Achieve universal primary education	Zero hunger
3	Promote gender equality and empower women	Good health and well-being
4	Reduce child mortality	Quality education
5	Improve maternal health	Gender equality
6	Combat HIV/AIDS, malaria and other diseases	Clean water and sanitation
7	Ensure environmental sustainability	Affordable and clean energy
8	Develop a global partnership for development	Decent work and economic growth
9		Industry, innovation and infrastructure
10		Reduced inequalities
11		Sustainable cities and communities
12		Responsible consumption and production
13		Climate action
14		Life below water
15		Life on land
16		Peace, justice and strong institutions
17		Partnerships for the goals

Commission on Environment and Development (commonly referred to as the Brundtland report) as *'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'* (WCED, 1987).

However, sustainable development is a contested and developing concept due to how this is being implemented by international institutions, such as the UN, and national governments in deciding what is meant to be sustained and developed (see Parris and Kates, 2003; Keiner and Marco, 2005; Redclift, 2005; Holden et al., 2014). In trying to rationalise the conflict within sustainable development, the concept of 'decoupling'[16] was introduced, i.e., separating economic development and growth from impacts on the natural environment and limiting natural resource use (UNEP and IRA, 2011; Ward et al., 2016; Fletcher and Rammelt, 2017). The concept of the 'circular economy', where any waste or left over resources are used to create or feed into other products, and old or broken products are recycles or refurbished, is another concept which is being promoted to reduce impacts on the environment (World Circular Economy Forum, 2018; Uddin et al., 2023). However, these concepts do not address the paradox of infinite/endless growth, as promoted by the SDGs (particularly SDG 8 and the focus on increasing GDP), on a finite planet as decoupling and circular economy address creating more efficient use of resources and creating carbon mitigation technologies (Schandl et al., 2016; Ward et al., 2016; Fletcher and Rammelt, 2017; Hickel, 2019; Washington, 2021). Circular economy value chains and decoupling actions will however be important in slowing down negative environmental impacts as future policy options are developed.

1.4 The Ocean Economy – Blue Economy Conundrum: Economic Seascapes of Ocean Resource Uses

Different meanings of the terms ocean economy, blue economy or similar terms, and their interchangeable use in the literature can give rise to confusion when using these in both peer-reviewed and grey literature. Colgan (2003b) defined the "ocean economy" as "that proportion of the economy which relies on the ocean as an input to the production process or which, by geographical location, taking place on or under the ocean", and distinct from the "coastal economy" as "that portion of economic activity which takes place on or near the coast (whether defined as coastal watershed, coastal zone, or near shore areas)". From this perspective, the ocean economy is a purely economic construct.

[16] This has been further divided into absolute decoupling (no impact on the environment) and relative decoupling (more efficient use of resources) (Ward et al., 2016; Fletcher and Rammelt, 2017).

Table 1.3: Examples of the use of the various terms used within the published and grey literature to describe ocean resource uses, and the main sectors or industries ascribed to these uses.

Terminology	Industries and Sectors	Reference
Ocean/s Economy	Marine Fishery; Offshore Oil and Gas; Ocean Mining; Marine Salt; Shipbuilding; Marine Chemical; Marine Biomedicine; Marine Engineering and Building; Marine Electric Power; Seawater Utilization; Marine Communications and Transportation; Coastal Tourism	(Zhao et al., 2013)
	Capture Fisheries (industrial and artisanal); Seafood Processing; Shipping; Ports; Shipbuilding and Repair; Offshore Oil and Gas (shallow water); Marine Manufacturing and Construction; Maritime and Coastal Tourism; Marine Business Services, Marine R&D and Education; Dredging; Marine Aquaculture; Deep and Ultra-deep water Oil and Gas; Offshore Wind Energy; Ocean Renewable Energy; Marine and Seabed Mining; Maritime Safety and Surveillance; Marine Biotechnology; High-tech Marine Products and services	(OECD, 2016)
	Fishing/Aquaculture; Marine Transportation; Marine Tourism; Offshore Oil and Gas; Marine Construction; Boat and Ship Building, Maintenance and Repair; Marine Renewable Energy; Marine Research and Education	(Wang, 2016)
	Marine Transport and Manufacturing; Tourism; Offshore Oil and Gas; Construction; Renewable Energy; Fisheries and Aquaculture; Communication; Desalination; Marine Protection Services and Governance; Small Harbour and Infrastructural Development	(Findlay, 2018)
	Living Resources; Minerals; Energy; Transport and Trade; Tourism and Recreation; Carbon Sequestration; Coastal Protection	(Patil et al., 2018)
Marine Economy	General Ocean and Coastal Based and Adjacent Sectors	(Sun et al., 2018)

Table 1.3 (cont.): Examples of the use of the various terms used within the published and grey literature to describe ocean resource uses, and the main sectors or industries ascribed to these uses.

Terminology	Industries and Sectors	Reference
Maritime Economy	Historical Seafood Harvesting (Mollusc Shell)	(Harland and Barrett, 2012)
	Historical Seafood Harvesting (Fish Bone)	(Milner and Barret, 2012)
	Economic and Research Activities - Shipbuilding; Logistics and Ports; Offshore Energy Supplies; Shipping Companies; Education and Specialized Services	(Bentlage et al., 2014)
	Coastal Tourism; Maritime Transport; Marine Fisheries and Aquaculture; Marine Engineering Architecture; Marine Shipbuilding; Marine Chemical; Offshore Oil and Gas	(To and Lee, 2018)
Blue Economy	Fisheries; Aquaculture; Shipping and Transport; Tourism; Marine (blue) Energy (fossil and renewable); Pharmaceutical and Cosmetic Industries, Genetic Resources and General Sea-based Products; Blue Carbon Markets	(UNECA, 2014)
	Fisheries and Aquaculture; Offshore and Deep-sea Mining; Marine Manufacturing (e.g., engineering, biotechnology, boat building)	(Mohanty et al., 2017)
Blue Growth	Fisheries and Aquaculture	(FAO, 2018)
	Blue Energy (offshore wind and ocean energy); Aquaculture; Coastal and Maritime Tourism; Blue Biotechnology; Seabed Mineral Resources	(EUC, 2017)

Inclusive of the coastal areas, the OECD (OECD, 2016) defined the ocean economy "as the sum of the economic activities of ocean-based industries, and the assets, goods and services of marine ecosystems", noting the need to not only include the tangible economic metrics but also the intangible non-material uses. Terms used in both the published and grey literature, and examples of the sectors mentioned as fitting within ocean economies, are listed in Table 1.3. From this it should be noted that the various terms describing the sectors and terms are similar across the countries and regions even though the exact wording may be different e.g., 'Marine Transportation' and 'Shipping and Transport'. Also of note, is that marine protection, governance, and education and research are not always considered a sector within ocean development. Three terms for ocean development have come to dominate in international discourse – ocean economy (e.g., used within the USA and South Africa), blue economy (e.g., used within the African Union), and blue growth (e.g., used within the European Union). The degree to which aspects of inclusivity, equality and environmental sustainability within these different discourses and definitions requires further interrogation.

Silver et al. (2015) noted the introduction of the term blue economy into international sustainable development discussions, in the lead-up to, and during the United Nations Conference on Sustainable Development (UNCSD) held in Rio de Janeiro in 2012, identifying four competing discourses related to human–ocean relations: (a) oceans as natural capital, (b) oceans as good business, (c) oceans as integral to Pacific Small Island Developing States, and (d) oceans as small-scale fisheries livelihoods.

However, there have been various uses of the term across different fields, making the definition of a blue economy often ambiguous. These include:

1. Kim and Mauborgne (2004) proposed a Blue Ocean Strategy relating to uncontested market competitiveness within business strategies that do not pertain exclusively to the ocean realm.

2. Gunther Pauli's book "The Blue Economy: 10 years – 100 innovations – 100 million jobs" advocated innovative solutions to sustainable development, including the fostering of entrepreneurship to create sustainability (Thomas and Pet Soede, 2013).

3. The UNCSD Rio+20 Conference was held in Rio de Janeiro, Brazil, over the period 20-22 June 2012 and centred on the advancement of the "green economy" concept and policies, in the context of sustainable development and poverty eradication, and the institutional framework for sustainable development. Arguments were presented in the Rio+20 preparatory process by coastal nations (particularly the Pacific Small Island Developing States which given the relative sizes of their EEZs to their landmasses), for a "blue economy" approach to be more prominently addressed, including the "Green Economy in a Blue World" Report which introduced sustainability in the ocean economy sectors (UNEP et al., 2012). Here the 'blue economy' could be considered a geographical

concept that goes beyond economic metrics to include sustainability and inclusivity. Included in this conference was the initiation of the SDG processes which have in the longer term resulted in inter alia SDG 14. However, as indicated above, Silver et al. (2015) noted that discussions on global oceans governance at Rio+20 offered differing and competing definitions of the blue economy.

4. WWF (2015a) and others have noted that reference to the blue economy as any economic activity in the maritime sector, whether sustainable (and aligned with green economy principles) or not. The authors of this WWF report used the 'Sustainable Blue Economy' as their preferred terminology (WWF, 2015a).

Interpretation of the blue economy concept therefore remains unclear and could lead to different spatial boundaries and prioritising of development outcomes relating to the economic, social and environmental pillars under the sustainable development considerations (see Fenichel et al., 2020). Such different uses may lead to the possible misuse of the term as substantiating exclusive or unsustainable initiatives by which organisations highlight good environmental policies or programmes but have no or limited implementation of positive environmental actions, or the actions are of such limited scope that it does not properly address the negative impacts of an industry, i.e., labelled as "blue-washing" or "green-washing" (Mitchell and Ramey, 2011; Alons, 2017; de Freitas Netto et al., 2020). This ambiguity of the blue economy concept also lends itself to being termed a buzzword – words that make the speaker seem knowledgeable and authoritative on a topic, but which may have different meaning to different audiences[17] (Palmer et al., 1997; Cornwall, 2007). Buzzwords, as a subject, have been discussed across various disciplines (see Cornwall, 2007; Goldberg and Bryant, 2012; Cluley, 2013; Bensaude Vincent, 2014; Schnable et al., 2021), with the ambiguity of the "buzzword" noted as a positive (in that it allows various actors to engage on a particular subject from their own area of interest) and negative (in that use of the term may be used by those in authority to provide a veneer of respectability while continuing a business-as-usual approach).

A new term has been added to the blue economy space – the 'New Blue Economy' – which is described as "the knowledge-based, digital economy, the innovative generation of scientific information delivered by communications technology products (ICT)' (Kildow, 2021). Whether the use of the 'New Blue Economy' term will gain traction remains uncertain but is being used by the Global Ocean Observing System, Marine Technology Society (based in the USA), and the American National Oceanic and Atmospheric Administration 'Dialogues with Industry' webinar series[18]. Considering the existing ambiguity in the use of the blue economy, and the lack of recognition of

[17] The Merriam-Webster online dictionary defines it as an important-sounding usually technical word or phrase often of little meaning used chiefly to impress laymen', https://www.merriam-webster.com/dictionary/buzzword (Accessed 11-02-2023).
[18] https://mtsociety.memberclicks.net/mts-goos-industry-dialogues. Accessed January 2023.

ocean knowledge production as a sector within the blue economy discourse, focusing on the “New Blue Economy” is important - having a better understanding of the oceans is imperative to developing better ocean protection mechanisms.

However, this would better be defined as the ‘blue knowledge economy/sector’, i.e., economic growth driven by the production of new ocean knowledge and innovations (Powell and Snellman, 2004; Blankley and Booyens, 2010), to avoid causing further confusion.

African Coastal States, as less developed nations with specific developmental needs, are in a unique position of being able to start their ocean growth strategies learning from the existing best practices. This should consider not only their economic needs but also the environmental and social well-being aspects to create sustainable development programmes which follow the SDG commitment to ‘leave no-one behind’. By recognising and incorporating ecosystem-based approaches into national accounting or reporting systems to underpin informed ocean governance capabilities, and engaging with ongoing international and regional programmes, States can develop their capacities (both human and technological) and capabilities to develop sustainable and inclusive economies. With the increasing focus on the oceans as an economic development space, States need to assess the status of multiple natural resources, how this impacts their peoples, and how to mitigate against and adapt to, anthropogenic impacts arising from any pressures due to economic sectors.

Such interconnected developmental needs can be addressed through management frameworks such as the DAPSI(W)R(M) - Drivers-Activities-Pressures-State changes-Impacts (on Welfare)-Responses (as Measures) - as proposed by Elliott et al. (2017). This framework links the societal needs, and activities arising from this, to the changes in the natural environment and possible effects on the economy, and the interventions needed to manage any harmful outcomes. The DAPSI(W)R(M) model illustrates that multiples Drivers (i.e., human needs) may lead to multiple interactions within the framework (e.g., fishing as a provisional ecosystem service source of food vs fishing as a cultural ecosystem service for job or wealth creation as Activities) and provides for nested interactions to allow integrated management plans. Ocean accounting provides novel indicator measurements under which the DAPSI(W)R(M) model can be implemented. For example, an economic driver (energy security) may result in an activity (oil and gas exploration and production) which results in a pressure (noise pollution of seismic surveying), and associated ecosystem state change (plankton mortalities), leading to declines in fishery natural capital and therefore supply to and use in the fisheries economy and benefit (Impact to Welfare in terms of lost opportunities to fishers) needing Responses in terms of Activity management. In conjunction with this, ocean governance tools such as Integrated Coastal Zone Management, Marine Spatial Planning, Marine Protected Areas and Ecosystem-based Management can provided mechanisms to address negative economic impacts on the environment and be inclusive of societal needs.

Development of the economic sectors and uses within the ocean space have been primarily driven by the developed countries which, in most cases, have well-developed ocean resource-use activities, economies and policies in place. However, developing countries (and especially small-island developing States) have developed or are busy developing their ocean resource-use industries, institutions and policies to be able to sustainably and inclusively capitalise on their sovereign ocean resources. Many countries advance and measure their ocean economies only as sectoral ocean resource use contributions to national accounts such as GDP metrics. Having a more diverse view that considers sustainability and equitable and inclusive developmental needs provides a much broader consideration for informed evidence-based decision-making by policymakers when considering national and regional development plans and alignment to the SDGs. This would also be important for Southern Africa and other African States that are considering developing national ocean development programmes.

Prior research on the blue economy concept have focused on specific meeting discourses (e.g., Silver et al., 2015), or analysing policy documents and grey literature (e.g., Smith-Godfrey, 2016; Voyer et al., 2018). An agreement on terminology and definitions is required to ensure outcomes aligned to the SDGs and consistency on activities between countries referred to as “blue economy” activities. There is no agreed definition for the blue economy term, although it is generally perceived as having beneficial economic, social and environmental outcomes. Some blue economy approaches may, therefore, follow a business-as-usual approach to economic development favouring economic growth over environmental sustainability and human well-being. It is, consequently, important to determine the extent of inclusivity and sustainability within the informed development and implementation of blue economy-based adaptive policy cycles and advancement. Adaptive policy cycles recognise that global and national conditions change and that flexibility is needed to respond to this, to manage and respond to any changes (Swanson et al., n.d.; Echeverría et al., 2013), and it is therefore important that policy researchers takes such cycles into account to be able to contribute to these.

1.5 Current Status of the Blue Economy in Africa, and the Western Indian Ocean

While the information on the potential for ocean development within Africa has been available in historical policy documents (UNECA, 1985; UNECA, 1986), activities to gain benefits from utilising ocean resources have only been implemented across the continent within the last two decades. The African Union’s 2050 Africa’s Integrated Maritime Strategy (2050 AIM Strategy) sets out the goals and challenges of developing maritime economies in Africa. The African Union Commission was tasked with developing an African maritime strategy by the Heads of State in 2009, with the strategy released in 2012 (AUC, 2012) defining a blue economy as,

'…a marine version of the green economy, one that improves African citizens' well-being while significantly reducing marine environmental risks as well as ecological and biodiversity deficiencies' (AUC, 2012).

The vision for the strategy was to,

'…foster increased wealth creation from Africa's oceans and seas by **developing a sustainable thriving blue economy in a secure and environmentally sustainable manner**[19]', with the strategic end state the,

'Increased **wealth creation** from AMD[20] that positively contributes to **socio-economic development**, as well as increased national, regional and continental stability, through collaborative, concerted, cooperative, coordinated, coherent and trust-building multilayered efforts **to build blocks of maritime sector activities** in concert with **improving elements of maritime governance**[21] ' (AUC, 2012).

While the 2050 AIM Strategy highlights that a healthy ocean is needed to successfully develop the maritime economy, as noted in the definition and vision statement, the language of the document emphasises a focus on economic security. Environmental protection services are not explicitly listed as a maritime sector – for capacity development – and only provided maritime governance and education and research as possible areas of alignment.

The African Union's (AU) Agenda 2063 is a policy directive for developing African States and lifting the peoples of Africa out of poverty. The Agenda 2063 provides several goals for States to strive towards and refers to the ocean economy as a means to help secure *'A Prosperous Africa Based on Inclusive Growth and Sustainable Development'* (Aspiration 1), with the objective that,

'Africa's Blue/ocean economy, which is three times the size of its landmass, shall be a major contributor to continental transformation and growth, through 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' (AUC, 2016).

The first Agenda 2063 ten-year implementation plan (AUC, 2015) further expands on this objective, defining '*Africa's Blue Economy'* as being,

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[19] Own emphasis added.

[20] Africa's Maritime Domain.

[21] Own emphasis added.

'… constituted by all **economic activities**[22] that emanate from Africa's oceans, seas/sea beds (sic), lakes, rivers. Examples of blue economy activities include: fishing, marine/lake transport/shipping, seabed mining, marine tourism, generation of tidal energy etc.'.

The document also set out the priority areas and targets until 2023 focused on 'Marine Resources and Energy' and 'Port Operations and Marine Transport' (AUC, 2015).

While objectives to respond to climate change, protect biodiversity and disaster management are included, it was not clear from the agreement how the inevitable and required trade-offs would be managed as part of the AU policy. The African Charter on Maritime Security and Safety and Development in Africa (Lomé Charter) was adopted by the AU, in 2016, and set out commitments for collaboration by African States for ocean development and promoting the 'sustainable Blue/Ocean Economy' (AU, 2016).

The AU institutionalised a Blue Economy Division within its structures in 2019, under the Department of Agriculture, Rural Development, Blue Economy, and Sustainable Environment, with four high-level policy outcomes, i.e., Policy and Governance, Socio-Economic Outcomes, Environmental Outcomes, and Stakeholder Engagement (AUC, n.d.). With the establishment of the Blue Economy Division, the AU released its Africa Blue Economy Strategy in 2019 (AU-IBAR, 2019), detailed across five themes, as well as its Implementation Plan 2021-2025 (AU-IBAR, 2020) which indicated the actions of States need to undertake to develop the themes identified. The objective of the Blue Economy Strategy *'is to guide the development of an inclusive and sustainable blue economy'* (AU-IBAR, 2019) and provides an overview of nine ocean sectors, namely, ports and shipping, fishery, aquaculture, sustainable blue energy, ocean mining, oil and gas, coastal tourism, blue carbon and other ecosystem services (natural capital approach), and research and education. The document then rationalises the development strategy for the above sectors into five thematic areas,

- Fisheries, aquaculture, conservation and sustainable aquatic ecosystems
- Shipping/transportation, trade, ports, maritime security, safety and enforcement
- Coastal and maritime tourism, climate change, resilience, environment and infrastructure
- Sustainable energy and mineral resources, and innovative industries
- Policies, institutional and governance, employment, job creation and poverty eradication, and innovative financing

Specific to environmental policy development, the African Ministerial Conference on the Environment (AMCEN), of which all 54 African States are members, sets the environmental agenda in Africa (UNEP, n.d.). During the 17th Session of the AMCEN, the Secretariat provided an information note

[22] Own emphasis added.

for discussion on ‘Advancing the sustainable blue (ocean-based) economy in Africa’ (AMCEN/17/6, 2019). The AMCEN information note provided an overview of the blue economy and its key sectors, justification for why developing the blue economy in Africa was necessary, the threats to ocean development, regional frameworks related to ocean governance, and posed five key questions on areas needed to advance the blue economy,

(a) What does Africa need to do to advance the blue or ocean economy?

(b) Can the existing frameworks and policies currently in place in Africa promote a

sustainably managed blue or ocean economy?

(c) How do we build on the outcomes of the 2018 Sustainable Blue Economy Conference

in order to advance Africa’s socioeconomic transformation from its oceans?

(d) How can African Governments ensure that ocean governance and the blue or ocean

economy are translated into action?

(e) Does Africa need to develop a flagship programme for the blue economy that will consolidate infrastructure developments on the continent? (AMCEN/17/6, 2019).

Providing additional policy support to African States to develop their ocean economies, the United Nations Economic Commission for Africa (UNECA) published ‘Africa’s Blue Economy: A Policy Handbook’ in 2016 (UNECA, 2016). The handbook emphasized the need for sustainable use and good management practices to protect ocean resources, and identifying the linkages between developing Africa’s blue economy and how it could contribute to realising the SDGs (UNECA, 2016). UNECA has had a strong focus on contributing to the blue economy discussion having hosted sevral meetings to provide policy inputs to the African States. This includes the 24th Session of the Inter-Governmental Committee of Experts (Senior Officials of Government) Meeting of Southern Africa under the theme “Blue Economy, Inclusive Industrialization and Economic Development in Southern Africa” in 2018, hosted by Mauritius. This meeting deliberated on the draft report on the ‘Blue Economy, Inclusive Industrialization and Economic Development in Southern Africa’. A high-level policy dialogue on the “The Blue Economy, Climate Change and Environmental Sustainability” was hosted by Namibia in 2019.

The Government of Kenya, highlighting its commitment to ocean development, held the ‘First Sustainable Blue Economy Conference’ in November 2018, co-hosted by the Governments of Canada and Japan. This was, attended by over fifteen thousand participants from all sectors of society (civil, academic, government and business) from all over the world (Anon., 2018b). Monetary commitments of over USD 172 billion (Anon., 2018a) were pledged to be invested in national, regional and global projects. Kenya is also one of three African members of the High-Level Panel for

a Sustainable Ocean Economy (also abbreviated to Ocean Panel), led by serving heads of state[23], to support and develop ocean knowledge, and committed to the development of Sustainable Ocean Planning to ensure sustainable use across 100% of their ocean space by 2025.

While the goals and actions called for in the AU's strategy and implementation documents are commendable, more could have been done to centre the strategy beyond the economic imperatives of job creation and poverty eradication with the assumption that this would lead to a more inclusive society. Additional areas of focus should have addressed the challenges in terms of understanding cultural identities concerning the ocean and women's empowerment and inclusion in the development plans.

As highlighted by the themes and questions in the AU documents and the AMCEN information note, the extent to which the African States are integrating, or can integrate, environmental sustainability and social upliftment within their economic development programmes is still poorly understood. Furthermore, there is a large disparity in funding and research opportunities that can be accessed due to geographic location. While States bordering the Atlantic Ocean have potential access to several high-profile programmes[24], with funding from partners such as the UK, the EU, USA and Canada, e.g., AtlantOS[25]; Atlantic International Research Centre[26]; and One Ocean Hub[27], the coastal countries of the Indian Ocean have limited high-level (i.e., heads of state and ministerial level) basin-wide initiatives that provide similar long-term contributions of investment towards research.

Research and governance programmes in the Indian Ocean tend to be sub-regional[28], e.g., projects through the Nairobi Convention[29], the Western Indian Ocean Marine Science Association (WIOMSA)[30], Indian Ocean Commission (IOC)[31] or Western Indian Ocean Governance Network (WIOGEN)[32], with limited funding available to undertake long-term capital-intensive research, for example, developing and buying instruments or paying for ship time. The First International Indian Ocean Expedition 1959-1965[33] and Second International Indian Ocean Expedition 2015-2025[34]

[23]https://www.oceanpanel.org/about#panel.. The current member governments are Australia, Canada, Chile, Fiji, France, Ghana, Indonesia, Jamaica, Japan, Kenya, Mexico, Namibia, Norway, Palau, Portugal and the United States of America. It is supported by the UN Secretary-General's Special Envoy for the Ocean.
[24] These programmes include environmental, social and economic research.
[25] http://www.atlantos-ocean.org/
[26]https://www.aircentre.org/
[27] https://oneoceanhub.org/. The Ocean Hub includes a strong focus on social sciences as part of the research.
[28] E.g., focused on the WIO, Northern Indian Ocean or specific to islands States.
[29] https://www.nairobiconvention.org/
[30] https://www.wiomsa.org/
[31] https://www.commissionoceanindien.org/
[32]https://wiogen.org/
[33] IIOE- NIO Conference (incois.gov.in)
[34] https://iioe-2.incois.gov.in/

(originally 2015-2020), are two of the only basin-scale research programmes conducted in the Indian Ocean, and these have limited participation by developing States.

An ocean-focused regional mechanism which could be used to develop a shared Indian Ocean regional research and ocean governance strategy focused on enhancing environmental, social and economic developments, is the Indian Ocean Rim Association (IORA). IORA is an intergovernmental association focused on the economic development of the Indian Ocean region established in 1997. IORA, as of 2023, is comprised of 23 Member States[35], 11 Dialogue Partners[36], and 2 Observer organisations[37]. All African Coastal States bordering the Indian Ocean are members of IORA. IORA has adopted the Blue Economy as one of its cross-cutting priority areas and has held three high-level Ministerial meetings (in Mauritius, Indonesia and Bangladesh) to develop regional policies around this, each endorsing a Ministerial Declaration[38]. These activities culminaed in the formation of the Working Group on the Blue Economy (WGBE), constituted in 2019, to develop the technical capabilities of Member States. The WGBE has been chaired by South Africa since its formation. While the IORA declarations have emphasised the sustainable and inclusive development of the oceans (IORA, 2015; IORA 2017), the WGBE had developed a sector-based work plan for 2020-2023 focused on those areas Member States have identified as priorities,

- Fisheries and Aquaculture
- Seaports and Shipping
- Seabed Exploration and Minerals
- Marine Biotechnology, Research and Development
- Coastal and Marine Tourism
- Renewable Ocean Energy (IORA, 2019).

Although the WGBE work plan has followed a sectoral approach to developing a blue economy programme with IORA, the activities under the work plan consider best practices and follow an evidence-based approach to development, and considers environmental sustainability as proposed through the IORA Blue Economy Declarations. Under the Blue Economy priority area, IORA has established the Blue Carbon Hub hosted by Australia, the first IORA Centre of Excellence;

[35] Commonwealth of Australia, People's Republic of Bangladesh, Union of Comoros, French Republic, Republic of India, Republic of Indonesia, Islamic Republic of Iran, Republic of Kenya, Republic of Madagascar, Malaysia, Republic of Maldives, Republic of Mauritius, Republic of Mozambique, Sultanate of Oman, Republic of Seychelles, Republic of Singapore, Federal Republic of Somalia, Republic of South Africa, Democratic Socialist Republic of Sri Lanka, United Republic of Tanzania, Kingdom of Thailand, United Arab Emirates and Republic of Yemen.

[36] People's Republic of China, Arab Republic of Egypt, Republic of Germany, Republic of Italy, Japan, Republic of Korea, Russian Federation, Republic of Turkey, United Kingdom, Kingdom of Saudi Arabia and United States of America.

[37] Indian Ocean Research Group and WIOMSA.

[38] The Mauritius Declaration on Blue Economy was adopted in 2015, the Jakarta Declaration on Blue Economy was adopted in 2017, and the Dhaka Declaration on Blue Economy was adopted in 2019.

undertaken a series of fisheries-related studies in partnership with the French Development Agency (AFD); and has undertaken a study on assessing the recovery of Member States after Covid-19, with a focus on the blue economy.

Climate Change was also identified as a potential focus area within the Blue Economy priority area with a workshop held in 2021 to deliberate on "The Urgency of Climate Change and its Consideration as a Topic in IORA. Subsequent engagements have seen this elevated as a potential new Working Group within IORA.

South Africa was the chair of IORA for the period between October 2017 and October 2019[39]. In the leadup to chairing of IORA, South Africa established the national Chapter of the Indian Ocean Rim Association Academic Group (SA IORAG) in 2016 through the initiative of the Department of Science and Innovation (DSI; then the Department of Science and Technology), with the Secretariat hosted by the National Research Foundation - South African Environmental Observation Network (SAEON) Egagasini Node. The objectives of this national academic group were to provide academic capacity that could be called upon to provide advice to government officials when requested and undertake self-identified research of importance to the Member States of IORA. The SA IORAG Secretariat also assisted South Africa's international science diplomacy initiatives, especially within Africa. The SA IORAG, therefore, focused on strengthening academic cooperation with the other WIO African States (i.e., Mozambique, Tanzania, Kenya, Somalia, Madagascar, Mauritius, Comoros and Seychelles) with several activities undertaken during the chair period focused on the African coastal countries of the WIO region to support policy advice with these countries and the broader IORA community.

The policy and development focus within IORA should be leveraged to include long-term scientific ocean research outcomes concerning the oceans, as recognised by the Perth Communique and Perth Principles communicated after the 13th Council of Ministers Meeting hosted by Australia in 2013 (IORA, 2013a; IORA, 2013b), as this is a shared resource space. The uptake of research through science-policy networks such as the SA IORAG will align research to the needs of policymakers.

East African Coastal States are party to existing international and regional programmes, frameworks and organisations, and knowledge produced through these initiatives and forums can be used to grow sustainable ocean economies from the outset. The implementation and advancement of African ocean economic growth developments have considerable opportunities for sustainability, and inclusivity, to support human and societal well-being.

[39] South Africa was again chair of the IORAG in 2022-2023.

1.6 Conclusion

The focus on ocean development, and the growing pressures from anthropogenic impacts, requires the implementation of cohesive and comprehensive ocean management programmes to address any negative impacts. The recognition of ecosystem services, or contributions, to human wellbeing and economic benefits derived from these has been an important step in ensuring that environmental protection is considered in development planning. Environmental sustainability is also recognised as key to achieving the SDGs. As coastal and islands states advance national development plans, a holistic framework needs to be considered to consider the full spectrum of ocean governance needs, from the trade-offs between economic, social and environmental objectives, to the systems and human capacity needs that will be required. This could include areas such as the international obligations, maritime safety and security needs, and new knowledge production. Africa states, through organisations such as the AU and UNECA, have developed such strategies, and individual countries are looking towards the implementation of this. African states which border the Western Indian Ocean also have also organisations, such as IORA and WIOMSA, from which to share experiences.

It is important to understand how the ocean development plans are being articulated, and implemented, to ensure that development goals are met, and understanding the ocean governance plans and actors in the Western Indian Ocean region provides an important indication of this.

CHAPTER 2: SYSTEMATIC REVIEW OF THE BLUE ECONOMY IN ACADEMIC LITERATURE

2.1 Introduction

Anthropogenic pressures on the oceans and coasts are expected to continue increasing in the coming decades as coastal human populations expand and the oceans are seen as the next space for development to support economic growth and social well-being activities to overcome current global societal challenges such as climate change, energy security and food security. There are also ongoing discussions through the UN to implement a legally binding instrument through UNCLOS around the protection of the high-seas and how to equitably make use of the resources for the benefit of all humankind. Many countries have national or regional programmes to advance ocean resource uses in what they term oceans or blue economies within their EEZs. Whilst the term oceans economy refers to sectoral resource-uses and is usually measured as a gross value add of ocean sector contribution to GDP, the term 'blue economy' is increasingly being used in a variety of manners.

As discussed in Chapter 1, the 'blue economy' paradigm has been developed across different disciplines and there is, therefore, no accepted definition for this term. Considering the current economic development focus on the oceans, this deficiency does present an opportunity to shape the blue economy concept development as it relates to the oceans and all the sectors and activities it is supporting and is proposed to support. Particularly as the AU has adopted the Africa Blue Economy Strategy (AU-IBAR, 2019) coastal and island states need to have clarity on the 'blue economy' term.

This chapter will focus on a systematic review of peer-reviewed academic literature, commentaries and conference proceedings to better understand how this blue economy term has developed and is used in the context of the oceans and ocean development, with the aim of considering if a universal definition would be useful and if a possible consideration framework for identification (or labelling) as blue economy.

2.2. Data and Methodology

A systematic literature search within peer-reviewed publications (journal articles, commentaries and conference proceedings) was undertaken to provide the data for the systematic review, using the terms 'blue economy' and 'ocean economy'. Four online research databases, Scopus, Science Direct, Wiley Online Library and African Journals were chosen based on their broad range of science topics.

Systematic reviews processes were developed to synthesise primary research to answer a specific question, either quantitatively or qualitatively, in a replicable and transparent manner, and so provide unbiased evidence-based answers (James et al., 2016; Tranfield et al., 2003).

There is a long history of systematic reviews within the health sciences (Munn et al., 2018) to the extent that best practice guidelines have been developed for such undertakings (for example, the Cochrane Review[40] processes). Such systematic reviews (and the associated meta-analyses which investigate and quantitatively combine data) permit the collation of global information in a manner that allows for better-informed decisions for patient healthcare, in that individual research outputs may be once-off, long-term studies with small sample sizes (Jennings and Van Horn, 2012).

This study used a modified systematic review process aimed to provide an assessment of the use of the term 'blue economy' in the peer-reviewed literature. The methodology for this review was modified from reviews undertaken by Colding and Barthel (2019) for the development of the term 'social-ecological systems' (also referred to as 'socio-economic systems') and Kosanic and Petzold (2020) from their systematic review linking cultural ecosystem services and human well-being. The review by Colding and Barthel (2019), focused on the development of the frameworks for social-ecological systems over twenty years, finding that three frameworks were most commonly used (one that was a descriptive framework and two that were diagnostic frameworks useful for modelling) and that most papers did not define what the authors meant by social-ecological systems. Colding and Barthel (2019) did not define social-ecological systems as part of their review outcomes but encouraged researchers to make explicit their definitions when conducting future research. While the authors did not refer to their study as a systematic review, they incorporated the elements of the systematic review process.

Kosanic and Petzold (2020) focused on the intersection between cultural services and human well-being, i.e., what are the relationships between people and nature? The authors noted that as cultural services were the most difficult to assess or quantify, there were fewer studies focused on these than provisioning or supporting services, as the latter are considered more easily quantified and important to human well-being. This systematic review considered, among other topics, the author's countries, location of the study area (e.g., country/region, landscape type, protected area), type of data collected in the study (e.g., qualitative, mixed-method, spatial data), the type of ecosystem services covered, the types of communities that were assessed, and the types of health or well-being impact from nature.

There are few examples of the systematic review process being conducted in the environmental sciences field (a literature search provided only two additional reviews (Malinauskaite et al., 2019; Weitzman, 2019)), and hence the reviews by Colding and Barthel (2019) and Kosanic and Petzold (2020), and the methodologies used therein, were chosen as being most representative of the information needs for this systematic review. However, a limitation of these reviews was the use of only one literature database in each. Colding and Barthel (2019) made use of the Scopus database

[40] Further information may be found at https://www.cochranelibrary.com/.

and Kosanic and Petzold (2020) made use of the Web of Science Core Collection. Databases have individual criteria for selecting their indexed literature, potentially impacting the papers available for selection allowing potential bias in the research.

2.2.1. Biases in Systematic Literature Reviews

While there is a long history in the development of systematic reviews, studies have shown that there are biases that may be inherent in the review processes. These include:

1. Language Bias: Journals published in English have a higher chance of being indexed in the more utilised international literature databases (Wu et al., 2013; Van Leeuwen et al., 2001; Nieminen and Isohanni, 1999)
2. Publication Bias: Research with significant or favourable results are more likely to be published, published in journals with higher profiles, citation indices, or a larger base of readers, and therefore more likely to be indexed in the more utilised international literature databases (Egger and Smith, 1998; Song et al., 2009; Jennings and Van Horn, 2012)
3. Location Bias: Journals published in developing countries, regardless of language, have been identified to be less likely to be indexed in international literature databases (Egger and Smith, 1998). Authors affiliated with institutions from developed countries, mostly based in what is referred to as the Global North, were also found to be more likely to be published than those from less developed countries, or the Global South (Pettorelli et al., 2021).

While not a review bias, another aspect of location bias is what has become known as ‘parachute’ science whereby scientists from developed countries conduct research in less developed countries and publish their research with the exclusion of local authorship or affiliation, capacity development, technological development or any information dissemination with the local scientists or communities that may have assisted them with their research (Stefanoudis et al., 2021; North et al., 2020). Recognition, therefore, accrues to the senior author’s country of residence or institutions leaving little to no legacy within the country in which the research was conducted.

2.2.2 Literature Database Data Acquisition

For this study, four literature databases were searched to moderate review biases apparent in the use of only a single database.

The Scopus, ScienceDirect and Wiley Online databases were chosen due to the broad range of science topics covered in these databases, with the African Journals (formerly SA e-Publications) database chosen to capture relevant journal publications from African countries that may not have been indexed in the other three databases to moderate for possible location biases. These

databases are described in Table 2.1 below. Literature searches were conducted between February-April 2020.

Table 2.1: Description of literature databases provided on the CPUT library portal (https://www.cput.ac.za/library-databases/).

Literature Database	Description
Scopus Established 2004[41]	Scopus is the largest abstract and citation database of peer-reviewed literature and quality web sources with smart tools to track, analyze and visualize research.
ScienceDirect Established 1997[42]	An electronic collection of full text and bibliographic information covering the following: physical sciences and engineering, life sciences, health sciences, and social sciences and humanities.
Wiley Online Library Established 2010[43]	Wiley Online Library offers a multidisciplinary collection of online resources covering life, health and physical sciences, social science, and the humanities.
African Journals Established 2001[44]	African Journals (formerly SA ePublications) have been available online to clients with great success since 2001. This service is the most comprehensive, searchable collection of full-text African electronic journals available on one platform which focuses on information originating from or about Africa.

[41] As indicated on the Scopus website - https://www.elsevier.com/solutions/scopus/why-choose-scopus. Accessed 09-07-2021.
[42] An Introduction to ScienceDirect - https://ieconferences.com/an-introduction-to-sciencedirect/. Accessed 09-07-2021.

[43] Wiley, P.B. and Chaves, F. 2010. John Wiley & Sons. 200 Years of Publishing. John Wiley & Sons, Inc. USA.
[44] As indicated on the CPUT website description.

Searches were done for the terms ‘blue economy’ and ‘ocean economy’ for all literature sources including in the title, keywords, abstracts and main text of the literature. The restriction of the search parameters to these two key terms was done to narrow the results to those related to the oceans, as the term ‘blue economy’ is also used in other areas (as discussed in Chapter 1), i.e., circular economy and new or uncontested market opportunities.

The bibliographic search results from each database were exported into separate Microsoft Excel spreadsheets. The results were then reviewed and screened for document type, and as per the methodologies of Colding and Barthel (2019) and Kosanic and Petzold (2020); books, book chapters, book reviews, reports and other documents (e.g., journal index pages) were excluded to ensure only primary or original journal articles were included.

The search results were then reviewed to identify and delete any duplicate records from the four databases and collated into a single dataset of articles, with the Scopus database used for comparison as this returned the largest set of results. For the final number of screened texts from the Science Direct, Wiley Online and African Journals databases, only the papers not included in the Scopus database were therefore counted. Where articles were not readily available for download through the CPUT online databases (i.e., needed to pay to view), a Google Search (https://www.google.com/) was undertaken to find the article from other online sources; which was then usually either available through the affiliated institution webpage or the author’s ResearchGate webpage.

However, some papers were not available through any open sources or were in a foreign language with only an English title and abstract provided and were therefore excluded. While “blue economy” was present in the title or abstract of some of these papers, the papers were excluded as full analyses of these papers could not be made.

False-positive results, based on the terms “blue economy” and “ocean economy” being present in the reference list only, could not be distinguished from the database document list. The final list of collated articles from the search results was therefore uploaded to the Mendeley desktop application (www.mendeley.com), which also allowed for the annotation and referencing of the articles, and each journal article was individually searched to identify if the term “blue economy” occurred within the text of the article. Articles for which the term was only present as part of the text in a figure or table, or the reference list were then excluded from further analyses.

The final dataset contained 87 articles for analysis and was analysed using the Systematic Literature Review Methodology as outlined in Figure 2.1. The data extraction consisted of capturing the article metadata and analysing the articles to develop broad themes to which each article could be assigned, as indicated in Table 2.1. These themes were developed by the author through consideration of the content of the articles.

Each article was provided with a code for facilitating further information extraction and analyses within the final dataset of papers. The full list of papers in the dataset is presented in Appendix 1.

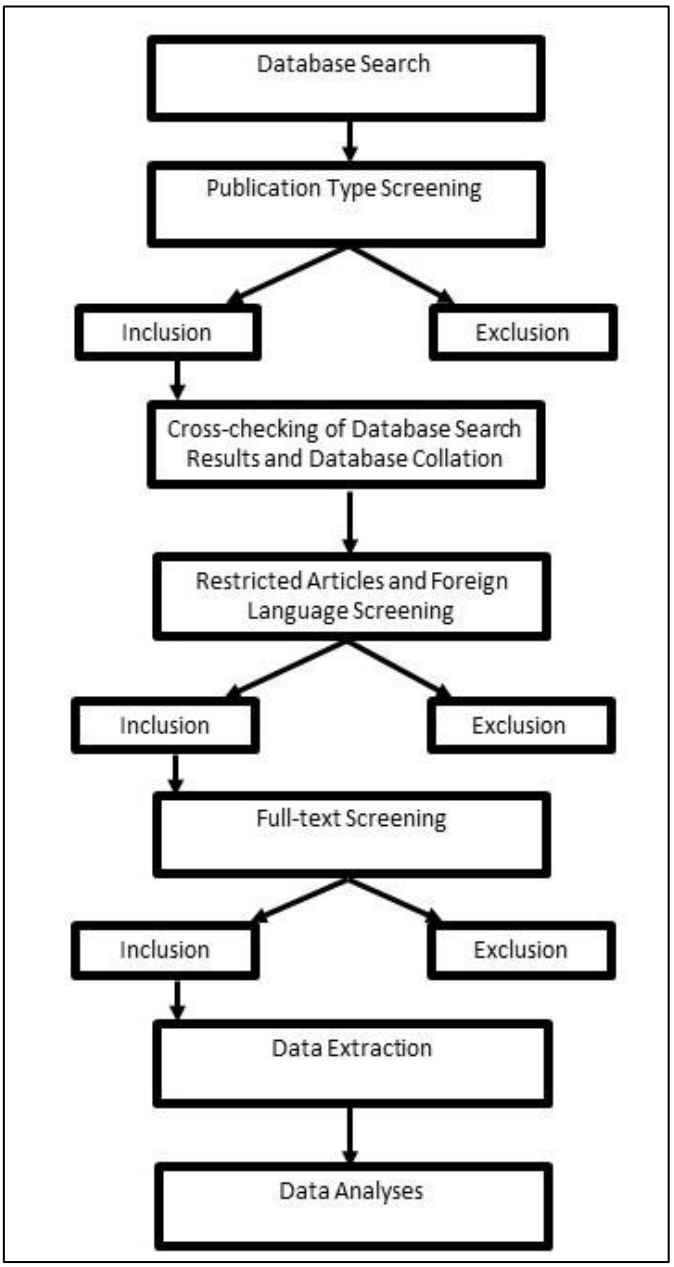

Figure 2.1: Systematic Literature Review Methodology modified from Colding and Barthel (2019) and Kosanic and Petzold (2020).

In March 2021, a second identical literature search was undertaken using the four selected journal databases to provide an updated list of papers until the end of 2020 (articles for 2021 were excluded). This provided an additional 52 papers, following the methodology in Figure 2.1.

Only the metadata for these papers was extracted (the details of which are provided in Table 2.2) for addition to the 2020 dataset, as this information was easily extracted during the review process.

2.2.3 Data Extraction and Catergorisation

To review the article dataset, the papers were uploaded into the Mendeley Desktop application. This allowed for the reading, annotation, and reference corrections of the articles. The manner of data extraction from the 2020 and 2021 datasets is provided in Table 2.2. After review and analyses of the initial eighty-seven (87) articles during the 2020 literature search, each paper was categorised into four main themes (or focus areas) based on the topic the paper was addressing. These four themes were 1) Sector-Specific which addressed topics of specific economic ocean uses; 2) Terminology Review which used different methodologies; 3) Ocean Governance which addressed the importance of the ocean to human well-being and why better governance, management practises or tools were needed; and 4) Economic Evaluations and Finance which focused on the economic value of ocean sectors and financing needs to develop ocean sectors. This was done to provide a broad understanding of the current disciplines using the term blue economy.

2.2.4 Qualitative Data Analysis Software and Methodology

Word Clouds provide a useful visualisation of the most used terms, i.e., the number of times a word or term was used within documents (Snyder, 2019; Li et al., 2016). Word Frequency Clouds were produced using the NVIVO 12 software package (https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home), a research tool for qualitative data analyses and mixed methods research.

The NVIVO Word Cloud function was used to identify the most frequently used words within all definition text for the blue economy, the results of which are also provided in a table. The Word Cloud does not include stop words - i.e., and, the, must, for, etc., - and excluded words only used once. Stop words are a set of commonly used words in any language. Words with similar meanings were also automatically grouped (e.g., ocean, oceans, oceanic; improve, improved, improvement; balance, balanced). A Word Cloud can also not address negative meaning, but as this analyses was done to determine the words associated with blue economy, this was not considered as impacting the results.

The NVIVO software package was also used for cluster analysis of the keywords provided in the journal articles. Coding was required for all the keywords in the 87 articles in the 2020 dataset, and keywords were coded exactly as they appeared in the article except for some instances to correct misspellings (e.g. ‘marine **special** planning’), the grouping of singular and plural terms (e.g. ‘ocean’ and ‘ocean**s**’; ‘ocean observation’ and ‘ocean observation**s**’) or where terms were abbreviated in some articles (e.g. ‘SDGs’ and ‘sustainable development goals’).

In their review of the use and reporting of cluster analysis in health psychology, using the reporting criteria provided by Aldenderfer and Blashfield (1984), Clatworthy et al. (2005) identified that only

27% of the papers they reviewed included all five reporting criteria needed to replicate the cluster analysis and interrogate of the validity of the cluster analysis results. These criteria were,

1. The computer program

2. The similarity measure

3. The cluster method

4. The procedure used to determine the number of clusters

5. Evidence for the validity of the clusters

Clatworthy et al. (2005) found that the similarity measure and the computer program used were most frequently omitted from the reporting criteria.

NVIVO allows the user to cluster variables[45] by,

1. Word Similarity - The words contained in the selected files, also referred to as nodes are compared. Files that have a higher degree of similarity based on the occurrence and frequency of words are shown clustered together. Files that have a lower degree of similarity based on the occurrence and frequency of words are displayed further apart.

2. Coding Similarity - The coding of the selected files is compared. Files that have been coded similarly are clustered together on the cluster analysis diagram. Files that have been coded differently are displayed further apart on the cluster analysis diagram.

3. Attribute Value Similarity - The attribute values (e.g., publication year or publication type) of the selected files are compared. Files that have similar attribute values are clustered together on the cluster analysis diagram. Files that have different attribute values are displayed further apart on the cluster analysis diagram.

For the cluster analyses, 'coding similarity' between the articles was chosen using the Jaccard similarity correlation coefficient. The Jaccard coefficient provides a measure of the shared elements between two datasets, or journal articles, as,

(the number of shared elements between the two datasets) / (the total number of elements).

As an example calculation, Article 1 may have the set of keywords {keyword1; keyword2; keyword3; keyword4; keyword5}, while Article 20 may have the set of keywords {keyword2; keyword3; keyword5; keyword6; keyword7}. The shared elements of keyword2; keyword3; keyword5 (a total of three) over the total number of elements (the set of keyword1; keyword2; keyword3; keyword4;

[45] For a full description of the NVIVO cluster analysis process see, https://help-nv.qsrinternational.com/12/win/v12.1.101-d3ea61/Content/vizualizations/how-cluster-analysis-generated.htm. Accessed 21-06-2021.

keyword5; keyword6 and keyword7 (of seven) provides the Jaccard Coefficient Calculation of 3/7 or 0.43.

Table 2.2: Description of the data extracted from the peer-reviewed articles. Text in italics indicates the metadata captured for both the 2020 and 2021 datasets.

Information on Journal Article	Description
Article Title	This was done for both the 2020 and 2021 datasets
Journal Title	This was done for both the 2020 and 2021 datasets
Country of Author/s Affiliations	This was done for both the 2020 and 2021 datasets
Publication Year	This was done for both the 2020 and 2021 datasets
Journal Metrics: Scopus - CiteScore 2019	This was done for both the 2020 and 2021 datasets. The score for the 2020 dataset was accessed in July 2020. The score for the 2021 dataset was accessed in March 2021. The Journal Metrics used were from the Scopus Database freely available CiteScore Metrics, and most of the articles were also available on Scopus. For this study the CiteScore 2019 Metrics were used, as at the time of the data collection, the CiteScore 2020 metrics were not yet available. The Citescore provides an indication of how many citations a particular journal has compared to the number of articles published, which may provide an indication of the popularity or quality of the journal and therefore assist in providing researchers information on which journals would provide the best chances of their research being read or having an impact (Salisbury, 2020).
How many times has the article been cited?	This information was only collected for the 2020 dataset. This information was extracted from the Scopus database and was acquired in July 2020.
Keywords	This information was only collected for the 2020 dataset.
Blue Economy Occurrence	The mention of BE in the title, abstract, keywords or main text was only collected for the 2020 dataset

Table 2.2 (cont.): Description of the data extracted from the peer-reviewed articles. Text in italics indicates the metadata captured for both the 2020 and 2021 datasets.

Information on Journal Article	Description
Explicit Blue Economy Definition Provided (Y, N)	The provision of a definition for Blue Economy in the text was only collected for the 2020 dataset
Blue Economy definition text	This information was only collected for the 2020 dataset.
References for Blue Economy definition, if provided	This information was only collected for the 2020 dataset.
Other Terms Used	Any other terms mentioned, such as ocean economy, oceans economy, marine economy, maritime economy or blue growth. This information was only collected for the 2020 dataset.
Geographical Focus	What was the area of the geographical area of focus - global, regional, and country-level? This information was only collected for the 2020 dataset.
Focus/Theme of the Article	These themes were developed by the author after consideration of the information in the reviewed articles: - Sector-specific article (e.g., Aquaculture, Maritime Transport, Ocean Energy, etc.) - Terminology reviews - Ocean Governance, Policy and Environmental Impacts and Protection (incl. general blue/ocean economy discussions, identifying the need for global ocean observing systems and better coordination of this, geo-political risks within the ocean spaces, and the benefits of developing blue/ocean economies, among others) - Economic Evaluations and Finance (including labour aspects) This information was only collected for the 2020 dataset.

2.3. Results

2.3.1 Review of the metadata of Journal Publications that include the term 'Blue Economy'

The results from the database searches and the final number of papers for which full-text screening was undertaken are shown in Table 2.3. Following the full-text screen, a total of 87 articles were used for the final analysis in 2020, and 52 articles for 2021.

Within the four journal databases, the term 'blue economy' first appeared in 2011 and showed an increasing trend in journal publications up to 2020 with the term used in 52 journal publications in that year (Figure 2.2). In reviewing the article from 2011 (SR36), it was indicated that the blue economy concept had been used earlier, at the 'International Symposium on Blue Economy Initiative for Green Growth, Massachusetts Institute of Technology and Korean Maritime Institute, Seoul, Korea, May 7, 2009'. It was not possible to find the symposium proceedings, but article SR36 States,

"The concept of environmentally friendly use of the ocean resources allows to evaluate how new technologies and models of the commercial activity can meet environmental and economic conditions of the sustainable use of the ocean resources", indicating the blue economy, at this early stage of development as a concept, was linked to sustainable development.

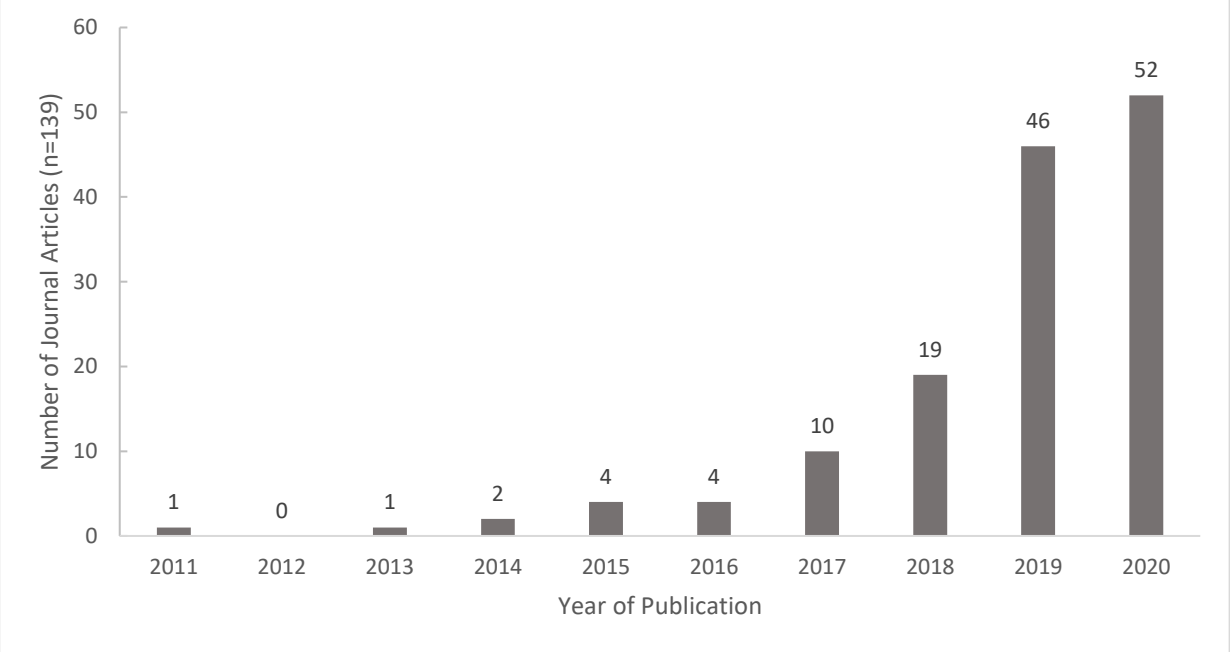

Figure 2.2: Journal publications covering the term 'blue economy' in the context of the development or use of the oceans. This represents the final number of journal articles, after being text-screened, from the searches conducted in 2020 and 2021

Table 2.3: Results of the literature databases searched for Scopus, ScienceDirect, Wiley Online Library and African Journals for 2020 and 2021. For the 2021 search, the search was restricted to papers up until the end of 2020. The databases were accessed through the CPUT Libraries Portal (https://www.cput.ac.za/library-databases/). Other document types include book reviews, reports, and journal index pages.

Database	Search date	Total number of results from the search query	Number of books or book chapters	Number of restricted articles	Number of Non-English articles	Number of other document types	The final number of papers for full-text screening
Scopus Established 2004	1st Search: 10 February 2020	115	12	14	1	0	88
	2nd Search: 02 February 2021	70	5	12	1	0	52
ScienceDirect Established 1997	1st Search: 28 March 2020	42	5	0	0	2	16
	2nd Search: 02 February 2021	16	0	0	0	0	8
Wiley Online Library Established 2010	1st Search: 28 March 2020	11	2	0	0	4	4
	2nd Search: 02 February 2021	15	0	0	0	4	2
African Journals Established 2001	1st Search: 06 April 2020	10	0	0	0	4	6
	2nd Search: 02 February 2021	6	0	0	0	2	4

The term ‘Blue Economy’ was cited in 61 Journal Titles (Table 2.4). Six journals accounted for more than 45% of these (Figure 2.3); these being Marine Policy (17%), Frontiers in Marine Science (8%), Journal of the Indian Ocean Region (8%), Ocean and Coastal Management (4%), Journal of Ocean and Coastal Economics (4%) and Sustainability Science (4%).

Most of the remaining journals only had one journal article which made mention of the term ‘Blue Economy’ (as indicated in Table 2.4). The CiteScore 2019 metrics provided by Scopus were low for most of the Journal Titles, with the highest citability for the journal Science (CiteScore 2019 – 43.5; out of the 4 799 articles published between 2016-2019, articles from the journal were cited in 217 261 publications within that period). The lowest was for the Journal - Journal of Ocean and Coastal Economics (CiteScore 2019 – 0.0; none of the articles published between 2016-2019 were cited in any publications).

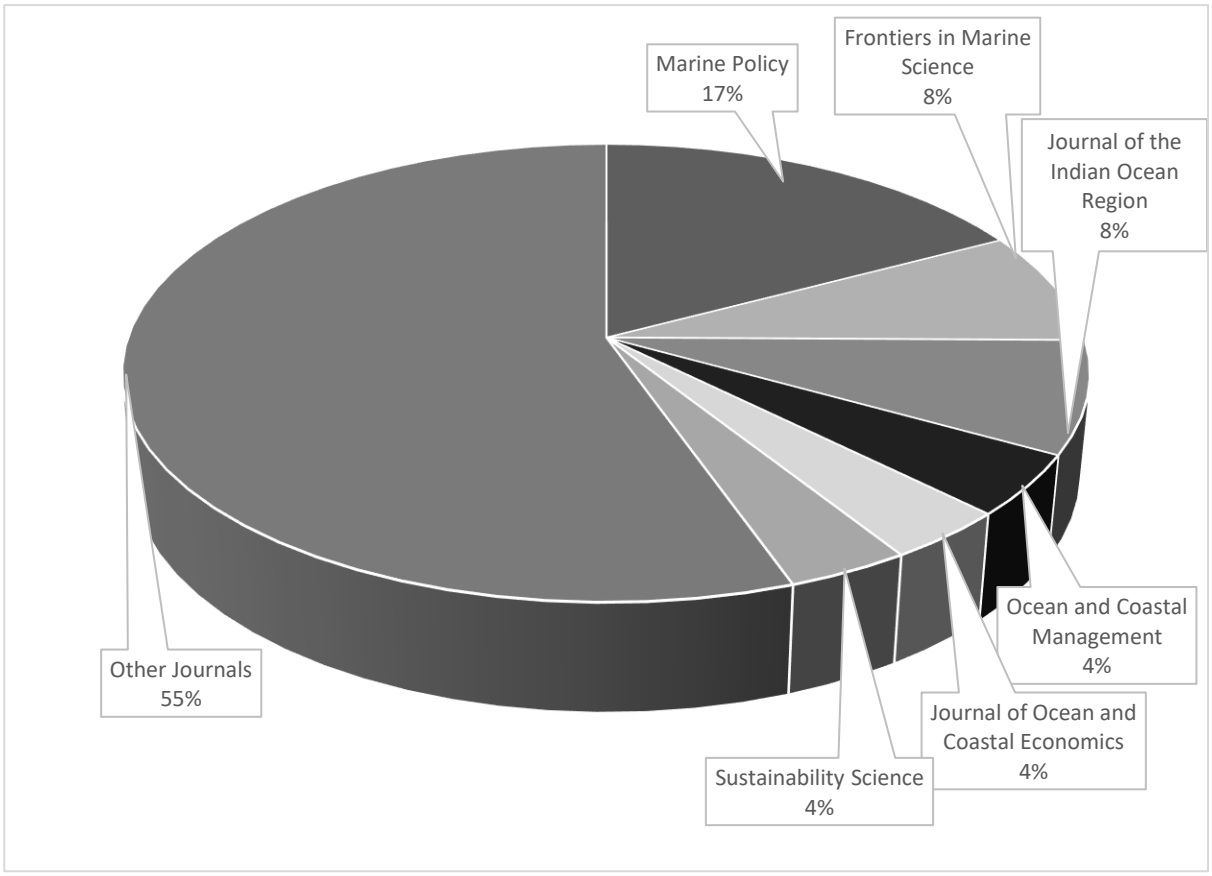

Figure 2.3: The percentage of Journals Articles which referred to the ‘Blue Economy’ from the 61 Journal Titles within the study, as per Table 2.3.

Table 2.4: List of Journal Titles indicating the number of 'Blue Economy' articles and the CiteScore2019 for each Journal (Scopus - CiteScore 2019; SR Articles Accessed July 2020; SRB Articles accessed March 2021). Where there is no CiteScore available, the journal was not available on Scopus.

Journal Title	No. of Articles per Journal	Journal Metrics
Marine Policy	24	5.3
Frontiers in Marine Science	11	4.4
Journal of the Indian Ocean Region	11	1.0
Ocean and Coastal Management	6	4.3
Journal of Ocean and Coastal Economics	5	0.0
Sustainability Science	5	6.9
Aquatic Conservation: Marine and Freshwater Ecosystems	4	4.6
Journal of Political Ecology	4	3.0
South African Journal of Military Studies	4	-
Acta Criminologica: African Journal of Criminology and Victimology	3	-
Environmental Development	3	4.8
Fish and Fisheries	3	12.4
Journal of Cleaner Production	2	10.9
Journal of Operational Oceanography	2	4.2
Marine Pollution Bulletin	2	6.7
Nature Ecology and Evolution	2	13.5
Nature Sustainability	2	6.8
One Earth	2	-
Procedia Engineering	2	2.7
2015 4th IEEE International Conference on Advanced Logistics and Transport, IEEE ICALT 2015	1	-
Acta Astronautica	1	5.1
AfricaGrowth Agenda	1	-
Antipode	1	5.6

Table 2.4 (cont.): List of Journal Titles indicating the number of 'Blue Economy' articles and the CiteScore2019 for each Journal (Scopus - CiteScore 2019; SR Articles Accessed July 2020; SRB Articles accessed March 2021). Where there is no CiteScore available, the journal was not available on Scopus.

Journal Title	No. of Articles per Journal	Journal Metrics
Applied Geography	1	6.4
Applied Ocean Research	1	4.2
Case Studies on Transport Policy	1	2.6
Conservation Letters	1	13.4
Deep Sea Research Part II: Topical Studies in Oceanography	1	6.6
Ecological Applications	1	8.1
Environment and Society: Advances in Research	1	2.0
Environment International	1	9.9
Environment, Development and Sustainability	1	3.4
Environmental Science and Policy	1	8.7
Foundations of Management	1	1.0
Gender and Behaviour	1	-
Geoforum	1	4.7
Geography Compass	1	3.7
Geojournal of Tourism and Geosites	1	1.4
Global Change Biology	1	15.2
ICES Journal of Marine Science	1	6.3
Integrated Environmental Assessment and Management	1	3.6
Irish Geography	1	1.1
Journal of Cultural Economy	1	2.0
Journal of Environmental Policy and Planning	1	6.5
Journal of Marine Science and Engineering	1	1.8

Table 2.4 (cont.): List of Journal Titles indicating the number of 'Blue Economy' articles and the CiteScore2019 for each Journal (Scopus - CiteScore 2019; SR Articles Accessed July 2020; SRB Articles accessed March 2021). Where there is no CiteScore available, the journal was not available on Scopus.

Journal Title	No. of Articles per Journal	Journal Metrics
Journal of Peasant Studies	1	7.3
Journal of Physics: Conference Series	1	0.7
Journal of Policy Modeling	1	2.6
Journal of Rural Studies	1	6.4
Maritime Affairs	1	0.8
Maritime Business Review	1	0.6
Maritime Studies	1	2.1
Nature Communications	1	18.1
Ocean Engineering	1	4.8
Polish Journal of Environmental Studies	1	2.3
Renewable and Sustainable Energy Reviews	1	25.5
Resources Policy	1	5.3
Science	1	45.3
Urbani Izziv	1	1.0
WIT Transactions on the Built Environment	1	0.3
Yuzuncu Yil University Journal of Agricultural Sciences	1	0.5

In terms of the author country institutional affiliations addressed, inclusive of the main author and all co-authors, most journal articles could be attributed to the UK, USA, Australia, South Africa and France (Table 2.5). There were only seven African countries with which authors were affiliated. These were South Africa (25 publications), Kenya (6 publications), Namibia (2 publications), Nigeria (2 publications), Seychelles (2 publications), Angola (1 publication) and Egypt (1 publication).

Table 2.5: Ranking of country affiliations addresses of authors. African countries are highlighted in bold. The brackets - () - indicates the number of publications the country has been listed in.

Ranking	Country of Affiliation
1	UK (40)
2	USA (37)
3	Australia (27)
4	**South Africa (25)**
5	France (15)
6	Germany (12)
7	Netherlands, Sweden (11)
8	China, Norway (10)
9	Canada, Italy, Spain (9)
10	Bangladesh (8)
11	Belgium (7)
12	**Kenya**, Switzerland (6)
13	Denmark (5)
14	Greece (4)
15	Fiji, Finland, Japan, Portugal (3)
16	Brazil, Malaysia, **Namibia, Nigeria**, Philippines, Romania, **Seychelles**, Singapore, Solomon Islands, Thailand, Venezuela (2)
17	**Angola**, Argentina, Bulgaria, Chile, Colombia, **Egypt**, Estonia, French Polynesia, India, Israel, Malta, New Zealand, Pakistan, Panama, Republic of Korea, Russia, Saudi Arabia, Taiwan, Turkey, Vietnam (1)

In comparing the author affiliation addressed with the regional focus areas, a disparity in the affiliation addresses and the regional focus areas was identified. Figure 2.4 represents the regional focus areas of the Journal Articles. While most articles were focused on general discussions of the global oceans (38%), this was followed by a focus on Africa or countries within Africa (22%), Asia or countries within Asia (14%) and Europe or countries within Europe (14%). The other regions, including North America and Australia, combined only account for 12% of the articles. Authors affiliated with institutions in the USA and Canada were well represented across articles in the dataset, with 37 and 9 articles respectively, even though North America was only the focus in 3% of the articles. Also of note was that more studies were focused on island States and regions such as the Pacific Islands and the Caribbean Community (CARICOM).

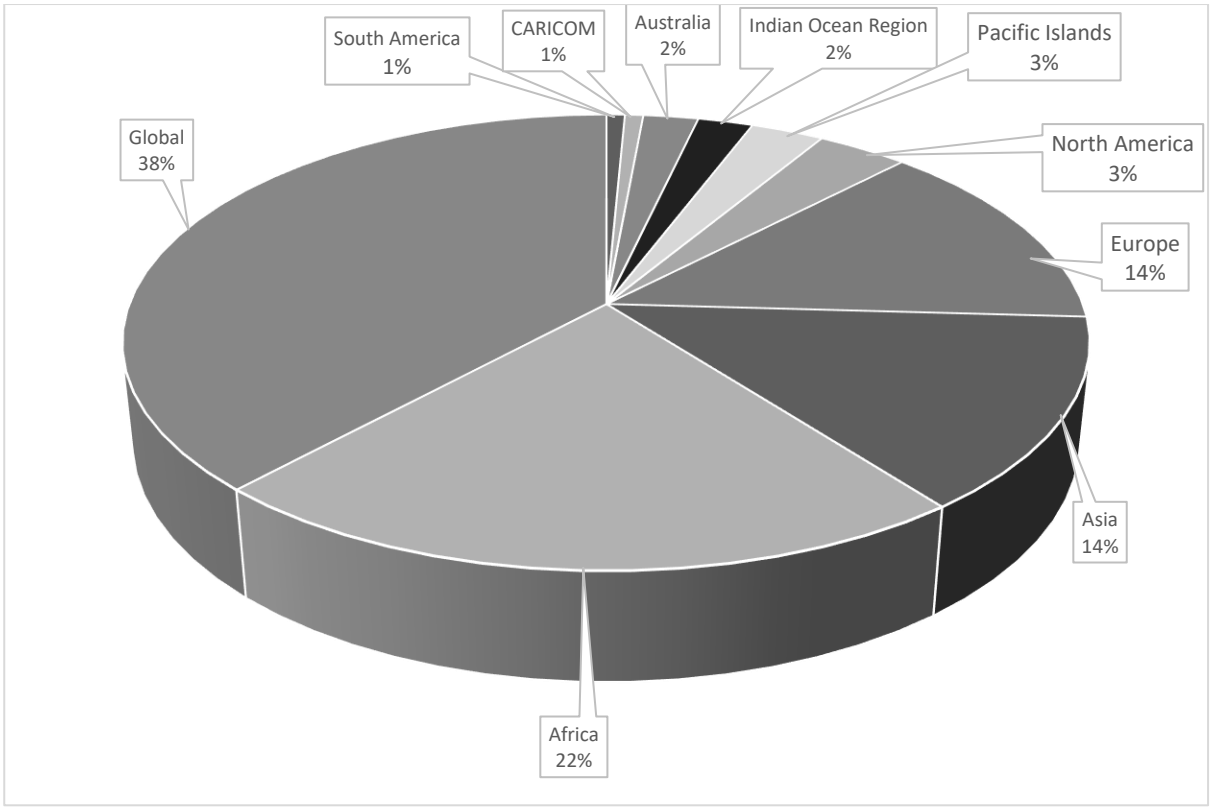

Figure 2.4: The regional focus areas of the Journal Articles. CARICOM= Caribbean Community. See Appendix 2 for the full list of countries and regions discussed in each Journal Article.

2.3.2 Analysis of the subset of Journal Articles (SR1-87) which included the term 'Blue Economy'

This section focuses on the analysis of the use of the term 'Blue Economy' in journal articles, commentaries and conference proceedings from the first assessment of articles (SR1-87; see Appendix 1) from the database search conducted in 2020 (i.e., excludes the journal articles from the 2021 database search). This focus is aimed at a better understanding of the use and/or the evolution of the term 'Blue Economy' and the themes associated with this from the 87 journal articles which were analysed to understand the themes associated with the term 'Blue Economy' and related terms.

2.3.2.1 Occurrence of terminology in the subset of Journal Articles

In terms of the citations for the 87 articles, most of the articles were cited at least once (n=68), several were cited nil/zero times (n=8), and several did not have citation data available (n=11), if these articles were not available on the Scopus database.

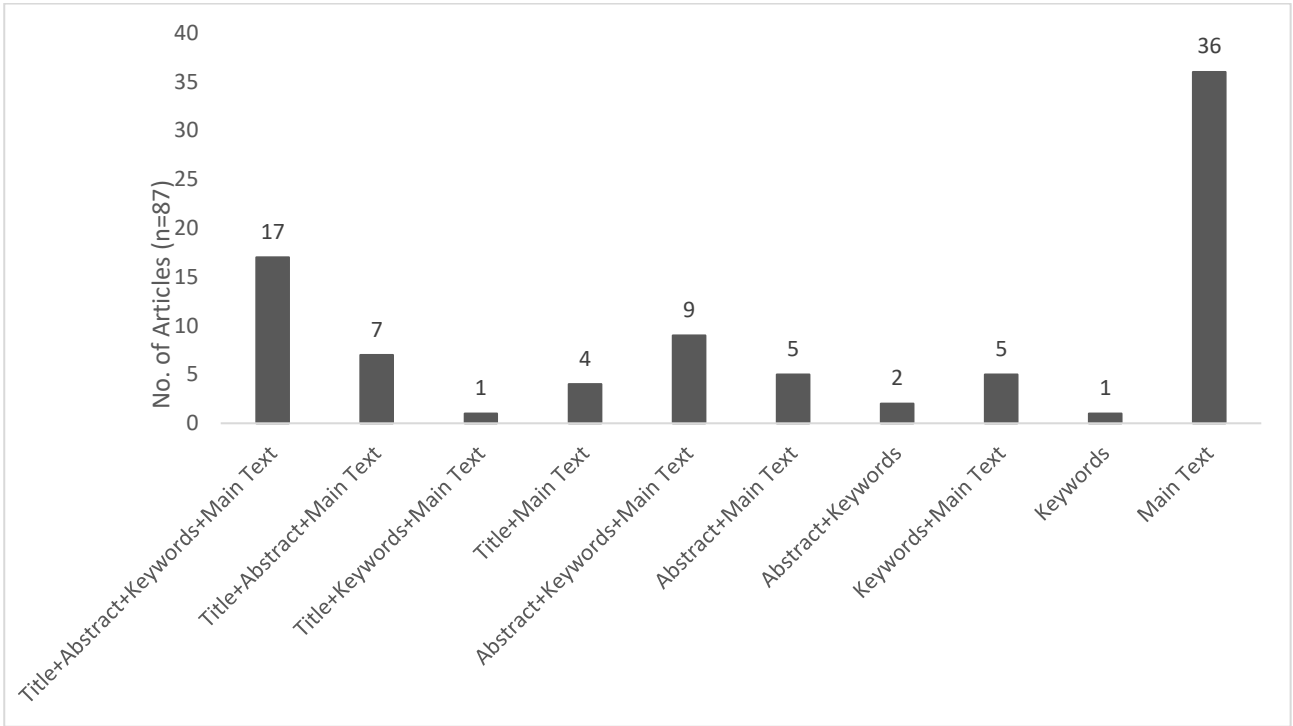

Figure 2.5: Occurrence of the term 'Blue Economy' in the article sections – Title, Abstract, Keywords, Main Text.

In analysing the occurrence of the term ‘Blue Economy’ within the different sections of the article – i.e., the Title, Abstract, Keywords or Main Text – it was found that for most of the articles ‘Blue Economy’ appeared in the Main Text only (n=36), followed by the term appearing in all sections (Title+Abstract+Keywords+MainText) of the articles (n=17) (see Figure 2.5). One of the articles only made mentioned the ‘Blue Economy’ in the Keywords, and two of the articles only made mention of the ‘Blue Economy’ in the Abstract and Keywords, which could indicate that this was used as a buzzword to draw attention to the article.

Analysing this information according to each article text section, the term ‘Blue Economy’ was mentioned in twenty-nine (29) of the article titles, forty (40) of the abstracts, thirty-five (35) of the keywords, and in eighty-four (84) of the main texts.

In comparison, for the Article Titles, the term ‘Ocean Economy’ appeared in one article as part of the title (SR23), and ‘Oceans Economy’ appeared in one article as part of the title (SR63).

Looking at the inclusion of other terminology that may be used as synonyms to ‘Blue Economy’, or could be seen as related to the term (as addressed in Chapter 1) the other articles included either ‘Ocean/s Economy’ (mentioned in 52 articles), Blue Growth (mentioned in 36 articles), ‘Marine Economy’ (mentioned in 12 articles), ‘Maritime Economy’ (mentioned in 8 articles), or ‘Sustainable Ocean Economy’ (mentioned in 1 article), or combinations of these terms were used in an article, as shown in Table 2.6. It was noted that twenty (20) articles made mention of the term 'Blue Economy’ only. Other terms also noted that were related to the term ‘Blue Economy’ were the ‘Coastal Economy’, ‘Blue Justice’, Blue Wealth’ and ‘Ocean Enterprise’.

Table 2.6: Presence of terms which may be considered related to the 'Blue Economy' for the selected articles (n=87). The terms in the columns on the left are terms which may be considered synonyms for the 'Blue Economy'. The (x) indicates which terms were used in the articles.

Article Code	Ocean/s Economy	Blue Growth	Marine Economy	Maritime Economy	Sustainable Ocean Economy	Coastal Economy	Blue Justice	Blue Wealth	Ocean Enterprise
SR01									
SR02	x								
SR03		x							
SR04									
SR05	x	x				x			
SR06	x	x						x	
SR07	x								
SR08									
SR09	x	x					x		
SR10	x								
SR11	x	x							
SR12	x								
SR13									
SR14									
SR15		x							
SR16									
SR17		x							
SR18	x	x	x						
SR19		x							
SR20		x		x					
SR21			x						
SR22		x							
SR23	x								
SR24									
SR25	x	x		x		x			
SR26	x		x			x			
SR27	x								
SR28	x								
SR29	x		x			x			
SR30	x								

Table 2.6 (cont.): Presence of terms which may be considered related to the 'Blue Economy' for the selected articles (n=87). The terms in the columns on the left are terms which may be considered synonyms for the 'Blue Economy'. The (x) indicates which terms were used in the articles.

Article Code	Ocean/s Economy	Blue Growth	Marine Economy	Maritime Economy	Sustainable Ocean Economy	Coastal Economy	Blue Justice	Blue Wealth	Ocean Enterprise
SR31	x								
SR32	x								
SR33	x	x							
SR34	x								
SR35	x								
SR36	x								
SR37	x	x		x					
SR38	x		x						
SR39	x	x		x					
SR40	x								
SR41		x							
SR42	x		x						
SR43									
SR44	x		x						
SR45	x	x							
SR46									
SR47									
SR48	x		x						
SR49		x							
SR50									
SR51	x	x							
SR52									
SR53									
SR54									
SR55	x	x							
SR56		x							
SR57									
SR58									
SR59	x	x				x			
SR60		x							

Table 2.6 (cont.): Presence of terms which may be considered related to the 'Blue Economy' for the selected articles (n=87). The terms in the columns on the left are terms which may be considered synonyms for the 'Blue Economy'. The (x) indicates which terms were used in the articles.

Article Code	Ocean/s Economy	Blue Growth	Marine Economy	Maritime Economy	Sustainable Ocean Economy	Coastal Economy	Blue Justice	Blue Wealth	Ocean Enterprise
SR61	x	x		x					
SR62	x								
SR63	x								
SR64	x	x							
SR65	x								
SR66	x								
SR67	x								
SR68		x	x						
SR69	x	x							
SR70		x							
SR71									
SR72	x								
SR73	x	x							
SR74	x								
SR75	x			x					
SR76									
SR77		x			x				x
SR78		x							
SR79		x		x					
SR80	x		x						
SR81	x								
SR82	x	x		x					
SR83									
SR84	x	x	x			x			
SR85	x	x				x			
SR86	x	x	x						
SR87									

2.3.2.2 Understanding the themes and use of the term 'Blue Economy'

Analyses of the themes around which the blue economy has been used identified that 64% of the articles had a focus on Ocean Governance; Economic Evaluations and Finance comprised 12% of the articles; reviews of terminology on the 'Blue Economy' and 'Marine Economy' comprised 6% of the articles; and articles focusing on a specific ocean use sector comprised 18% of the articles, as shown in Figure 2.6. The Sector-Specific theme could be further differentiated into Aquaculture, Maritime Security, Maritime Transport, Multi-platform and - use of space (offshore energy, aquaculture and desalination), Small-scale Fisheries, Wild-caught Fisheries, Space/Satellite Technologies, and Tourism.

Thirty-three (33) articles defined the 'Blue Economy' as shown in Appendix 3. Of the 87 articles reviewed, some provided a brief discussion on what is meant by a 'Blue Economy' as part of the introductions, as well as noting that there was no consensus on the definition, but these articles were only included if a final definition was accepted and provided by the authors. Of the thirty-three articles that did provide a definition, ten (10) articles provided no references to the definition for the 'Blue Economy' or stated their definition (SR1, SR33, SR40, SR44, SR46, SR59, SR63, SR67, SR68, SR73).

The most used cited definitions, as indicated in Appendix 3, were from the World Bank[46] (2017), Silver *et al.* (2015) and Economist Intelligence Unit (2015). Different United Nations Conference of Trade and Development (UNCTAD) publications are also cited,

- UNCTAD (2014a). Blue Economy Concept Paper, 'Sustainable Development Knowledge Platform, United Nations (UN), January 2014.
- UNCTAD (2014b). Small Island Developing States: Challenges in Transport and Trade Logistics, Background note to the third session of Multi-Year Expert Meeting on Transport, Trade Logistics and Trade Facilitation, Geneva, 24–26 November.
- UNCTAD (2014c). The oceans economy: Opportunities and challenges for small island developing States, UNCTAD/DITC/ TED/2014/5. New York: UNCTAD.

The varying use of 'Blue Economy' is illustrated in the definitions referring to it as a 'concept' (see SR1, SR3, SR64, SR71, SR73), an 'agenda' (see SR15), types of economic 'activities' (see SR46, SR75, SR77, SR82), a 'program' (see SR16), an 'economic model' (see SR28), and a 'commonly used phrase' (see SR 46).

[46] More correctly, however, in the literature this is noted as the World Bank report.

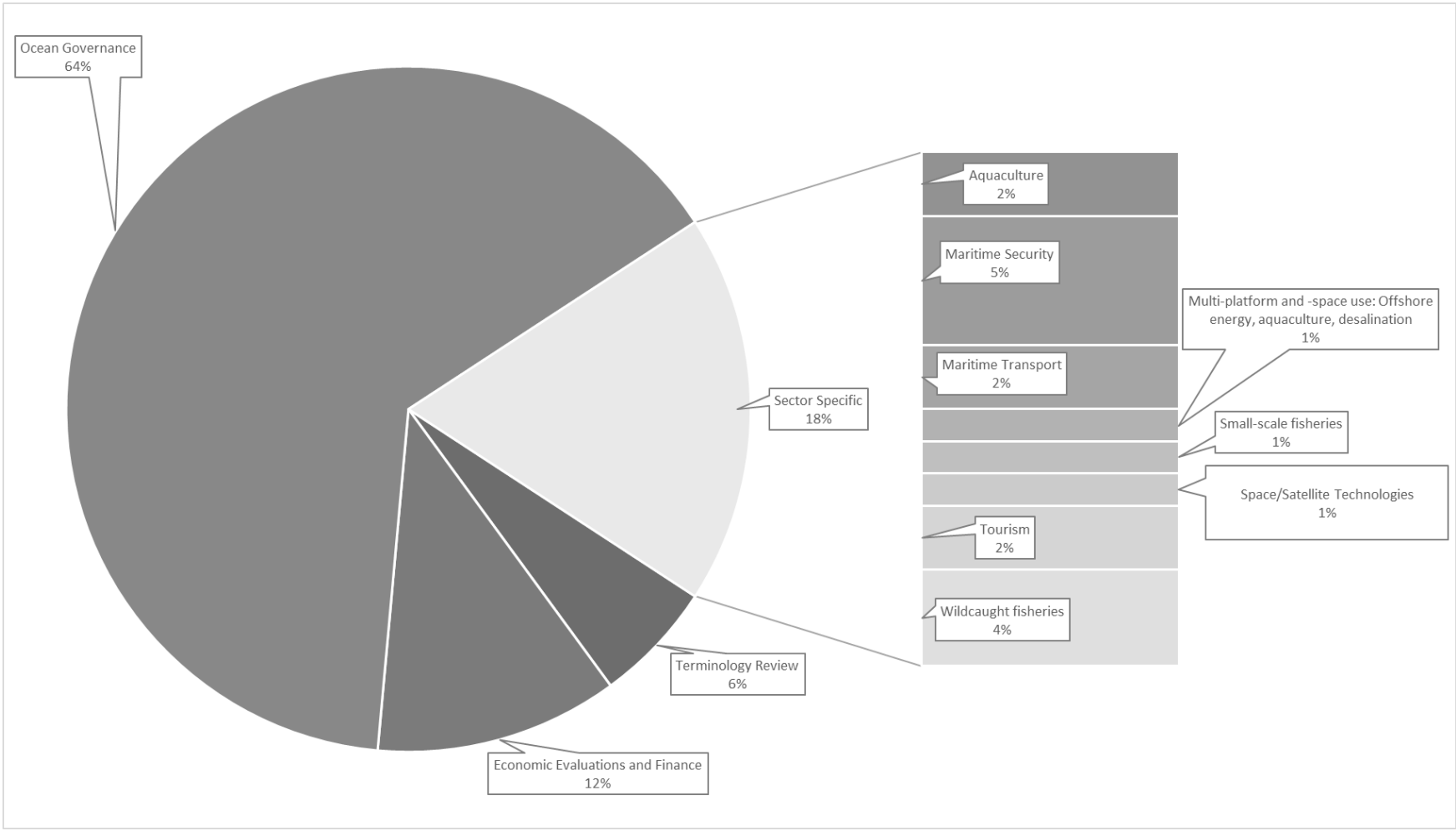

Figure 2.6: Themes identified in the analysis of the subset of Journal Articles (n=87). Four main themes were identified 1. Ocean governance, 2. Sector-specific articles, 3. Terminology reviews, and 4. Economic evaluations and finance. The Sector-Specific theme is further differentiated into sectors focused on in the bar graph on the right.

This disparity in definitions has the potential to lead to confusion among different ocean stakeholders (e.g., the public, academia, government officials, and business/industry members) unless the authors provide further context to the term used.

Most of the definitions indicated recognition of the need to balance economic activity with environmental sustainability (n=15), although eight of the definitions indicate the 'Blue Economy' as having an economic focus only. Only nine of the definitions included a focus on social improvement – e.g., improved livelihoods and human welfare, job creation, and social inclusion – and only one definition centred on the 'Blue Economy' as being focused on environmental sustainability and social improvement (SR70), defining that the blue economy 'aims to support and improve human welfare and social stability, while at the same time to reduce environmental risks and ecological losses'.

The definitions, as provided in Appendix 3, strongly confirm the spatial extent of the 'Blue Economy' focused on marine (or ocean, seas) and coastal spaces.

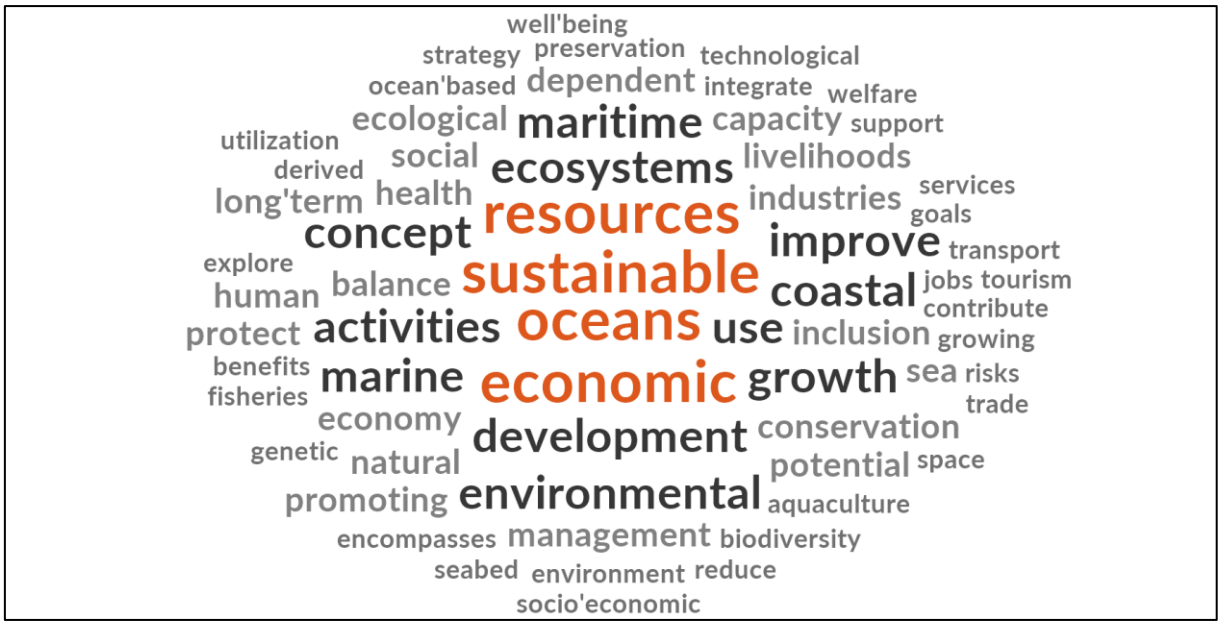

Figure 2.7: Word Frequency Word Cloud generated from the definition text provided for the term 'Blue Economy'. The NVIVO programme cannot distinguish hyphenated words, hence long'term = long-term, ocean'based = ocean-based, socio'economic = socio-economic, and well'being = well-being are used in the figure. Only words counted two or more times were included for the word cloud, and similar words were grouped with the variations provided in Table 2.7. The colours indicate the most frequently used words (in orange), second most commonly used words (in black), and least used words (in grey).

The Word Cloud to identify the most frequently used words used in the definitions is provided in Figure 2.7., with the results of the word counts provided in Table 2.7. The most frequently

used words were – oceans (used 31 times), sustainable (used 23 times), economic (used 22 times) and resources (used 21 times) (Figure 2.7 and Table 2.7).

The frequent feature of the word ‘economic’ may be explained by the fact that the most used references for the definitions provided in the peer-reviewed papers are from reports by economic organisations such as the World Bank, the Economist Intelligence Unit, and the United Nations Conference on Trade and Development (UNCTAD) as indicated in Appendix 3, which is to be expected as this is an economic paradigm. However, this may limit the importance placed on environmental and social welfare and inclusion priorities, although the use of words such as ‘well-being’, inclusion’, ‘preservation’, ‘livelihoods’, while used less frequently does indicate consideration of social needs.

The results indicate that within the peer-reviewed literature the ‘blue economy’ is mostly understood to be a - concept for the sustainable economic use of ocean resources. The definitions are not explicitly in agreement with defining the spatial boundaries, industry sectors, environmental management, or social upliftment goals that may be achieved by ocean development.

Table 2.7: Results of the Word Frequency Word Cloud generated from the definition text provided for the term ‘Blue Economy’. The NVIVO programme cannot distinguish hyphenated words, hence long’term = long-term, ocean’based = ocean-based, socio’economic = socio-economic, and well’being = well-being. Only words counted two or more times were included for the word cloud, and similar words were grouped with the variations provided.

Word	Word Count	Similar Words		Word	Word Count	Similar Words
oceans	31	ocean, oceanic, oceans		sea	3	sea, seas
sustainable	23	sustainability, sustainable, sustainably		aquaculture	2	
economic	22			benefits	2	
resources	21	resource, resources		biodiversity	2	
development	13	develop, developing, development		contribute	2	contribute, contribution
use	13	use, used, uses, using		derived	2	
activities	11	activities, activity		encompasses	2	

Table 2.7 (cont.): Results of the Word Frequency Word Cloud generated from the definition text provided for the term 'Blue Economy'. The NVIVO programme cannot distinguish hyphenated words, hence long'term = long-term, ocean'based = ocean-based, socio'economic = socio-economic, and well'being = well-being. Only words counted two or more times were included for the word cloud, and similar words were grouped with the variations provided.

Word	Word Count	Similar Words		Word	Word Count	Similar Words
ecosystems	10	ecosystem, ecosystems		environment	2	
growth	8			explore	2	explore, exploring
marine	7			fisheries	2	
coastal	6			genetic	2	
concept	6			goals	2	
environmental	6			growing	2	
improve	6	improve, improved, improvement, improving		integrate	2	
maritime	6			jobs	2	
balance	5	balance, balanced		ocean'based	2	
economy	5			preservation	2	
conservation	4	conservation, conserving		reduce	2	reduce, reducing
health	4			risks	2	
industries	4	industrialization, industries		seabed	2	
livelihoods	4	livelihoods, livelihoods		services	2	
management	4	management, managing		socio'economic	2	
natural	4	natural, nature		space	2	space, spaces
potential	4			strategy	2	
social	4	social, socially		support	2	
capacity	3			technological	2	technological, technologies
dependent	3	dependent, depending		tourism	2	
ecological	3			trade	2	
human	3			transport	2	

Table 2.7 (cont.): Results of the Word Frequency Word Cloud generated from the definition text provided for the term 'Blue Economy'. The NVIVO programme cannot distinguish hyphenated words, hence long'term = long-term, ocean'based = ocean-based, socio'economic = socio-economic, and well'being = well-being. Only words counted two or more times were included for the word cloud, and similar words were grouped with the variations provided.

Word	Word Count	Similar Words		Word	Word Count	Similar Words
inclusion	3	inclusion, inclusive		utilization	2	utilization, utilizing
long'term	3			welfare	2	
promoting	3	promote, promoting		well'being	2	
protect	3	protect, protecting, protection				

2.3.2.3 Assessing the provided key words from the literature

Most journals will request that authors provide keywords to assist with indexing to identify the most important topics, which along with the abstract, can assist readers with identifying if an article may be of interest.

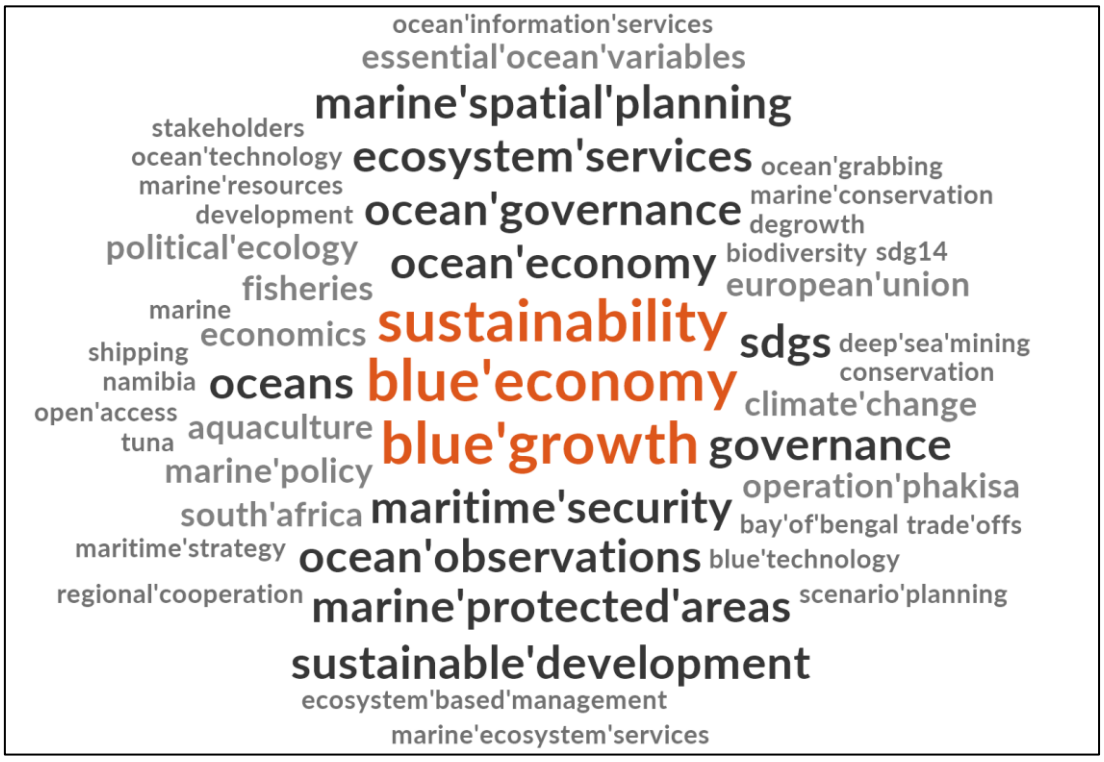

Figure 2.8: Word Cloud of Keywords with a minimum frequency of two (2) keywords across documents displayed. The NVIVO programme cannot distinguish hyphenated words, hence blue economy=blue'economy and marine protected areas=marine'protected'areas are used in the figure. Only words counted two or more times were included for the word cloud, and similar words were grouped with the variations provided in Table 2.8.

Figure 2.8 provides the Word Frequency Word Cloud for the keywords most used across all the articles, with the word count results provided in Table 2.8. Only keywords provided in two or more articles were included, i.e., keywords only provided in one article were excluded.

Table 2.8: Results of the Word Frequency Word Cloud generated from the article Keywords, with a minimum frequency of two (2) keywords across documents displayed. The NVIVO programme cannot distinguish hyphenated words, hence blue economy=blue'economy and marine protected areas=marine'protected'areas.

Word	Word Count		Word	Word Count
blue'economy	33		biodiversity	2
blue'growth	14		blue'technology	2
sustainability	7		conservation	2
ocean'economy	6		deep'sea'mining	2
maritime'security	5		degrowth	2
ocean'governance	5		development	2
ocean'observations	5		ecosystem'based'management	2
ecosystem'services	4		marine	2
governance	4		marine'conservation	2
marine'protected'areas	4		marine'ecosystem'services	2
marine'spatial'planning	4		marine'resources	2
oceans	4		maritime'strategy	2
sdgs	4		namibia	2
sustainable'development	4		ocean'grabbing	2
aquaculture	3		ocean'information'services	2
climate'change	3		ocean'technology	2
economics	3		open'access	2
essential'ocean'variables	3		regional'cooperation	2
european'union	3		scenario'planning	2
fisheries	3		sdg14	2
marine'policy	3		shipping	2
operation'phakisa	3		stakeholders	2
political'ecology	3		trade'offs	2
south'africa	3		tuna	2
bay'of'bengal	2			

The results indicate that the keywords most used across the articles, from Figure 2.8 and Table 2.8, were the blue economy (listed in 33 articles), blue growth (listed in 14 articles) and sustainability (listed in 7 articles). Interesting to note was the inclusion of maritime security,

which did not feature as part of the text in the blue economy definitions (Appendix 3), and the focus of terms related to marine or environmental sciences. The keywords also highlighted four regional areas and countries on which the research was focused, i.e., the European Union, South Africa, the Bay of Bengal, and Namibia.

A keyword cluster analysis of the papers was undertaken from the author provided keywords. Fifteen (15) articles were excluded as they did not have any keywords in the article. The results did not indicate strong clustering of terms.

2.4 Discussion

The results of the four publication database searches and analyses highlight the importance of selecting databases with coverage across many research fields and using more than one database to limit any selection biases, e.g., language, location or publication bias, that any individual database may have.

Scopus provided the most search results, while African Journals provided the least (Table 2.3). This was expected as the African Journals indexing criteria was limited to African publications, however, these were also mostly articles from South African authors, either indicating a lack of publications on the blue economy or oceans economy by other African authors and publications or that this dataset may not have included publications from other African States, where language or availability of national journals into global indexing databases may be a barrier.

The results from Figure 2.2. indicated that the term ‘blue economy’, in the context of ocean development, was first mentioned in the peer-reviewed literature in 2011 in one journal article titled – “The Future of Blue Economy: Lessons For European Union’’ (SR36). This article focused on the potential for Poland and the EU to develop new ocean industries, as well as leverage their existing industries and knowledge to further develop their ocean spaces (Kaczynski, 2011).

The results indicated that the ‘blue economy’ discussion had already started in the lead-up to the United Nations Conference on Sustainable Development 2012, at which the island States introduced the term as a synonym to the green economy. While there were no peer-reviewed articles published in 2012 from the dataset which mentioned the ‘blue economy’, the almost doubling in the number of articles featuring the term per year between 2016 to 2019 may be related to the prominence that ocean development had been gaining in regional and international development discussions such as the inclusion of SDG14 - Life below water, the AU declaring the African Decade of the Ocean 2015-2025, IORA recognising the blue economy as a development focus area, the lead up to the UN Ocean Decade 2021-2030, and

the establishment of the High-Level Panel for Sustainable Ocean Economy established in 2018, among other initiatives.

The journal titles (Table 2.4 and Figure 2.3) with the most articles were (Marine Policy (n=24 articles), Frontiers in Marine Science (n=11 articles), and Journal of the Indian Ocean Region (n=11 articles)). These are publications with a focus on ocean governance research and policy discussion, which indicates that the blue economy is still a developing concept as a discussion topic within policy research. However, the breadth of the use of the term in articles across 61 journal titles of various focus areas, indicates that interest in ocean development across various social, economic and environmental research fields. Increasing use of the term in sectoral-specific journals, e.g., 'Ocean Engineering', 'Maritime Business Review', 'Fish and Fisheries', and social sciences journals, e.g., 'Journal of Rural Studies', 'Journal of Cultural Studies', indicates that the focus of the ocean development is being considered in more than only policy journals.

While a detailed analysis of the journal metrics (Table 2.4), indicates how often articles in the specific journal are cited in other publications, was beyond the scope of this review, the fact that the term blue economy was mentioned in highly cited journals such as 'Science', 'Renewable and Sustainable Energy Reviews', and 'Nature Communications', with the already large number of journals the term has been used in, may indicate the importance of including the term within research outputs.

While a large percentage of articles had a global focus (Figure 2.4), as would be expected within research focused on the ocean, it is interesting to note that articles which focused on Africa (articles focusing on the continent including islands, and individual countries) comprised a large percentage of the focus areas of articles, especially considering the author affiliations (Table 2.5) for which the UK, USA and Australia were ranked highest. This could indicate the importance with which global researchers view development in Africa. However, although South African researchers are well represented, contributing to 25 publications, other African coastal States are not. However, African research and policy publications, in general, are limited, which could be a factor in this result.

As the term, as it may generally be understood, was introduced at Rio+20, it is also notable that not more focus is placed on island States. This could be attributed to generally low funding for research in those States, like the status of African publications, and the indexing biases from the research databases as discussed in Section 2.2.1.1.

While many publications focused on Africa as a geographic area, not many authors were affiliated with African institutions. More should be done to include African researchers as co-authors as they would have additional perspectives on their local and continental policy needs, which could assist with the dissemination and uptake of recommendations in national governance spheres.

The use of the term ‘blue economy’ in the different sections of the articles (Figure 2.5) highlights the aspect that in some cases the term may have been used as a ‘buzzword’, providing a degree of knowledgeability without real meaning, especially in the instances where it was only used as part of the abstract or keywords (as for articles SR33, SR56, SR66), or as in the case of SR44 where the blue economy was introduced in the conclusion, whereas ocean economy had been used throughout the rest of the article. This is also apparent in the use of the term in conjunction with other terms (Figure 2.6) such as ‘ocean economy’, ‘blue growth’, ‘marine economy’, sometimes used interchangeably (as is the case within e.g., SR17, SR19, SR41, SR45), and the introduction of new terms such as ‘blue justice’ and ‘blue wealth’ to denote the link to the ocean. While the blue economy may have become part of the global lexicon, as a synonym for the green economy for island States, the way it has developed is having an impact on the global ocean stakeholder discussions around development needs and outcomes.

This is apparent in the themes around which the articles are based, especially as the primary focus was on ocean governance discussions. That articles assessing the meaning of the blue economy have already been published (SR38, SR55, SR74, SR84), indicates the confusion which can be caused by introducing new terminology without providing a clear definition or consensus on the meaning, especially in high-level engagements where the policy decisions are discussed among governments and international institutions.

The various uses of the term were also highlighted in the analysis of their definitions in the articles, indicating no consensus on the meaning of the term, and its reference to specific activities or a concept or programme for the development of the oceans. The economic focus highlighted in the definitions was to be expected as the term was introduced at the United Nations Conference on Sustainable Development 2012 discussions, however, by the same token, the sustainability and social well-being aspects could be expected to feature as prominently in the definitions. Considering the terms most featured in the definitions, Figure 2.7 and Table 2.7, the blue economy could be understood as “a concept for the sustainable economic use of ocean resources”. The sustainability aspect was also highlighted in the keyword analyse, Figure 2.8 and Table 2.8.

Consensus on the term ‘blue economy’, based on the three pillars of 1) economic development, 2) environmental sustainability, and 3) social equality, equity and inclusivity must be considered by national policymakers, especially within developing States. This should be especially so for African States, still in the development phase of their ocean development plans, as the implementation of the Africa Blue Economy Strategy is actioned, to ensure that the benefits of developing the ocean space accrue to society and that there is sufficient human capacity, monitoring systems and regulatory systems developed to safeguard the ocean environment to sustain the development goals. An Ocean Accounting Framework can provide

a basis for capturing development gains and impacts across the three pillars of the blue economy.

2.5 Conclusion

The term ‘blue economy’, though increasingly used in academic literature, lacks a clear, universally accepted definition, often being used interchangeably with other terms such as ‘ocean economy’ and ‘blue growth’. As the concept evolves, particularly in global ocean governance and policy discussions, it is crucial for developing nations, especially in Africa, to ensure their voices and perspectives are represented. It is proposed that the ‘blue economy’ term be accepted as a comprehensive approach based on an equal priority given to economic development, environmental sustainability, and social equality, equity and inclusivity, which is essential for effective implementation of ocean development strategies. National policymakers must prioritise inclusivity and sustainability to fully realise the potential benefits of the ocean development, while safeguarding the marine environment for future generations.

CHAPTER 3: COUNTRY- LEVEL OCEAN DEVELOPMENT PROFILES

3.1. Introduction

The oceans are under increasing pressure with developed countries looking to explore new ocean sectors and developing countries looking to further develop established and new sectors within their waters.

Understanding national ocean development priorities assists in the provision of information for better coordination or decision-making between States as regional development strategies are formulated and implemented. This is especially so in terms of the focus on implementing the development of ocean and coastal spaces to support economic development and the inclusion of social inclusivity and environmental sustainability in a meaningful manner. Information provided by governments through their national websites or internationally recognised institutions provides information to identify their priorities and progress in terms of national and international commitments.

Examples of existing well-established ocean economy reporting programmes include those developed by the USA, EU, and China. The USA has released a Blue Economy Strategic Action Plan 2021-2025, published by the National Oceanic and Atmospheric Administration (NOAA), focused on expanding five ocean sectors, 1) Marine Transportation, 2) Ocean Exploration, 3) Seafood Competitiveness, 4) Tourism and Recreation, and 5) Coastal Resilience, and two cross-cutting support areas, 6) Internal Focus Areas, and 7) External Opportunities (NOAA, 2021). The support areas are focused on areas such as communication, human capacity building, development of policies and legislation, and expanding science and technology applications (NOAA, 2021). NOAA also partners with the Bureau of Economic Analysis to undertake economic valuations for the ocean economy and maritime sectoral satellite accounts (NOAA, 2021), the most recent of which was released in 2022 showing that the marine economy was worth 1.7% of the USA's national GDP for 2020. A summary of America's ocean economy development, since the 1970s, is provided in Colgan (2003a)[47].

The European Commission (EC) recognised the need for an Integrated Maritime Policy for its Member States in 2007, with the signing of 'the Limassol Declaration' in 2012, which recognised 'the value of marine ecosystem goods and services and the protection of the marine environment as an important element for sustainable development and prosperity' (European Commission, 2012) following a 'Blue Growth' strategy defined as 'smart, sustainable and inclusive economic and employment growth from the oceans, seas and coasts' with the Blue Economy the 'economic activities' linked to the strategy (Ecorys et al., 2012). The EC has published an annual 'Blue Economy Report' since 2018, with the latest

[47] Additional information and publications, on the National Ocean Economy Programme, is available at https://cbe.miis.edu/noep/.

report published in 2022, which includes updates on established sectors[48], emerging sectors[49], and on the sustainability of the use of marine ecosystem services[50] (European Commission, 2022).

The blue economy discourse in China has followed much the same path as that of the USA and the EU in recognising the need for environmental sustainability while developing the ocean economic sectors (Zhang and Ravesteijn, 2019; Fang et al., 2021). To and Lee (2018) indicated that the State Oceanic Administration of China has published an annual maritime economy report since 2002, focused on the sectors of travel and tourism; shipping; marine fisheries; engineering; hydrocarbon; shipbuilding; chemical industry; pharmaceuticals; electricity; mining; salt; and seawater utilisation (Fabinyi et al., 2021).

These examples highlight the similarities in the sectoral development plans of the USA, China and EU, concerning the oceans economy, with the blue economy developing into a notable policy focus area[51], and included in the national (and regional in the case of the EU) policy development experiences on the ocean and human uses that are in existence, even though there is no agreed-upon definition for the blue economy. The question of how African countries particularly the WIO States, may relate to this with the publication of the Africa Blue Economy Strategy (AU-IBAR, 2019), is of interest in understanding how this is shaping up and how policies on the continent relate to the international discussions and can contribute to shaping the ongoing ocean development programmes.

This chapter will provide a qualitative exploration of the ocean development agendas of African countries of the WIO Region through analysing information provided on the government websites, national reporting provided on the SDGs website and an online questionnaire extended to policy and research practitioners.

3.2 Data and Methodology

3.2.1 Collation and analyses of government information on ocean sector development

A web search, using Google search (www.google.com), was undertaken between August and October 2020 centred on each of the WIO state's national websites, (i.e., searches for 'government of [country]') to create the dataset for each country's ocean development profiles

[48] Listed as marine living resources; marine non-living resources; marine renewable energy (offshore wind); port activities; shipbuilding and repair; maritime transport; and coastal tourism.
[49] Listed as ocean energy; blue biotechnology; desalination; maritime defence, security and surveillance; research and innovation; and infrastructure.
[50] Listed as human interactions with blue natural capital; marine ecosystem accounting and nature-based solutions; marine pollution; waste-water treatment; decarbonisation trends in the EU Blue Economy; impacts of coastal inundations in EU economic growth.
[51] Moreso, for the EU and USA, but the government information from China is limited due to language access, hence similar information may exist for China.

and to obtain information on the marine-related activities and/or development plans, as well as information on their colonial histories.

Each sovereign state has their government structure, and therefore the ministries and departments, listed under the main government website, differed in their responsibility and mandates for ocean-related sectors. The selection of ministries to search was based on the ministries or departments that had the potential to include ocean-related sectors, i.e., fisheries, transport, tourism, energy, environment, trade, defence, and blue economy.

Website home pages, and/or website subpages, were then saved in PDF format for further reading and analyses if they contained information relevant to oceans management. Where information on government acts, regulations and instruments, reports and independent reports provided on government websites were also downloaded. Where information on the websites was limited, further web searches were conducted to search for additional relevant information. The search terms used for this were,

1) ‘country name’ and ‘ocean economy’, and

2) ’country name’ and ‘blue economy’.

The national voluntary reports to the UN Agenda 2030 Agenda as displayed on the SDG website[52] were downloaded where available, and information related to ocean and coastal developments in support of the SDGs was extracted.

The website information and SDG reports were imported into the Mendeley Desktop application (www.mendeley.com) for reading and analysis. Table 3.1 provides the standard information for which data were collected.

Table 3.1: Information compiled for each country from government websites and the UN SDG website.

Data extracted	Description of data
Previously colonised state	Indication of whether a state was previously colonised
Year of Independence	Year at which independence was gained
Continent/Island	Indication of whether the state is a part of the African mainland or an Island state
Ocean Development Program	Indication of whether the state has a formal ocean development programme
Responsible Ministry/Department	The responsible ministry or department for the ocean development programme if applicable

[52] https://sustainabledevelopment.un.org/memberStates

Ocean related ministries	The ministries that are responsible for any particular ocean-related sectors

Table 3.1 (cont.): Information compiled for each country from government websites and the UN SDG website.

Data extracted	Description of data
Sectors highlighted on the website (information on the webpage and/or government reports and resources)	The specific sectors that are highlighted within an ocean development programme
Legislation highlighted on the website	An indication of any relevant policies and legislation and/or regulations are provided on the websites
Voluntary SDG reporting (Year of latest report/Information)	Year of National Voluntary report and information on which SDGs highlight ocean contributions. Voluntary reports were accessed from https://sustainabledevelopment.un.org/memberStates

3.2.2 Online Questionnaire Survey

An online survey to assess the ocean development terminology and activities within the East African coastal States was developed and circulated on four different African ocean stakeholder platforms, between October 2020 and March 2021, comprising government officials, policymakers, financial institutions, and researchers. The four stakeholder platforms were,

1) The Africa Natural Capital Accounts (NCA) Community of Practice (CoP)

2) West Indian Ocean Governance & Exchange Network (WIOGEN)

3) Western Indian Ocean Marine Science Association Early Career Scientists Network (WIOMSA ECSN)

4) IOI-SA Ocean Governance 2021 course participants

This included posting on the WhatsApp instant messaging application, email circulation, and on the platform webpage - depending on which applications were available. The survey introduction indicated that the survey would be anonymous and that no personal or contact information was collected. Appendix 4 provides a copy of the invitation circulated to the networks and Appendix 5 provides a copy of the online survey.

Responses remained extremely low (n=5), and none of the questionnaires returned were complete. No qualitative analysis could, therefore, be undertaken of the responses, but some of the information is reported.

3.3. Results of the Country-level Information and Online Questionnaire Survey

From the search for historical information on each state, it was found that each respondent state had been previously colonised, only gaining independence between the early 1960s to the mid-1970s (Table 3.2). South Africa, while being a Republic as of 1961, only held its first fully inclusive democratic elections in 1994. Comoros, Madagascar, Mauritius and Seychelles were identified as island States, while Kenya, Mozambique, Somalia, South Africa and Tanzania are mainland African continental States.

At the time of the data collection, information on the government websites indicated that only Kenya, Mauritius, Seychelles, Somalia and South Africa had undertaken national ocean development programmes (Table 3.3).

Table 3.2. Status of independence and geographical domain of each state.

Country	Previously colonised state	Year of Independence	Continent/Island
Union of Comoros	Y	1975	Island
Republic of Kenya	Y	1963	Continent
Republic of Madagascar	Y	1960	Island
Republic of Mauritius	Y	1968	Island
Republic of Mozambique	Y	1975	Continent
Republic of Seychelles	Y	1976	Island
Federal Republic of Somalia	Y	1960	Continent
Republic of South Africa	Y	1994*	Continent
United Republic of Tanzania	Y	1961	Continent/Island**

* While South Africa became a Republic in 1961, 1994 was the year of South Africa's first democratic elections.

** Tanzania comprises the mainland and a few small islands along with the larger island of Zanzibar.

Table 3.3. States ocean development programmes and the implementing or oversight authority as indicated on the Government Websites. The information was accessed between August and October 2020.

Country	National Ocean Development Programme	Responsible Ministry or Department
Kenya	National Blue Economy Committee*	-
Mauritius	-	Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
Seychelles	Seychelles Blue Economy Strategic Policy Framework and Roadmap	Office of the Vice-President - Department of Blue Economy
Somalia	Federal Government of Somalia Blue Ocean Economy	Ministry of Fisheries and Marine Resources
South Africa	Operation Phakisa Oceans Economy	Department of Forestry, Fisheries and the Environment

*Information on the committee was not readily available on the Kenyan government website, only appearing in news highlights, and did not indicate the responsible ministry or department, although it could be assumed to be housed within the State Department for Fisheries, Aquaculture, and the Blue Economy.

While each of the governments had its ministerial structures, commonalities could be seen in the inclusion of fisheries, mineral resources, energy, maritime transport and tourism, as indicated in Table 3.4. Except for Comoros and Madagascar, relevant legislation, regulations and policies were publicly available on the government websites. South Africa had an online dashboard of activities under its Operation Phakisa webpage, which is regularly updated, but recent information and reports on activities were not available, which suggests that this is not regularly updated.

Although the Seychelles Website indicated that a Department of Blue Economy had been established, additional information on the sectors had to be sourced online.

Table 3.4: Ministries and industry sectors related to marine and coastal sectors as provided on the government websites. The sector lists may therefore be considered non-exhaustive as this was based on the online information only. Column three provides a list of the sectors identified and not listed according to the related ministry or department. Websites were accessed between August – October 2020.

Country	Primary website/s from which information was sourced	Ministries with marine-related mandates	Sectors highlighted on the website (information on the webpage including government reports and resources)	Legislation highlighted on the website
Comoros	https://beit-salam.km/composition-du-gouvernement	Maritime and Air Transport	-	-
Kenya	www.kilimo.go.ke/management/state-department-of-livestock-2 https://www.transport.go.ke/index.php/state-departments/state-department-for-maritime-and- shipping-affairs-2	Agriculture, Livestock and Fisheries: State Department for Fisheries, Aquaculture and the Blue Economy Transport, Infrastructure, Housing, Urban Development and Public Works: State Department for Maritime and Shipping Affairs	Fisheries Aquaculture Shipping	Y
Madagascar	No information was available on the government website: http://www.presidence.gov.mg/gov/index/html	-	-	-

Table 3.4 (cont.): Ministries and industry sectors related to marine and coastal sectors as provided on the government websites. The sector lists may therefore be considered non-exhaustive as this was based on the online information only. Column three provides a list of the sectors identified and not listed according to the related ministry or department. Websites were accessed between August – October 2020.

Country	Primary website/s from which information was sourced	Ministries with marine-related mandates	Sectors highlighted on the website (information on the webpage including government reports and resources)	Legislation highlighted on the website
Mauritius	https://blueconomy.govmu.org/SitePages/Index.aspx https://environment.govmu.org/Pages/index.aspx https://tourism.govmu.org/SitePages/Index.aspx https://localgovernment.govmu.org/SitePages/Index.aspx	Blue Economy, Marine Resources, Fisheries and Shipping Environment, Solid Waste Management and Climate Change Tourism	Mineral resource development Ship building Ship registration Communication cable laying Pharmaceutical enterprises Sustainable energy from waves and current Seaside leisure tourism **Fisheries and Aquaculture** Innovative finance tools (e.g. blue bonds)	Y

Table 3.4 (cont.): Ministries and industry sectors related to marine and coastal sectors as provided on the government websites. The sector lists may therefore be considered non-exhaustive as this was based on the online information only. Column three provides a list of the sectors identified and not listed according to the related ministry or department. Websites were accessed between August – October 2020.

Country	Primary website/s from which information was sourced	Ministries with marine related-mandates	Sectors highlighted on the website (information on the webpage including government reports and resources)	Legislation highlighted on the website
Mozambique	http://www.mozpesca.gov.mz/ http://www.mireme.gov.mz/ http://www.mtc.gov.mz/	Transport and Communication Sea, Inland Waters and Fisheries Mineral Resources and Energy	Shipping Maritime Safety and Security Fisheries	Y
Tanzania	https://www.mifugouvuvi.go.tz www.tpdc.co.tz https://www.tanzania.go.tz	Livestock and Fisheries Energy and Minerals Natural Resources and Tourism Transport	Fisheries Aquaculture Conservation Offshore oil and gas Marine transport Tourism	Y

Table 3.4 (cont.): Ministries and industry sectors related to marine and coastal sectors as provided on the government websites. The sector lists may therefore be considered non-exhaustive as this was based on the online information only. Column three provides a list of the sectors identified and not listed according to the related ministry or department. Websites were accessed between August – October 2020.

Country	Primary website/s from which information was sourced	Ministries with marine-related mandates	Sectors highlighted on the website (information on the webpage including government reports and resources)	Legislation highlighted on the website
Seychelles	http://www.mofa.gov.sc/ http://www.meecc.gov.sc/ https://www.egov.sc/GovernmentAgencies/lstGovt.aspx	Agriculture and Fisheries Environment, Energy and Climate Change Tourism, Civil Aviation, Ports and Marine Office of the Vice President – Department of Blue Economy (no information was available on the webpage at the time)	Fisheries Tourism Ports Mariculture Energy Biotechnology Digital connectivity Trade Marine and coastal protection Climate resilience and adaption Ecosystem service accounting	Y
Somalia	https://www.somalia.gov.so/ministries/	Humanitarian Affairs and Disaster Management Fisheries and Marine Resources Petroleum and Mineral Resources Ports and Marine Transport Information, Culture and Tourism	Fisheries Marine conservation Offshore oil and gas Coastal tourism Ports Marine transport	Y

Table 3.4 (cont.): Ministries and industry sectors related to marine and coastal sectors as provided on the government websites. The sector lists may therefore be considered non-exhaustive as this was based on the online information only. Column three provides a list of the sectors identified and not listed according to the related ministry or department. Websites were accessed between August – October 2020.

Country	Primary website/s from which information was sourced	Ministries with marine-related mandates	Sectors highlighted on the website (information on the webpage including government reports and resources)	Legislation highlighted on the website
South Africa	https://www.environment.gov.za/branches/oceans_coast www.dfac.mil.za www.cogta.gov.za www.dmr.gov.za https://www.dst.gov.za https://www.transport.gov.za https://www.tourism.gov.za https://www.thedtic.gov.za https://www.tourism.gov.za www.samsa.org.za https://www.operationphakisa.gov.za/operations/oel/pages/default.aspx	Forestry, Fisheries and the Environment Defence Higher Education, Science and Innovation Mineral Resources and Energy Tourism Transport Trade, Industry and Competition	Marine transport and manufacturing Offshore oil and gas exploration Aquaculture Marine ProteGovernance Ocean governance Small harbours Coastal and Marine Tourism Maritime safety and security	Y

The review of the SDG national voluntary reports indicated that few States included ocean-related sector development as part of their strategies for attaining their SDG targets (Table 3.5). Only Mauritius and Seychelles provided comprehensive information on how they were using their ocean sectors and knowledge development towards reaching their goals, reporting on their programmes under SDG2 - Zero Hunger and SDG8 - Decent work and economic growth. Desalination, under SDG6, was identified as a development technology for securing access to water in Kenya, Mauritius, Seychelles, and South Africa.

Madagascar, in 2016, only provided an update on its status of readiness to implement its SDG reporting, while Somalia and Tanzania had not submitted any voluntary reports at the time the information was collected.

It was surprising, considering each state's coastal resources, that the benefits of improving access and better management responses to improve coastal livelihoods were not a strong feature of all the voluntary reports, not only through supporting small-scale fisheries but also in other coastal activities such as tourism and ornamental uses, e.g., jewellery made out of seashells.

Partial responses to the questionnaire, i.e., only some questions were answered, were only received from Kenya (2), South Africa (1), Mauritius (1), and Mozambique (1). Therefore, no analysis or conclusions could be drawn from the questionnaire responses (see Table 3.6). However, from the responses received, there were different terms for ocean development provided by the respondents, including Oceans Economy, Ocean Economy, and Blue Economy. Of note was that the two respondents from Kenya provided Oceans Economy and Blue Economy as responses for the preferred national term.

For the definition provided for Blue Economy, the remaining respondent from Kenya and Mozambique provided similar responses - that economic development was for the benefit of people. The respondent from Mauritius provided the geographical extent for the definition of the Blue Economy. Only the respondent from South Africa noted the Blue Economy as only an economic development need.

The respondents all indicated that national ocean development programmes were being implemented in their respective countries.

The respondents from Kenya, South Africa and Mauritius indicated that their respective countries had several mature ocean sectors, with fewer new sectors having been established, Table 3.7. The respondent from Mozambique indicated fewer mature sectors, while new sectors were being developed. Energy and food security sectors were indicated as emerging sectors for all the countries.

Table 3.5: Marine and coastal actions or activities related to the SDGs undertaken by the States as reported in their Voluntary National Report for the SDGs. The year in brackets indicates the publication year of the report. An (x) indicates if an ocean-related activity was provided in support of the SDG.

	Comoros (2020)	Kenya (2020)	Madagascar (2016)	Mauritius (2019)	Mozambique (2020)	Seychelles (2020)	Somalia	South Africa (2019)	Tanzania
SDG1			Report status update only				No report undertaken		No report undertaken
SDG2						x			
SDG3									
SDG4						x			
SDG5									
SDG6		x		x		x		x	
SDG7				x		x			
SDG8				x		x			
SDG9	x			x	x	x			
SDG10									
SDG11						x			
SDG12				x		x			
SDG13				x		x		x	
SDG14	x	x		x	x	x		x	
SDG15				x					
SDG16				x					
SDG17				x					

Table 3.6: Results of the online questionnaire indicating the number of respondents, country of respondents, definitions, and economic development programmes.

Country	No. of responses	Occupation	What is the preferred term for the economic development of your country's Exclusive Economic Zone?	Understanding/definition of the term	National ocean development programme
Kenya	2	1. Restoration, Education & Ecosystems Manager 2. Research Scientist	1. Oceans Economy 2. Blue Economy	1. Blue economy 2. It is the new frontier in economic development aimed at improving peoples' lives in the coastal countries.	1. Kenya Blue Economy Task Force 2. -
South Africa	1	Environmental Consultant	Ocean Economy	Economy includes multiple uses of the ocean	[Operation] Phakisa
Mauritius	1	Environmental Consultant	Blue Economy	Marine and coastal zone and inland water bodies	Blue Economy
Mozambique	1	Professor	Blue Economy	Sustainable exploitation of ocean resources for socioeconomic development, conserving the ecosystems and benefiting people	Politica e Estrategia do Mar

Table 3.7: Results from the questionnaire indicating the mature, new and emerging ocean-related sectors.

Country	Mature Sectors (older than 10 years)	New Sectors (last 5-10 years)	Emerging Sectors (less than 5 years)
Kenya	Aquaculture Fisheries Ports and Warehousing Maritime Transport Offshore Oil and Gas Coastal Tourism Desalination Offshore Wind Energy Marine Environmental Management and Protection Maritime Security Shipbuilding and Repair	Offshore Oil and Gas Maritime Security	Offshore Oil and Gas Offshore Wind Energy Ocean Energy Aquaculture
South Africa	Fisheries Fish Processing Shipbuilding and Repair Ports and Warehousing Maritime Transport Offshore Oil and Gas Coastal Tourism Marine Environmental Management and Protection Maritime Security	Aquaculture Desalination Offshore Wind Energy Ocean Energy	Aquaculture Blue Bioeconomy/Biotechnology Desalination Offshore Wind Energy Ocean Energy

Table 3.7 (cont.): Results from the questionnaire indicating the mature, new and emerging ocean related sectors.

Country	Mature Sectors (older than 10 years)	New Sectors (last 5-10 years)	Emerging Sectors (less than 5 years)
Mauritius	Aquaculture Fisheries Fish Processing Ports and Warehousing Maritime Transport Coastal Tourism Desalination Marine Environmental Management and Protection	Maritime Security	Offshore Oil and Gas Blue Bioeconomy/Biotechnology Offshore Wind Energy
Mozambique	Aquaculture Fisheries Ports and Warehousing Maritime Transport Coastal Tourism	Fish Processing Offshore Oil and Gas Marine Environmental Management and Protection Maritime Security	Aquaculture Fisheries Ports and Warehousing Maritime Transport Offshore Oil and Gas Coastal Tourism Maritime Security

3.4 Discussion

Developing the ocean sectors has been highlighted within Africa through development agendas and policies such as the AU's Agenda 2063, 2050 AIMS and Africa's Blue Economy Strategy, along with the Decade of African Seas and Ocean 2015-2025, which was launched at the 22nd Ordinary Session of Heads of States and Governments under the theme 'Harnessing the Blue Economy in Achieving the African Union Agenda 2063' and highlights the importance with which the oceans have been viewed. The East African coastal States especially have existing marine research and policy capabilities and regional partnerships to leverage in this regard including the WIOMSA, IOC, the Nairobi Convention, and IORA.

Despite this, the progress made in including ocean development as a central policy across the spheres of government was limited within most of the countries in this study (Table 3.4). This was highlighted by either the limited ocean-related industries development in some States, e.g., Comoros and Kenya, or the mandate for ocean sector development being spread across several ministries, e.g., South Africa and Mauritius. Ongoing security threats to the region may also play a role in limiting development as activities may be delayed, and resources are mobilised for security aspects. The Somali piracy threats and more recent terrorist attacks and the delay of the offshore gas field development in Mozambique in 2021 highlight these impacts, and why ongoing instability in African States, and lack of investment in maritime safety and security, may hamper development.

While most of the countries have developed fisheries sectors, whether small-scale coastal fisheries or industrial fishing (by national and/or foreign fleets), only Seychelles highlighted this as part of their reporting under SDG2 - Zero Hunger. Also, only Mauritius and Seychelles highlighted ocean development under SDG8 - Decent work and economic growth, which as the national voluntary reports provide information on government achievements and policies, seems a missed opportunity as countries had been highlighting their ocean-related initiatives, achievements, and commitments in the lead up to the UN Ocean Decade 2021-2030, e.g., Kenya's Sustainable Blue Economy Conference held in 2018.

While it may seem obvious that Mauritius and Seychelles would have placed the oceans at the forefront of their development plans, as island States, it was surprising that South Africa and Kenya, which have made investments in their ocean development and created national programmes, did not emphasise this. Comoros, as another island state, also only highlighted SDG9 - Industrial innovation and infrastructure within its reporting of port developments. Desalination, under SDG6, was identified as a development technology for securing access to water in Kenya, Mauritius, Seychelles and South Africa.

As the report by Madagascar did not provide an update on the status of the SDGs, it was not possible to compare the island States' priorities, and how Madagascar aimed to incorporate its ocean sectors in achieving the SDGs (or not). The limited information available on the

government website of Madagascar also did not indicate policies and intentions. However, Madagascar has established a Ministry of Fisheries and the Blue Economy as of 2021[53].

The models of Seychelles and Mauritius could provide an example for other States to follow in that having a blue economy as a stand-alone ministry or at a very high level within government, and not as a component under another sectoral department, ensures a more coordinated implementation of the different components which would fit under such a government policy or programme. While the emphasis on fisheries may be important, in ensuring food security, the other sectors and their development opportunities should be highlighted as well.

Desalination, under SDG6, identified as a development technology for securing access to water by Kenya, Mauritius, Seychelles and South Africa, highlights a service that could be provided using ocean resources, which could contribute to the SDGs, besides the more obvious focus on fisheries. Developing this as an industry across Africa would have many benefits, such as a drought mitigation response, and mobile desalination plants to be used to support relief measures after extreme rainfall events.

Considering the potential coastal resources among the countries, it was surprising that the benefits of improving access and better management responses to improve coastal livelihoods were not a strong feature of all the voluntary reports, not only through supporting small-scale fisheries but also in other coastal activities such as tourism and ornamental uses. Only Mauritius and Seychelles provided comprehensive information on how they were using their ocean sectors and knowledge development towards reaching their goals, such as for SDG2 - Zero Hunger and SDG8 - Decent work and economic growth. While this may be expected considering their island status, the limited feedback by Kenya and South Africa, was unexpected considering their existing capabilities and investment in developing their ocean sectors, especially considering the development of their fisheries sectors in achieving SDG2 and ocean job creation for achieving SDG8. It would have been opportune for Kenya, having established a National Blue Economy Committee, being a member of the High-level Panel for a Sustainable Ocean Economy and having hosted the Sustainable Blue Economy Conference in 2018, to include this in its web presence and as part of the activities of its reporting on reaching the SDGs. Information on the work of the National Blue Economy Committee was also not readily available on the Kenyan government website during the period the data was collected.

Due to the limited responses from the online survey, it was not possible to undertake any conclusive analysis of the results. However, the indication of many different sectors either as mature sectors for the respondents for Kenya, South Africa, and Mauritius, while implementing

[53] https://news.mongabay.com/2021/12/changes-to-madagascars-trawling-sector-raise-questions-and-hopes/. Accessed September 2022.

programmes to further develop this may indicate that while the capability is there, these sectors may not currently offer large employment opportunities, have a large skills base to draw from or have meaningful social impact. This may also be why some sectors were listed as ‘mature’, ‘new’ and ‘emerging’ as different opportunities in these sectors are being developed, e.g., for aquaculture the farming of new marine species. This would support the results from the government websites, which indicated ocean economic development as an ongoing government programme.

This observation is supported by the policies that have been developed and are being developed within Africa, e.g., Agenda 2063, 2050 AIMS, and the Africa Blue Economy Strategy, that call for the development of maritime sectors.

The received responses also indicate that different terms are in use in different countries. For the definition of the Blue Economy, some consensus appeared on the ocean development being for economic and social benefit opportunities. The low response rate may indicate that the questionnaire was too long, the questions were unclear or could indicate a lack of interest in the stakeholder groups to respond. If such a survey were conducted again, it would be recommended that several shorter surveys be undertaken.

The information that this survey set out to compile should still be considered important, and future research to determine how marine researchers and policymakers in Africa view ocean development and the extent of the current progress needed. Reporting and monitoring of such information to determine if the various policies are having a positive impact on social well-being across Africa and if there is policy coherence. Considering the implementation of the Africa Continental Free Trade Agreement, there are opportunities which could be harnessed if African nations consider assisting each other in the development of their national ocean development programmes.

3.5 Conclusion

Reflecting on progress made with national and international development priorities is important for evaluating existing national policies. While Africa has made strides in highlighting the importance of ocean sectors through initiatives like Agenda 2063, 2050 AIMS, and Africa’s Blue Economy Strategy, progress in fully integrating ocean development into national policies remains limited in some countries. Relevant progress, focused on ocean-related activities, reported to the SDGs is also limited. Despite notable examples from Seychelles and Mauritius, where blue/ocean economy efforts are centrally coordinated, other nations have yet to fully capitalise on their existing capabilities. The fragmentation of ocean sector mandates across ministries may be a hindrance to development. To ensure sustainable and inclusive ocean development, African states must adopt more coordinated approaches, as exemplified by Mauritius and Seychelles, and strengthen regional cooperation.

CHAPTER 4: REGIONAL OCEAN GOVERNANCE AND BLUE ECONOMY PROGRAMMES IN THE WIO WHICH SUPPORT THE DEVELOPMENT OF OCEAN ECONOMIES

4.1 Introduction

The increasing production and consumption pressures on the oceans driven by increasing resource uses means that national governments need to focus efforts on conserving and sustaining the ocean ecosystems, while balancing the economic and social needs of society. Different economic, social, and environmental stakeholder interests focused on the oceans result in different levels of stakeholder organisations operating in the ocean space. Understanding the different actors within the WIO region can assist with identifying the complementarities, challenges and gaps in the development of effective ocean governance mechanisms. Options for ocean governance range from the development of policies and strategies to be implemented by individual national governments to project specific initiatives that may be undertaken from sub-national to multinational scales (for example regional ocean governance strategies).

The implementation of ocean governance programmes in the WIO can be informed by the following regional initiatives:

1. The Strategic Action Programme for the Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities (WIOLaB) (UNEP and Nairobi Convention Secretariat, 2009): This programme was advanced from the Global Environment Facility (GEF) funded programme 'Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities' undertaken between 2004-2009 and implemented through the project 'Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities' (WIO-SAP) by the Nairobi Convention until 2021 (Nairobi Convention, n.d.).

2. The Strategic Action Programme for Sustainable Management of the Western Indian Ocean Large Marine Ecosystems (WIO-LME) (ASCLME and SWIOFP, 2014): A collaborative outcome of the GEF-funded and UNDP implemented 'Agulhas and Somali Current Large Marine Ecosystems (ASCLME)' project and the GEF-funded and World Bank implemented 'The Southwest Indian Ocean Fisheries Project' (SWIOFP). The Strategic Action Programme was endorsed by the WIO States in 2014 after a series of 'National Marine Ecosystem Diagnostic Analyses' had been conducted for each State along with an integrated 'Transboundary Diagnostic Analysis' (ASCLME and SWIOFP, 2014). The action programme resulted in a regionally negotiated policy document which outlined the challenges to ecosystem sustainability and provided detailed areas of action to be undertaken to manage the shared marine ecosystems between States. Outcomes of the SAP are being actioned through the

‘Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms (SAPPHIRE) project.

3. Maritime Development in Africa: An Independent Specialists' Framework (The Brenthurst Foundation, 2010): This discussion paper set out the maritime security architecture needed for the success of maritime development for Africa, and was likely a precursor to the AIMS 2050 as it was produced in collaboration with the AU.

4. The Nairobi Convention Regional Ocean Governance Strategy currently under development (Nairobi Conventon Secretariat et al., n.d.).

Both the WIO-SAP and SAPPHIRE were implemented by the Nairobi Convention (NC) Secretariat[54]; an intergovernmental institution established under the United National Environment Programme (UNEP) Regional Seas Programme. The focus areas of the SAPs and Implementation Projects are provided in Table 4.1, and the maritime needs and challenges as identified through the Brenthurst Foundation discussion paper are provided in Table 4.2. While the WIO-LaB was focused on the land-based challenges to coastal ecosystem integrity and WIO-LME was focused on the offshore ecosystem integrity, read together with the Brenthurst discussion paper, these documents provide a relevant reference point for the development of ocean governance in the WIO region, and the challenges and development areas to realise an effective cooperative ocean governance strategy for the WIO region. Hence, the successful implementation of the identified strategic areas for development would ensure social, economic and environmental sustainability. A limitation of these programmes is the requirement for sustainable and sustained funding by the national governments who bare overall responsibility for ensuring the protection of their respective coastal and offshore ecosystems.

The process of marine ecosystem management requires mechanisms, or tools, to be developed to assist with decision-making, e.g., MSP and Integrated Coastal Zone Management (ICMZ). These management tools (or approaches) require decision support tools (DST) which can integrate the data underpinning the decisions that are taken to provide an evidence-base from which management decisions can be assessed, monitored and communicated. DST are considered computer-based applications (software) or add-ons to applications (Shim et al., 2002; Barzehkar et al., 2021), and several papers have reviewed the types of DST, and decision support systems making use of multiple DST, that are used to inform environmental management decisions (see Peckett et al., 2014; Kong et al., 2015;

[54] The Nairobi Convention (NC), of which signatory partners are Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia, Tanzania and the Republic of South Africa, was first signed in 1985 and entered into force in 1996. The NC is intended to be a platform for governments, civil society, and the private sector to collaborate on marine and coastal issues. https://www.nairobiconvention.org/nairobi-convention/who-we-are/ (Accessed 11-02-2023).

Bundy et al., 2016; Grêt-Regamey et al., 2017; Barzehkar et al., 2021; Correia da Fonseca et al., 2021; Drakopulos et al., 2022).

Table 4.1: Former Ocean Governance Strategic Programmes (WIO-Lab and WIO-LME) developed for the Western Indian Ocean Region, and the follow up Implementation Projects (WIO-SAP and SAPPHIRE) that were developed to action the identified strategic development areas. The table provides the identified problem areas or challenges and the areas that were identified for development through the programmes, and the strategic components addressed through the Implementation Projects. The information was adapted from UNEP and Nairobi Convention Secretariat, 2009; ASCLME and SWIOFP, 2014; Nairobi Convention, no date; and UNEP (14/1), 2017.

Ocean Governance Strategic Programme	Problem Areas and Challenges	Strategic Areas for Development	Implementation Project	Strategic Components
Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities (WIO-LaB)	Physical alteration and destruction of habitats	Protecting, Restoring and Managing Critical Coastal Habitats	Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities (WIO-SAP)	Component A: Sustainable management of critical habitats
	Water and sediment quality degeneration due to pollution	Ensuring Water Quality		Component B: Improved water quality
	Alteration in freshwater flows and sediment loads from rivers	Managing River Flows Wisely		Component C: Sustainable management of river flows
		Strengthening Governance and Awareness		Component D: Governance and regional collaboration
Sustainable Management of the Western Indian Ocean Large Marine Ecosystems (WIO-LME)	Water Quality Degradation	An Ecosystem Monitoring Programme	The Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms (SAPPHIRE)	Component 1: Supporting Policy Harmonization and Management Reforms towards improved ocean governance
	Habitat and Community Modification	A Capacity Building and Training Programme		Component 2: Stress Reduction through Community Engagement and Empowerment in Sustainable Resources
	Declines in Living Marine Resources	A Science-Based Governance and Adaptive Management Programme	The Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms (SAPPHIRE)	Component 3: Stress Reduction through Private Sector/Industry Commitment to transformations in their operations and management practices
	Environmental Variability and Extreme Events	Community Engagement and Stakeholder Involvement for more Inclusive and Effective Implementation of a Strategic Action Programme for LME Management		Component 4: Delivering best practices and lessons through innovative ocean governance demonstration
				Component 5: Capacity Development to Realise improved ocean governance in the WIO region

Table 4.2: Strategic areas for maritime security development to support ocean governance in Africa. Adapted from The Brenthurst Foundation, 2010.

Ocean Governance Strategic Reference Document	Objectives for an African Maritime Strategy	Problem Areas and Challenges	Strategic Areas for Development
Maritime Development in Africa. Brenthurst paper 2010/03	Strengthening international and intra-African co-operation	Security: Piracy	Maritime legislation and regulations
	Enhancing transport and infrastructural capacity	Security: Smuggling	Naval forces
	Strengthening Africa's collective security architecture to ensure safe passage	Security: Terrorism	Coastal and port police forces
	Protecting resources	Security: Bunkering	Integrating maritime security into Africa's overall security architecture
	Giving Africa increased leverage and competitiveness in the global economy	Security: Insufficient coastal protection capacity	Sharing of information and intelligence
	Strengthening Africa's position in negotiating and implementing multinational security and development partnerships	Security: Lack of 'deep water' patrol capacity	Disaster relief, humanitarian assistance and environmental management
Maritime Development in Africa. Brenthurst paper 2010/03	Ensuring that Africa is well represented in international maritime law; and ensuring that Africa has its own relevant maritime law framework in complementarity to international maritime law.	Non-security/ Growth: Securing inland waterways	Continental collaborative mechanism
	Compliance with international commitments, standards and obligations	Non-security/ Growth: Inter-state resource conflicts	Commercial interface
		Non-security/ Growth: Inefficient and insecure commercial ports	International and legal responsibilities and requirements
		Non-security/ Growth: Sub-optimal integration of road rail, air and sea transport networks	Soft infrastructure (people, training and systems)
		Non-security/ Growth: Tourist industry	Maritime awareness and education
		Non-security/ Environmental: Threats to Africa's fisheries	Budget
		Non-security/ Environmental: Natural disasters	
		Non-security/ Environmental: Climate change	

It has been recognised that these DSTs must provide information that can assist with win-win outcomes for economic, social and environmental needs, and should not only be experimental or analytical but must also be useful in the actual decision-making processes (Matthies et al., 2007). The scope of such DST is very broad and there are therefore various methods that have been developed it, therefore, depends on the research needs to determine which tool to use.

Within ocean governance, the management approaches have been framed around spatial place-based management such as MSP, IC(Z)M, Marine Protected Areas (MPAs), Ecosystem-based Management, and more recently the OAF (Young et al., 2007; Kong et al., 2015; Smythe, 2017; Gacutan et al., 2022a; Gacutan et al., 2022b). The identified management approaches can be localised at national governmental levels, or scaled up to bilateral or multilateral government arrangements over areas in which they have jurisdiction.

Across Africa, the UNESCO/IOC International Oceanographic Data and Information Exchange (IODE) Programme through its Ocean Data and Information Network for Africa (ODINAFRICA) project[55] is a programme which has developed the African Marine Atlas, an online GIS-based application, which provides several datasets common to the African coastal States derived from various national and transboundary projects (UNESCO/IOC, n.d.). Internationally, the IUCN Red List of Threatened Species[56] and IUCN Red List of Ecosystems[57] are accepted standards for assessing the status of individual species and ecosystems, respectively, and the IUCN provides freely accessible online access to the associated databases. These IUCN frameworks can be used to supplement management tools such as MSP or OA in monitoring and evaluating the success of conservation projects, as well as for assessing the environmental impacts of economic sectors (Bland et al., 2019; Rondinini et al., 2014; Bennun et al., 2018; Young et al., 2014).

Understanding the ocean governance stakeholder actors, their focal areas, planned or priority outcomes and the considered management tools assists governments and governance implementing agencies to better reflect on and evaluate progress on past and current programmes and projects and better collaborate and synergise ongoing and future activities in the region. This chapter aims to assess the range of recent ocean governance programmes, the institutional actors involved in developing and implementing ocean governance and their associated efficacy in the WIO region resulting in a reference point for ocean governance research in the WIO region and the potential to address ocean governance gaps which may exist.

[55] The ODINAFRICA project has had four phases running between 1997-2014 (UNESCO/IOC n.d.). The African Marine Atlas can be accessed at, http://www.africanmarineatlas.org/.
[56] Available at https://www.iucnredlist.org/.
[57] Available at https://assessments.iucnrle.org/.

4.2 Data and Methodology

Data for this ocean governance mapping process was collected by reviewing organisational websites between August and September 2022 based on the author's experience in the WIO. The Regional Economic Communities (RECs) within Africa of which East African Coast States were members were included in the process, as these RECs were also identified as being responsible for implementing blue economy and ocean governance programmes. This information was collected in December 2022. An online google–based search, was done for all the organisational websites. Information was collected on all projects and reports which focused on or mentioned ocean governance or blue economy to capture the aims, focus areas, funders, management tools, and decision support tools. The organisation and project websites visited are provided in Table 4.3 and the resultant information was captured in an MS Excel spreadsheet, provided as Appendices 6 and 7. While the UN Affiliated Organisations are also intergovernmental, a distinction was made to reflect the priorities between organisations which would only be decided by Member countries and those which may be influenced by broader international priorities.

Table 4.3: Organisations and regional programmes and projects with a focus on ocean governance and blue economy programmes within or inclusive of the Western Indian Ocean Region.

Organisation Type	Organisation	Ocean Governance Programme/Project	Websites and Documents
Intergovernmental	African Union (AU)	Africa Blue Economy Strategy	https://au.int/en/arbe AU-IBAR, 2019. Africa Blue Economy Strategy. Nairobi, Kenya AU-IBAR, 2020. Africa Blue Economy Strategy Implementation Plan, 2021-2025 AU-IBAR, 2022. Information Note on Blue Accounting in the Context of African Union Blue Economy Strategy
		Africa Blue Economy Strategy: Implementation Plan 2021-2025	
Intergovernmental	Indian Ocean Commission (IOC)	Regional Blue Economy Action Plan	https://www.commissionoceanindien.org/ IOC. 2021. Regional Blue Economy Action Plan https://www.oceanmetiss.re/?lang=en Raj Mohabeer and Kate Sullivan de Estrada. 2019. Strengthening Maritime Security in the Western Indian Ocean. Ebene, Mauritius: IOC.
		Ocean METISS	
		Maritime Security Promotion Program (MASE)	
Intergovernmental	Indian Ocean Rim Association (IORA)	Blue Economy priority area; Working Group for the Blue Economy Maritime Safety and Security priority area; Working Group for Maritime Safety and Security	https://www.iora.int/en
Intergovernmental (RECs)	Common Market for Eastern and Southern Africa (COMESA)	Blue Economy Focus Area	https://www.comesa.int/; COMESA. 2019. Action Plan for the COMESA Industrialization Strategy 2019-2026. CS/INDUSTR/III COMESA. 2017. COMESA Industrialization Strategy 2017-2026. CS/INDUSTR/1 https://www.comesa.int/governance-peace-security/ https://www.comesa.int/industry-agriculture/ https://www.comesa.int/coming-soon-a-regional-blue-economy-strategy/

Table 4.3 (cont.): Organisations and regional programmes and projects with a focus on ocean governance and blue economy programmes within or inclusive of the Western Indian Ocean Region.

Organisation Type	Organisation	Ocean Governance Programme/Project	Websites and Documents
Intergovernmental (RECs)	East African Community (EAC)	Blue Economy Focus Area	http://www.eac.int/ https://www.eac.int/environment/aquatic-ecosystems/blue-economy https://www.eac.int/press-releases/141-agriculture-food-security/2081-lake-victoria-fisheries-organization-project-aimed-at-promoting-fish-farming-launched [ECOFISH Programme set to contribute to sustainable fisheries for the blue economy of the Eastern and Southern Africa and Indian Ocean regions] EAC. 2021. Sixth EAC Development Strategy 2021/22 - 2025/26. EAC. 2021. Sixth EAC Development Strategy 2021/22 – 2025/26. Comprehensive Planning and Implementation Matrix
Intergovernmental (RECs)	Intergovernmental Authority on Development (IGAD)	Blue Economy Focus Area Regional Blue Economy Strategy and Implementation Plan for 5 years (2021-2025) 2015-2030 IGAD Integrated Maritime Strategy (2015-2030 IGAD IMS) Strategic Manual for Valuation of Blue Economy	https://igad.int/ IGAD. 2022. Concept Note. Ministerial Validation Meeting for IGAD Blue Economy Strategy IGAD. 2020. Regional Blue Economy Strategy and Implementation Plan for 5 years (2021-2025). Draft document for discussion at the Ministerial Validation Meeting for IGAD Blue Economy Strategy (2021-2025) https://igad.int/agriculture-environment/; https://igad.int/agriculture-environment/environment-protection-2/; https://igad.int/agriculture-environment/environment-protection-2/igad-blue-economy/ https://igad.int/peace-security/maritime-security/ https://igad.int/about-the-igad-maritime-security-programme/ IGAD. 2022. Declaration of Ministers of IGAD Member States on the IGAD Regional Blue Economy Strategy (IGAD-BE) https://igad.int/about-the-igad-maritime-security-programme/ IGAD. 2020. IGAD Regional Strategy 2021-2025: Implementation Matrix

Table 4.3 (cont.): Organisations and regional programmes and projects with a focus on ocean governance and blue economy programmes within or inclusive of the Western Indian Ocean Region.

Organisation Type	Organisation	Ocean Governance Programme/Project	Websites and Documents
Intergovernmental (RECs)	Southern African Development Community (SADC)	Blue Economy Focus Area	https://www.sadc.int/ https://www.sadc.int/pillars/fisheries https://www.sadc.int/procurement-opportunities/programme-improving-fisheries-governance-and-blue-economy-trade-2 SADC Secretariat. 2020. Southern African Development Community (SADC) Regional Indicative Strategic Development Plan (RISDP) 2020–2030, Gaborone, Botswana, 2020
UN Affiliated	Nairobi Convention (NC)	The Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms (WIO-LME SAPPHIRE)	https://www.nairobiconvention.org/ https://www.nairobiconvention.org/clearinghouse/
		Nairobi Convention - SWIOFC Partnership Project: Blue Growth Project	https://www.nairobiconvention.org/ https://www.nairobiconvention.org/clearinghouse/ https://nairobiconvention.org/clearinghouse/node/852
		Capacity Building of Multilateral Environmental Agreements (ACP MEAS3) project	
		Integrated Management of the Marine and Coastal Resources of the Northern Mozambique Channel (NoCaMo) Project	
		Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities (WIO-SAP)	
		Western Indian Ocean - 2022 – 2024 Resilience & Prosperity Initiative (WIO-RPI)	
		WIO Symphony	
		Western Indian Ocean Governance Initiative (WIOGI)	

Table 4.3 (cont.): Organisations and regional programmes and projects with a focus on ocean governance and blue economy programmes within or inclusive of the Western Indian Ocean Region.

Organisation Type	Organisation	Ocean Governance Programme/Project	Websites and Documents
UN Affiliated	United Nations Economic Commission for Africa (UNECA)	Blue Economy Focus Area	https://www.uneca.org/eastern-africa/blue-economy
		Blue Economy Valuation Toolkit	UNECA. 2021. Blue Economy Valuation Toolkit: User Manual. Kigali, Rwanda UNECA. 2016. Africa's blue economy: a policy handbook. Addis Ababa UNECA. 2016. The blue economy. Addis Ababa
Non-governmental Organisation	Western Indian Ocean Marine Science Association (WIOMSA)	Cities and Coasts Project: Coastal Cities of the Western Indian Ocean Region and the Blue Economy	https://www.wiomsa.org/ WIOMSA and UN-Habitat, 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Strategic Roadmap. WIOMSA and UN-Habitat, Zanzibar, Tanzania, xxx pp. WIOMSA, UN-Habitat. 2021. Coastal Cities of the Western Indian Ocean Region and the Blue Economy: Status Report. WIOMSA and UN-Habitat, Zanzibar, Tanzania, xxx pp.
Non-governmental Organisation	International Ocean Institute – South Africa (IOI-SA)	West Indian Ocean Governance & Exchange Network (WIOGEN)	https://meerwissen.org/partnership-projects/wiogen https://wiogen.org/
Non-governmental Organisation	Stop Illegal Fishing (SIF)	FISH-i Africa Task Force	https://fish-i-network.org
Non-governmental Organisation	International Union for Conservation of Nature (IUCN)	The Great Blue Wall	https://www.greatbluewall.org
International Funding Institution	World Bank (WB)	SWIOFISH	https://www.worldbank.org/en/programs/africa-program-for-fisheries#1

4.3. Results

Different organisational types focused on ocean governance, Figure 4.1, including Intergovernmental Organisations (AU, IORA, RECs, IOC), UN Affiliated Organisations (Nairobi Convention, UNECA), Non-governmental Organisations (Stop Illegal Fishing (SIF), IUCN, IOI-SA, WIOMSA), and an International Funding Organisation (World Bank). This highlights how many organisations are strategising around or managing the economic development and ocean protection programmes and projects in the Western Indian Ocean.

While for some organisations it was clear which programmes they collaborate with, e.g., WIOMSA undertaking research for the Nairobi Convention, the relationships between other organisations were not clear, e.g., IORA, World Bank.

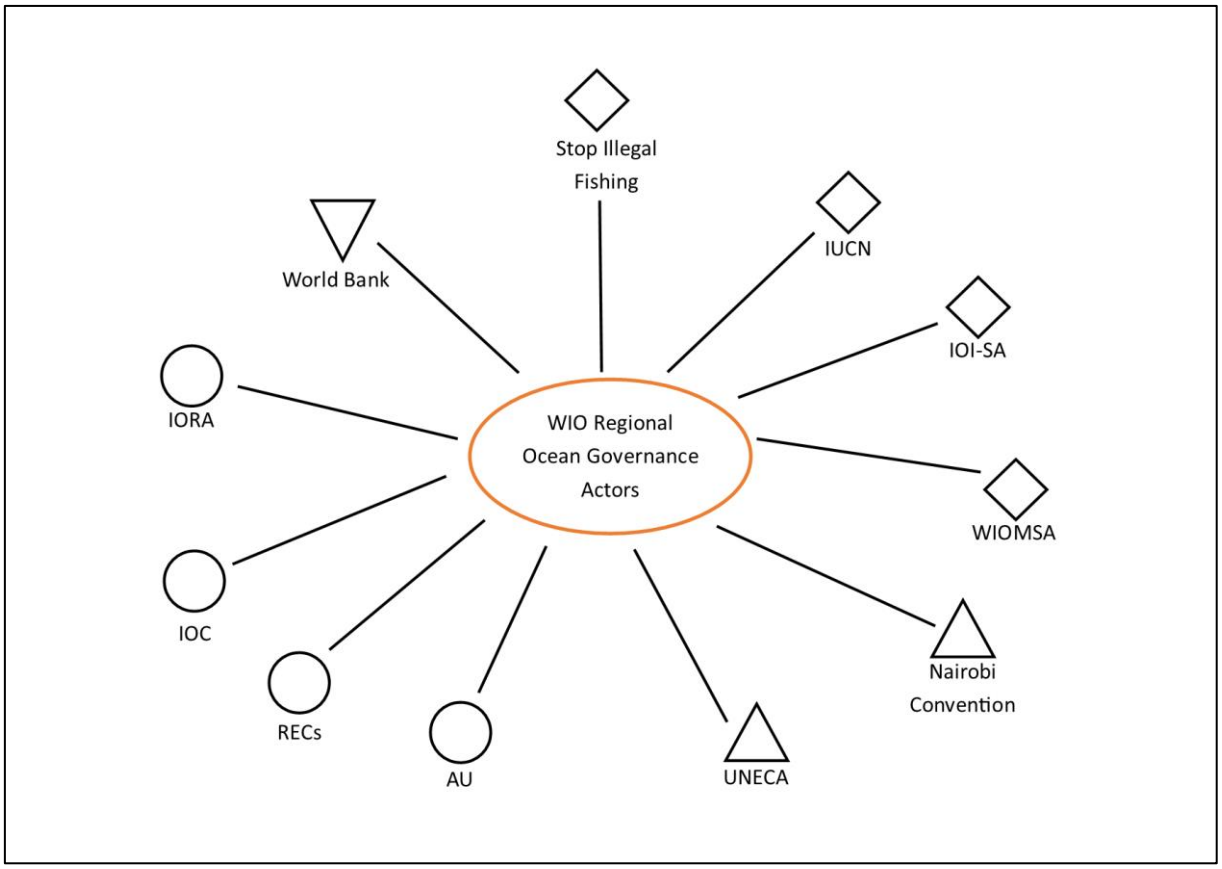

Figure 4.1: Organisations which contribute to ocean governance programmes in the Western Indian Ocean. Key: circle - Intergovernmental Organisations; triangle - UN Affiliated Organisations; diamond - Non-governmental Organisations; and inverted triangle - International Funding Organisations. RECs: Regional Economic Communities. Relevant to this study, the RECs with WIO States are COMESA, EAC, IGAD and SADC.

Table 4.4: Information on the Blue Economy development processes with the African Regional Economic Communities (RECs) of which East African coastal States are Members: Common Market for Eastern and Southern Africa (COMESA), East African Community (EAC), Intergovernmental Authority on Development (IGAD), and Southern African Development Community (SADC). See Appendix 7 for the list of WIO States party to each REC.

REC	Division Under Which the Blue Economy is addressed	Blue Economy Strategy Available (Y/N)	Sectors Addressed or Mentioned
COMESA	Industry and Agriculture	N (under development)	Fisheries and Aquaculture; Renewable Ocean Energy; Transport and Logistics; Tourism; Ocean Knowledge Clusters; Research and Development; Seabed Exploration and Minerals
EAC	Environment and Natural Resources: Aquatic Ecosystems	N	Maritime Transport and Port Development
IGAD	Agriculture and Environment: Sustainable Environment Protection	Y	Fisheries; Aquaculture; Tourism; Transport; Shipbuilding/Repair; Energy; Bioprospection and Biotechnologies; Underwater Mining; Other Emerging Activities
SADC	-	N (under development)	-

The information on the RECs were presented separately in Table 4.4, to assess how the ocean governance and blue economy aspects were being incorporated into their institutional work programmes. While the blue economy is mentioned as a development area within the websites and documents of all four RECs, it has only been incorporated institutionally as a focus area for COMESA, EAC and IGAD. The blue economy focus area was placed under the environmental protection divisions of the EAC and IGAD, and the industry division of COMESA. Only the IGAD has an approved blue economy strategy document, while the COMESA and SADC have documents under development; COMESA has a draft document, however, this was not publicly available as yet. The SADC, while in the process of developing a blue economy strategy, and also mentioning within its Regional Indicative Strategic Development Plan (RISDP) 2020-2030 (noting several ocean governance objectives within the RISDP document), has not yet positioned the blue economy under any of its institutional divisions or work programmes and no information was available on the sectors that would be focused on for development. The SADC has, however, addressed areas of ocean governance and blue economy within its Green Economy Strategy (see Appendix 7). The EAC focus on the blue economy was primarily in support of maritime transport and port development.

Four of the organisations have published Blue Economy strategy documents, see Table 4.3 and Table 4.4. - the AU, IOC, IGAD and WIOMSA. The IGAD has also published an Integrated Maritime Strategy; the IGAD “Blue Economy Strategy and Maritime Strategy” based on

regionalising the AU Blue Economy and Maritime Strategy documents. The IOC was the only intergovernmental organisation implementing a maritime security programme (MASE, funded primarily by the EU), however, the regional security interventions and security centres set up through the programme supports the region. IORA, while having maritime safety and security as a priority, does not have any apparent, or publicly available information on maritime safety and security activities being implemented. The information provided through COMESA also indicated it was implementing the MASE programme, but this was focused on money laundering and not specific to any maritime activities.

The Community of Sahel–Saharan States (CEN–SAD) was also listed as a REC recognised by the AU but no information on this organisation could be found.

Considering the focus areas of ocean governance-related programmes and projects of different organisations, Figure 4.2 highlights the funding bodies, organisations (excluding RECs) addressing ocean governance and blue economy programmes/projects in the WIO region, and the themes addressed. The European States are invested in many of the projects, through both individual state sponsorship, as well as through multi-state funding instruments such as the EU and Nordic Development Fund. Japan was the only state from the Asian region to co-fund a programme. No partnerships or collaborations were identified with the North American or South American States.

In identifying the themes being addressed, in Figure 4.2, most of the organisations focused on policy development (e.g., the various blue economy strategies, action plans and work plans) and tools for ocean management, of which marine spatial planning and stakeholder engagement (which included networking and human capacity development) were the top two focal areas. It can be noted that the management strategies were focused on location-based management tools such as marine spatial planning, marine protected areas, locally managed marine areas, and integrated coastal zone management. Marine domain awareness (including maritime security) was an area of limited engagement by most of the organisations, with the only active programmes being undertaken by the IOC and SIF, through the MASE project and Fish-i Africa, respectively. The Nairobi Convention implemented the most themes across various projects (see Table 4.3), likely due to its focus as an institution focused on environmental protection and as an affiliate institution of the UN providing it with the legitimacy, capacity and resources to implement such programmes.

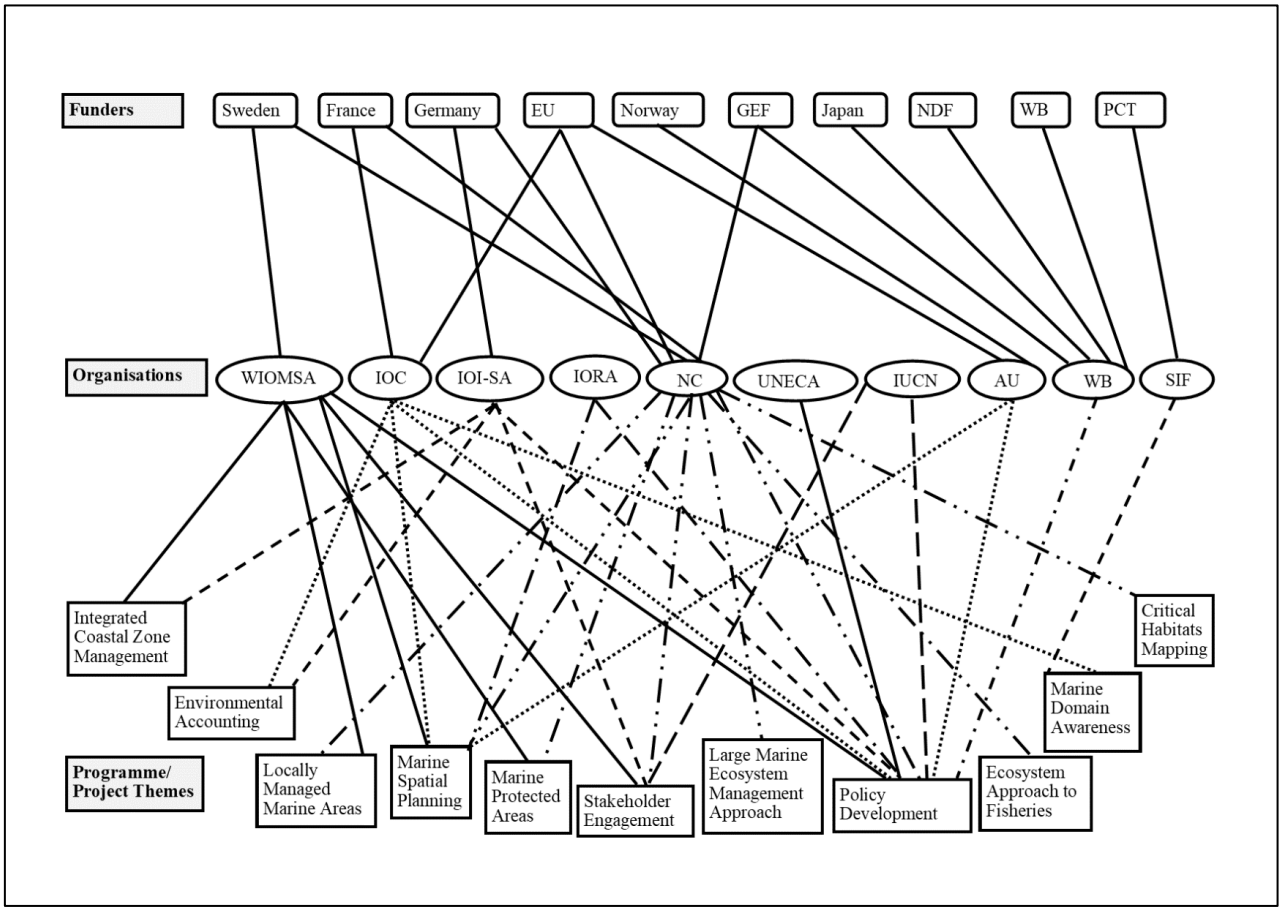

Figure 4.2: Ocean governance actors, as identified in Figure, 4.1., in the WIO comprised of the funding institutions (Funders), Organisations with a focus on or impact on ocean governance, and the Programme/Projects Themes they are addressing. The information on the RECS are excluded.

The development of Decision Support Tools (DSTs), i.e., web-based or computer-based software, to inform decision-making was limited. Only three programmes had a DSTs as an outcome - the Nairobi Convention's WIO Marine Protected Areas Interactive Dashboard (part of WIO-SAP); the UNECA Blue Economy Valuation Toolkit Dashboard, an MS-Excel-based programme; and the Fish-i Africa Vessel Identification Database, which supports the uploading of vessel images to an online database by the public which can be accessed by the responsible national maritime security authorities.

The review of regional ocean governance programmes and projects indicates that there are considerable initiatives focused on the blue economy and ocean governance that are being undertaken in the WIO region, with strong institutional backing to develop mechanisms to support ocean governance and blue economy activities, however collaboration or integration within the region is limited.

4.4 Discussion

With the focus on the oceans as a development space, anthropogenic pressures on the ecosystems (and therefore the support systems and services they provide to human well-being) are increasing. While national governments are responsible for the national impacts that may extend across their borders (and the national laws, regulations, and their implementation and enforcement and adjudication (the trias politicas of government see Turton et al. (2007)), partnerships with regional organisations and funding bodies are beneficial in developing cross boundary policies, resource sharing and development activities or initiatives which countries may not be able to undertake alone. This is especially true for developing countries which often do not have the national expertise, human capacity and funding to undertake such programmes.

Reviewing the programmes and projects being undertaken in the WIO region, provides a point of departure for discussions in the region on collaboration in areas of blue economy and ocean governance. The various governmental and non-governmental institutions identified in Figure 4.1 and Table 4.4 indicate the scope and scale of the interest in ocean development activities in the WIO region. The high-level intergovernmental status of the organisations suggests a focus on regional policy development would be expected, although integration of policies would, however, need to be delegated to the individual States to develop as per their capacity and national needs. How these institutions integrate into the international ocean governance framework, as shown in Figure 1.2, would need to be further assessed as only the NC, as a regional seas programme, would be included in the framework.

This focus on regional policy development is highlighted by Figure 4.2. The regional blue economy strategies implemented through the RECs (Table 4.4.), WIOMSA and the IOC, indicates that a need for information remains. Such information can be tailored to individual States to understand how developed regional or Pan African policies (e.g., at the level of the AU), could be downscaled for application to local contexts. However, complexity arises from States belonging to more than one organisation with different blue economy strategies and objectives (e.g., Kenya belonging to COMESA, EAC and IGAD; see Appendix 7), and the need to ensure that these complement one another. The need for REC Blue Economy Strategies may also be extraneous – the IGAD Blue Economy Strategy is a well-considered document which developed principles for establishing a blue economy (IGAD, 2020), and if considered with the AU Blue Economy Strategy (which indicates the themes or sectors for development) would ensure that environmental and social needs are addressed along with the economic development outcomes. Adoption of the IGAD Strategy would also assist other RECs, and the States party to these RECs, to move ahead with implementing their national blue economy strategies. The inclusion of ocean economy aspects within the SADC Green Economy Strategy - which identifies the expansion of MPAs, law enforcement for IUU, aquaculture development and desalination plant development - indicates that there may also need to be some

revaluation of priorities to be addressed through the green and blue economy strategy documents to ensure complementarity.

A focus on stakeholder engagement (including networking and human capacity development) was also expected as most of these organisations are multilateral in function and would therefore be expected to focus on information sharing among the different States. However, a broad range of stakeholders are engaged across civil society, private industries, research communities and policymakers in an ongoing process so that there is a need to ensure that information is shared, and knowledge development is retained. Marine Spatial Planning as a management tool was also highlighted by several of the organisations focusing on such engagement, while other tools such as MPAs expansion and environmental accounting were less utilised. Environmental accounting, including the ocean accounts framework which includes a broader social and economic information system, is relatively novel compared to MSP, and the development of further information DSTs to supplement MSP are important. The ARIES application has, for example, had limited development in marine ecosystem accounting and identifies the work of the GOAP as a potential advancement in this area of ecosystem accounting[58]. For the WIO region, while national DSTs may be developed, regionally developed DSTs may also become options for national use, such as the MPA Dashboard developed through the Nairobi Convention WIO-SAP project. It remains unclear as to how the development of non-WIO actors' engagements, such as the Swedish developed and funded Symphony Marine Spatial Planning tool, used across the WIO will be integrated[59]. Such aspects highlight a potential challenge of duplication of DSTs or unproductive use of limited funding if there is not clear communication between implementing organisations.

Three themes or areas not adequately addressed, or with limited recognition through the existing programmes on the institutional websites and their associated documents, are maritime safety, maritime security and ocean knowledge development (marine science research, technologies development and education identified in the New Blue Economy concepts), which can be considered enabling or supporting sectors for ocean economy development. There appears to be limited ownership on the development of national maritime security infrastructure and capacity. The MASE programme, implemented by the IOC, IGAD, EAC and COMESA, was funded by the EU, and it remains unclear if the structures and networks operationalised through the programme would be maintained without the continued support of the EU. Maritime safety should be considered a priority as the ocean economy is developed as this ensures not only safe operations at sea, but also addresses the social equity

[58] Accessible at https://seea.un.org/content/aries-for-seea.
[59] A webinar introducing the Symphony MSP tool to South African stakeholders was held in June 2022 (per. obs.).

in the fair inclusion of women, and other vulnerable groups, in sectors such as port operations, shipping and fisheries.

The lack of recognition of the ocean knowledge sector could be considered as an important challenge to be addressed in the development of the ocean economy as many African States still have limited information on their coastal and marine species diversity, ecosystem types (especially offshore) and seabed resources. Technology deployment for mapping and monitoring the oceans is also limited as these are expensive and need to be sourced from other more developed States and require specialised knowledge to operate and maintain. Developing such information technologies within Africa would mitigate some of these costs, however, sustainable markets and value chains for this would need to be created. Research on the existing value chains of marine sciences and potential for economic development will be important to understanding how this could be developed within Africa. It is important to note the role that OA frameworks can play in the development of strategic relative metrics or indicators in such initiatives.

The information collated on the funding institutions indicates that the EU and European States have a strong interest in the WIO region, by supporting long-term institutional development (e.g., through WIOMSA), and short-term projects (e.g., WIOGEN or WIOGI). While this study did not address the value of funding from external partners flowing into the region, this information is available for some institutions and made available through funding institutions and could be assessed to provide an indication of the importance being placed on the marine ecosystem protection through environmental activity accounting processes identified in the SEEA Central Framework. Considering the relatively closed nature of the Indian Ocean, i.e., bounded in the west by Africa, in the north and east by Asia and Australia, and therefore, the common shared nature of the space, it is of note that there is not more collaboration on OG between States of the Indian Ocean within the ocean governance programmes. The IORA is the only existing basin-wide regional organisation, through which such engagements could be supported. However, the organisation's focus on strengthening regional economic cooperation may have limited the types of engagement that could occur. It is only in the last decade that activities to better coordinate across other areas (e.g., blue economy; women's economic empowerment; (marine and coastal) tourism; science, technology, and innovation; and maritime safety and security) are being realised through the formulation of working groups comprised of government officials to develop and implement work plans and activities to strengthen regional cooperation. The top-down and consensus-based nature of IORA does, however, limit the speed at which activities are implemented as only Member States with the resources and capacities to undertake programmes and projects do so based on their areas of interest. There is also a concern around the political will of Member States to fully engage in the priorities of IORA as this programme is primarily driven through the ministries of foreign affairs of the Member States, which then rely on the support of other ministries to be able to

implement IORA activities. The IORA Heads of State have only met once, in 2017, since the establishment of IORA in 1997. More regular events including Heads of State, such as done through the AU, could highlight the political support for IORA, and encourage other ministries responsible for the many priority areas of IORA to better capacitate support for IORA activities. Whilst IORA does have an academic group to initiate a knowledge-based economy, the IORAG, this structure to date has not been able to leverage the regional membership of IORA to develop long-term collaborative research or information-sharing programmes in the region.

The information provided through this review of organisations, programmes and projects which support ocean governance in the WIO region, indicates that there are many and varied organisations operating in the region, over a broad area of topics. The number of policy and strategy documents produced indicates that there are substantial resources that States can draw from to develop their national policies on ocean governance and ocean economies, to ensure equitable, inclusive and sustainable national development programmes.

Considering the identification of the need for collaborative and sustained marine data and information services through WIOLaB and WIO-LME, and the development of research programmes and capacity to collect and analyse data which has been ongoing since the late 1990s, there seems to be limited progress to address the challenges identified through these programmes. The Nairobi Convention seems the best placed organisation to coordinate and accelerate implementation of activities in the WIO, and considering all the programmes and partnerships it has, it could be considered as already developing this function. The Nairobi Convention, after developing an African position on international OG developments, could then engage with other multilateral fora, such as IORA (to advance OG priorities in the Indian Ocean Region) and UNECA (to be inclusive of landlocked States and advance OG priorities across Africa), in advancing OG priorities.

The passive dissemination of information, primarily through organisational websites and reports, is, however, a limiting factor in the uptake of information as this relies on there being capacity within States to 1.) be aware of the activities, 2.) actively participate in activities, 3.) engage with the information being produced, 4.) be able to filter the information applicable for national use, and 5.) having structures in place to disseminate the information nationally at the appropriate policy cycles. These limitations are also relevant for uptake in the use of existing DSTs, for example, the African Marine Atlas (developed through ODINAFRICA) and the MPA Dashboard (developed through the Nairobi Convention)

National research institutions, universities and think tanks could fill this role, but this requires a level of trust and cooperation with relevant government departments and an active and transparent dialogue platform. Again, the Nairobi Convention and IORA are two organisations which have the institutional mechanisms in place to support this, through the Forum of Academic and Research Institutions in the Western Indian Ocean Region (FARI) and Indian

Ocean Dialogue, respectively. Development of dedicated science-policy boundary spanning or bridging individuals within academia, that would be able to focus on building science-policy dialogue platforms (across environmental, social, and economic disciplines, i.e., a nexus approach), undertaking information synthesis, and active information dissemination (through policy briefs, information notes and social media during the relevant policy cycles) could be the first step in this process.

This assessment of ocean governance policies identified in this Chapter can address at least two questions from the information note discussed during the 17th Session of AMCEN (see Chapter 1),

(b) Can the existing frameworks and policies currently in place in Africa promote a

sustainably managed blue or ocean economy?

(e) Does Africa need to develop a flagship programme for the blue economy that will

consolidate infrastructure developments on the continent? (AMCEN/17/6, 2019).

The existing frameworks and policies developed in the region can promote sustainable ocean economies, and there are already positive ocean economy programmes being developed in the region. What is needed are better and more sustained communication on the policies and programmes and better sharing of information and best practice between African States, and promotion of the maritime sectors as viable job opportunities.

The opportunity for international collaboration provided by the SDGs and the UN Ocean Science Decade for Sustainable Development provides an opportune time to accelerate the development of African knowledge and capacities in ocean governance to support tangible benefits to society. This will be needed in coming years as the negotiations continue on climate change, resources use and sharing in ABNJ, and negotiations concerning the Antarctic Treaty. African States need to invest in the capacity to be able to negotiate from a position of knowledge and experience, and not be limited by a continued focus on their territorial boundaries, which would see African States forego on opportunities of shared oceans and associated resources.

4.5 Conclusion

African states of the WIO region have been active within many intergovernmental platforms which are focused on national development. While significant strides have been made in promoting ocean governance and blue economy strategies in the WIO region, more coordinated efforts are needed to address the challenges of limited capacity, knowledge gaps, and fragmented implementation. The existing frameworks and policies provide a solid foundation for sustainable ocean economies, but their effectiveness depends on improved

communication, collaboration, and information sharing among African states. Institutions like the Nairobi Convention and IORA are well-positioned to lead these efforts, yet their success will require greater political will, enhanced stakeholder engagement, and investments in research and human capacity development. As African nations face complex negotiations on climate change, resource sharing, and global ocean governance, they must strengthen their collective knowledge and capabilities to fully leverage the economic and social opportunities offered by their shared ocean spaces, while protecting the environment. The current momentum provided by international frameworks such as the SDGs and the UN Ocean Decade offers a timely opportunity to accelerate these efforts, ensuring that ocean governance contributes meaningfully to Africa's sustainable development.

CHAPTER 5: GENERAL DISCUSSION AND CONCLUSIONS

The internationally recognised consensus of the oceans as the new economic development space has gained prominence in the past decade among coastal and island States. However, there is recognition, (i.e., through the UN SDGs and other commitments), that development should not follow a business-as-usual approach by placing economic gains above social interests and ocean health or assume better economic outcomes will lead to better societal outcomes being met. Discussions, focused on ocean development beyond GDP, at international and regional fora, such as through IORA, AU, UNECA or RECs, and commitments related to ocean development arising from these discussions require localisation of actions to have any real and measurable impact.

This research study aimed to investigate the development of ocean economic activities in the WIO region. Particularly how ocean development was framed, i.e., as a 'blue economy', 'ocean economy' or other term, and examining the balance between ocean economic development, social equality, equity and inclusivity and the preservation of the ocean environment.

The research aims were to first understand the development of the term 'blue economy', as this is how the AU has framed its ocean development approach, through a systematic review of academic literature. Second, to assess how African coastal states in the WIO region are developing national ocean development programmes, as well as assess progress in implementing the SDGs, particularly SDG14. Third, to understand the objectives of regional ocean governance programs that support ocean economic development in the WIO, and how these programmes may be incorporating the blue economy approach.

Through understanding these ocean development priorities, the overall research objective was to provide evidence-based policy recommendations for national governments to enhance their ocean development programmes. The research design followed a qualitative research approach through a systematic review, online questionnaire and analyses of grey literature/policy documents.

Interrogating the development of the oceans through the framing of the blue economy in peer-reviewed literature (Chapter 2), and information and commitments on high-level programmes such as the SDGs (Chapters 3 and 4), provided a means to understand how the oceans are being viewed and utilised in the WIO region. The information from Chapters 3 and 4, focused on the WIO region, provided a new and synthesised analysis of the ocean policy developments in this region. It highlighted the knowledge creation in the region, which can be used to inform blue economy programmes across other African coastal states, and other regions of the world. In drawing together the information, this thesis serves as a useful reference for further blue economy research. Not all of the study aims were met, particularly the intention to understand national ocean development programmes, due to the low/minimal responses received for the

questionnaire in Chapter 3. This was a key shortcoming as important questions could not be addressed, including understanding the views of academics and policymakers on ocean development programmes within WIO States.

The key discussion points and conclusion are presented below.

Oceans vs Blue Economies

Multiple meanings of the blue economy in the peer-reviewed literature, as reviewed in Chapter 2, indicate that there is still a need to encourage researchers, policy makers and politicians to define the blue economy so that it is not used as a potentially green- or blue-washing buzzword but can be considered a definitive statement or intention – or at the very least limit the continued confusion on what a blue economy is, and what it is not. An agreement on the definition of the blue economy would be the best outcome, not only in the research community but also in national governments and international fora that are setting the ocean development agendas. This would facilitate the referencing of the blue economy as a programme or strategy that gives due consideration of clear environmental sustainability outcomes and broader social benefits is a given, beyond only economic benefits and gains. This would also allow some differentiation between a blue and an ocean economy, through which the focus on defining the boundaries of this, i.e., the geographic limits and economic sectors, could be interrogated. The use of new terms, e.g., 'New Blue Economy' related to ocean knowledge development as a sector (Kildow, 2021) being discussed by northern hemisphere States, should be discouraged to eliminate further confusion.

Valuing the Oceans

The perception of the oceans in policy circles as the "next economic frontier" and the continued focus on GDP as an indicator of economic growth through SDG8, may provide a challenge in developing truly sustainable societies. The role of more intangible contributions from nature to human well-being, for example cultural and heritage identities linked to the oceans, offers a more holistic view on the benefits or contributions we receive from nature. Integration of economic, environmental and social metrics in policy development through accepted and transparent decision processes would assist this. However, standard environmental and social well-being measurements or indicators still need to be developed, and with the adoption of the SEEA Ecosystem Accounting (SEEA, 2021) and the ongoing development of the Ocean Accounting Framework, it should be encouraged that more countries start developing such statistical reporting systems to provide a holistic status of their ocean development activities. This would also assist in indicator-based monitoring and identification of areas that need additional support to develop, as well as to ensure that actions can be taken in support of the best possible outcomes for society.

The economic contribution of ocean sectors remains critical to national ocean policy planning, strategic macroeconomic planning and investment decisions for African States. Further research is needed in understanding the ocean contributions to national economies and how this can be disaggregated from land-based activities. National programmes and research examples by China, the USA, and the EU, as introduced in Chapter 3, provide insight into how this can be done. Learning from this, African States would be able to develop relevant performance indicators at the inception of their ocean economy programmes, including through OA Frameworks. Through developing disaggregated data systems, reporting on nationally determined contributions or targets for the SDGs, climate change and biodiversity would be streamlined and assist that countries are not under-reporting on their progress.

Positioning on a Global stage

There exists an opportunity that Africa, as a regional bloc, could drive and lead the development of the 'Blue Economy', and what this means in a practical sense, as their ocean development programmes are at the inception phase, and can still incorporate activities to align to the outcomes of the SDGs and ensure positive or neutral environmental outcomes. A regional response would also assist with taking ownership of maritime safety and security needs, which will be needed if any ocean development activities are to be sustainable, successful and relevant to African priorities.

While the ocean development agenda is currently in the spotlight (and the plethora of online workshops, conferences and webinars over the past three years mentioning the blue economy is a testament to this, *pers.obs*.), integrating this into national policies and reporting structures appears to be a challenge. This is highlighted by the lack of or limited information on government websites and very few of the countries in this study highlighting integration in their SDG National Voluntary Reports, even though there are existing policies, strategies, and information available under the AU, regional organisations and national ministries.

African States, on a continental policy level through the AU, have accepted the development of the ocean (and inland freshwater systems) under the sustainable and inclusive 'blue economy' concept (UNECA, 2016). This presupposes environmental sustainability and societal improvement as part of economic activities undertaken as part of the African Blue Economy Strategy, and a level of policy integration across national governments. Currently, where countries of the WIO have ocean development programmes, this is mainly still sectoral in focus (e.g., South Africa and Kenya). As (or if) States action the Africa Blue Economy Strategy Implementation Plan 2021-2025, and ocean industries are developed, government structures could become integrated through Ocean Economy or Blue Economy ministries following the examples of Seychelles and Mauritius. This would allow for cohesive mandates and principles in national ocean development programmes, instead of being in a situation of each ministry only focusing on its mandates which may cause friction between economic and

environmental priorities. More should have been done to capitalise on the Sustainable Blue Economy Conference hosted by Kenya in 2018, to centre and report on ocean development activities which have been progressed in the WIO region, to support international commitments.

Policy and Research Capacity

As highlighted in Chapter 4, the WIO region has strong policy and research capacity. Alignment between the AU strategy thematic areas and the IORA Blue Economy priorities offers further opportunity for knowledge transfer and capacity building which can be leveraged to share information through African networks. However, while there are sufficient information, policies and organisations to develop a sustainably managed blue or ocean economy there seems to be some limitations between regional and subregional organisations on the implementation of recommendations, and the ability to build and sustain networks which can implement programmes, build and maintain institutional capacity, and support uptake nationally among States. What are required are better collaboration among States, active engagement with the resources that have been developed, i.e., how to translate this into action, and a sustainable regional funding mechanism to be developed with commitment from all benefitting States. The role that the Nairobi Convention is playing could be used as a model for this, with due consideration for how landlocked States can be engaged in such institutions.

Recommendations for better collaboration among the African States, and future research include:

1. Notwithstanding the vision and purpose as outlined in the Africa Blue Economy Strategy (AU-IBAR, 2019), the AU should adopt and promote a definition of the blue economy that specifically mentions the economic, social and environmental pillars. This may prevent any actors implementing development activities from claiming the blue economy concept, but not adhering to what it means. This would then distinguish ‘ocean economy’ development from the ‘blue economy’.
2. Further research should be done to assess what is currently being considered an ocean sector by each African country, i.e., geographical limit or another factor, with in-person interviews of government officials prioritised, to gain further insight on ocean policies and achievements.
3. In developing a Blue Economy approach, any programme or activity labelled as ‘blue economy’ should have a clear environmental sustainability association and social benefit, along with any economic justification, and follow an integrated ocean governance approach of interactions between the three spheres of government, society and science/research.
4. The WIO and African States should consider how best to integrate their ocean development agendas as a coordinating structure across the various sectors. The

examples of Mauritius and Seychelles, as discussed in Chapter 3, could be followed. This would prevent a siloed approach to development and could assist in more streamlined development of coastal and marine policy planning and spatial planning activities, and assist that information on ocean development indicators, disaggregated from land-based sectors, are developed holistically.

5. The WIO or African States should have better engagement within regional organisations, such as IORA, to support their development objectives.
6. The potential impacts of blue economy development on the climate change nationally defined contributions should be assessed both in terms of technologies and interventions to mitigate and adapt to climate change, and to indicate the ability of blue carbon systems for climate mitigation and adaptation priorities.
7. Development of science-policy bridging actors should be facilitated at national levels which could assist with information sharing and policy guidance at national and international levels. This must follow a proactive approach in engaging the broader society through science communication to create visibility for ocean science and governance initiatives.
8. The priorities in the Atlantic Ocean basin appear to be different in that, due to the influence of the EU, programmes follow a more technologically focused and pro-business blue growth agenda (e.g., AIR Centre, All Atlantic Forum). This places African States at a disadvantage, as they cannot always benefit from the research advances, while first needing to implement basic environmental (meteorological, oceanographic, biological, and social-ecological) research and monitoring systems and build and maintain human capacity and infrastructure. A similar review of African States bordering the Atlantic Ocean regarding the national ocean development programmes and reporting of SDG and ocean governance actors could be undertaken to assess how this compares to the WIO region and priorities of the AU.
9. Research is needed to determine the best options for sustained blue economy financing / funding for maintaining and communicating project outcomes of regional ocean governance programmes, and which institution or institutions would be best able to manage this.

Considering it is less than a decade until the SDGs are to be met, innovative mechanisms for improving society and the environment are needed, and Africa can play a meaningful role in meeting the international commitments and developing best practice for implementation of these.

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Appendix 1: Articles for Systematic Review in Chapter 2

Code	Authors	Title	Year	Journal
SR1	Alam M.N., Masroor I., Rokon T.M., Rakib S.G.	Blue technology for sustainability of small and medium fish firms: a study on small and medium fish firms of Bangladesh	2020	Environment, Development and Sustainability
SR2	Allison E.H., Bassett H.R.	Climate change in the oceans: Human impacts and responses	2015	Science
SR3	Andriamahefazafy M., Bailey M., Sinan H., Kull C.A.	The paradox of sustainable tuna fisheries in the Western Indian Ocean: between visions of blue economy and realities of accumulation	2020	Sustainability Science
SR4	Andriamahefazafy M., Kull C.A., Campling L.	Connected by sea, disconnected by tuna? Challenges to regionalism in the Southwest Indian Ocean	2019	Journal of the Indian Ocean Region
SR5	Arbo P., Knol M., Linke S., St. Martin K.	The transformation of the oceans and the future of marine social science	2018	Maritime Studies
SR6	Barbesgaard M.	Blue growth: savior or ocean grabbing?	2018	Journal of Peasant Studies
SR7	Bari, A.	Our Oceans and the Blue Economy: Opportunities and Challenges	2017	Procedia Engineering
SR8	Bennett N.J.	Navigating a just and inclusive path towards sustainable oceans	2018	Marine Policy
SR9	Bennett N.J., Cisneros-Montemayor A.M., Blythe J., Silver J.J., Singh G., Andrews N., Calò A., Christie P., Di Franco A., Finkbeiner E.M., Gelcich S., Guidetti P., Harper S., Hotte N., Kittinger J.N., Le Billon P., Lister J., López de la Lama R., McKinley E., Scholtens J., Solås A.-M., Sowman M., Talloni-Álvarez N., Teh L.C.L., Voyer M., Sumaila U.R.	Towards a sustainable and equitable blue economy	2019	Nature Sustainability

SR10	Blythe J., Silver J., Evans L., Armitage D., Bennett N. J., Moore M-L., Morrison T.H., Brown K.	The Dark Side of Transformation: Latent Risks in Contemporary Sustainability Discourse	2018	Antipode
SR11	Brent Z.W., Barbesgaard M., Pedersen C.	The Blue Fix: What's driving blue growth?	2020	Sustainability Science
SR12	Brits P., Nel M.	A wake-up call for Navies in the SADC region: towards more effective maritime law enforcement	2016	Acta Criminologica: African Journal of Criminology and Victimology
SR13	Bueger C., Wivel A.	How do small island States maximize influence? Creole diplomacy and the smart state foreign policy of the Seychelles	2018	Journal of the Indian Ocean Region
SR14	Carr L.M.	Marine spatial planning in a climate of uncertainty – An Irish perspective	2019	Irish Geography
SR15	Carver R.	Lessons for blue degrowth from Namibia's emerging blue economy	2020	Sustainability Science
SR16	Chen J.-L., Hsu K., Chuang C.-T.	How do fishery resources enhance the development of coastal fishing communities: Lessons learned from a community-based sea farming project in Taiwan	2020	Ocean and Coastal Management
SR17	Childs J.	Performing 'blue degrowth': critiquing seabed mining in Papua New Guinea through creative practice	2020	Sustainability Science
SR18	Cisneros-Montemayor A.M., Moreno-Báez M., Voyer M., Allison E.H., Cheung W.W.L., Hessing-Lewis M., Oyinlola M.A., Singh G.G., Swartz W., Ota Y.	Social equity and benefits as the nexus of a transformative Blue Economy: A sectoral review of implications	2019	Marine Policy
SR19	Cohen P.J., Allison E.H., Andrew N.L., Cinner J., Evans L.S., Fabinyi M., Garces L.R., Hall S.J., Hicks C.C., Hughes T.P., Jentoft S., Mills D.J., Masu R., Mbaru E.K., Ratner B.D.	Securing a just space for small-scale fisheries in the blue economy	2019	Frontiers in Marine Science

SR20	Dalton G., Bardócz T., Blanch M., Campbell D., Johnson K., Lawrence G., Lilas T., Friis-Madsen E., Neumann F., Nikitas N., Ortega S.T., Pletsas D., Simal P.D., Sørensen H.C., Stefanakou A., Masters I.	Feasibility of investment in Blue Growth multiple-use of space and multi-use platform projects; results of a novel assessment approach and case studies	2019	Renewable and Sustainable Energy Reviews
SR21	Ding L.-L., Lei L., Wang L., Zhang L.-F., Calin A.C.	A novel cooperative game network DEA model for marine circular economy performance evaluation of China	2020	Journal of Cleaner Production
SR22	Fairbanks L., Boucquey N., Campbell L.M., Wise S.	Remaking oceans governance: Critical perspectives on marine spatial planning	2019	Environment and Society: Advances in Research
SR23	Findlay K.	Operation Phakisa and unlocking South Africa's ocean economy	2018	Journal of the Indian Ocean Region
SR24	Fouche, H.	Combating threats to security in Africa's maritime domain: opportunities and challenges	2014	Acta Criminologica: African Journal of Criminology and Victimology
SR25	Friess B., Grémaud-Colombier M.	Policy outlook: Recent evolutions of maritime spatial planning in the European Union	2019	Marine Policy
SR26	Garland M., Axon S., Graziano M., Morrissey J., Heidkamp C.P.	The blue economy: Identifying geographic concepts and sensitivities	2019	Geography Compass
SR27	Golden J.S., Virdin J., Nowacek D., Halpin P., Bennear L., Patil P.G.	Making sure the blue economy is green	2017	Nature Ecology and Evolution
SR28	Gonzales A.T., Kelley E., Bernad, S.R.Q.	A review of intergovernmental collaboration in ecosystem-based governance of the large marine ecosystems of East Asia	2019	Deep Sea Research Part II: Topical Studies in Oceanography
SR29	Graziano M., Alexander K.A., Liesch M., Lema E., Torres J.A.	Understanding an emerging economic discourse through regional analysis: Blue economy clusters in the U.S. Great Lakes basin	2019	Applied Geography

SR30	Guidetti P., Danovaro R.	Global ocean conservation under the magnifying glass	2018	Aquatic Conservation: Marine and Freshwater Ecosystems
SR31	Hampton M.P., Jeyacheya J.	Tourism-Dependent Small Islands, Inclusive Growth, and the Blue Economy	2020	One Earth
SR32	Hossain D., Islam M.S.	Unfolding Bangladesh-India maritime connectivity in the Bay of Bengal region: a Bangladesh perspective	2019	Journal of the Indian Ocean Region
SR33	Howard, B.C	Blue growth: Stakeholder perspectives	2018	Marine Policy
SR34	Johansen D.F., Vestvik R.A	The cost of saving our ocean - estimating the funding gap of sustainable development goal 14	2020	Marine Policy
SR35	Jouffray J-L., Blasiak R., Norström A.V., Osterblom H., Nyström M.	The Blue Acceleration: The Trajectory of Human Expansion into the Ocean	2020	One Earth
SR36	Kaczynski W.(.M.)	The Future of Blue Economy: Lessons For European Union	2011	Foundations of Management
SR37	Katila J., Ala-Rämi K., Repka S., Rendon E., Törrönen J.	Defining and quantifying the sea-based economy to support regional blue growth strategies – Case Gulf of Bothnia	2019	Marine Policy
SR38	Keen M.R., Schwarz A.-M., Wini-Simeon L.	Towards defining the Blue Economy: Practical lessons from Pacific Ocean governance	2018	Marine Policy
SR39	Kronfeld-Goharani U.	Maritime economy: Insights on corporate visions and strategies towards sustainability	2018	Ocean and Coastal Management
SR40	Laffoley D.,Baxter J., Lefebvre C.,Sévin M-A., Simard F.	Building MPA networks by 2020: IMPAC3 achievements, future challenges and next steps	2014	Aquatic Conservation: Marine and Freshwater Ecosystems
SR41	Lähteenmäki-Uutela A., Repka S., Haukioja T., Pohjola T.	How to recognize and measure the economic impacts of environmental	2017	Journal of Cleaner Production

		regulation: The Sulphur Emission Control Area case		
SR42	Lee K.-H., Noh J., Khim J.S.	The Blue Economy and the United Nations' sustainable development goals: Challenges and opportunities	2020	Environment International
SR43	Levin L.A., Bett B.J., Gates A.R., Heimbach P., Howe B.M., Janssen F., McCurdy A., Ruhl H.A., Snelgrove P., Stocks K.I., Bailey D., Baumann-Pickering S., Beaverson C., Benfield M.C., Booth D.J., Carreiro-Silva M., Colaço A., Eblé M.C., Fowler A.M., Gjerde K.M., Jones D.O.B., Katsumata K., Kelley D., Bris N.L., Leonardi A.P., Lejzerowicz F., Macreadie P.I., McLean D., Meitz F., Morato T., Netburn A., Pawlowski J., Smith C.R., Sun S., Uchida H., Vardaro M.F., Venkatesan R., Weller R.A.	Global observing needs in the deep ocean	2019	Frontiers in Marine Science
SR44	Lin X., Zheng L., Li W.	Measurement of the contributions of science and technology to the marine fisheries industry in the coastal regions of China	2019	Marine Policy
SR45	Link J.S., Thébaud O., Smith D.C., Smith A.D.M., Schmidt J., Rice J., Poos J.J., Pita C., Lipton D., Kraan M., Frusher S., Doyen L., Cudennec A., Criddle K., Bailly D.	Keeping Humans in the Ecosystem	2017	ICES Journal of Marine Science
SR46	Llewellyn L.E., English S., Barnwell S.	A roadmap to a sustainable Indian Ocean blue economy	2016	Journal of the Indian Ocean Region
SR47	Lombard A.T., Ban N.C., Smith J.L., Lester S.E., Sink K.J., Wood S.A., Jacob A.L., Kyriazi Z., Tingey R., Sims H.E.	Practical approaches and advances in spatial tools to achieve multi-objective marine spatial planning	2019	Frontiers in Marine Science
SR48	Lombard A.T., Dorrington R.A., Reed J.R., Ortega-Cisneros K., Penry G.S., Pichegru L., Smit K.P., Vermeulen E.A., Witteveen	Key challenges in advancing an ecosystem-based approach to marine spatial planning under economic growth imperatives	2019	Frontiers in Marine Science

	M., Sink K.J., McInnes A.M., Ginsburg T.			
SR49	Mallin M.F., Stolz D.C., Thompson B.S., Barbesgaard M.	In oceans we trust: Conservation, philanthropy, and the political economy of the Phoenix Islands Protected Area	2019	Marine Policy
SR50	Matiza T., Slabbert E.	Tourism: the new(er) frontier of Africa's sustainable development agenda?	2019	AfricaGrowth Agenda
SR51	Míguez B.M., Novellino A., Vinci M., Claus S., Calewaert J.-B., Vallius H., Schmitt T., Pititto A., Giorgetti A., Askew N., Iona S., Schaap D., Pinardi N., Harpham Q., Kater B.J., Populus J., She J., Palazov A.V., McMeel O., Oset P., Lear D., Manzella G.M.R., Gorringe P., Simoncelli S., Larkin K., Holdsworth N., Arvanitidis C.D., Jack M.E.M., Chaves Montero M.M., Herman P.M.J., Hernandez F.	The European Marine Observation and Data Network (EMODnet): Visions and roles of the gateway to marine data in Europe	2019	Frontiers in Marine Science
SR52	Miloslavich P., Bax N.J., Simmons S.E., Klein E., Appeltans W., Aburto-Oropeza O., Andersen Garcia M., Batten S.D., Benedetti-Cecchi L., Checkley D.M., Jr., Chiba S., Duffy J.E., Dunn D.C., Fischer A., Gunn J., Kudela R., Marsac F., Muller-Karger F.E., Obura D., Shin Y.-J.	Essential ocean variables for global sustained observations of biodiversity and ecosystem changes	2018	Global Change Biology
SR53	Miloslavich P., Seeyave S., Muller-Karger F., Bax N., Ali E., Delgado C., Evers-King H., Loveday B., Lutz V., Newton J., Nolan G., Peralta Brichtova A.C., Traeger-Chatterjee C., Urban E.	Challenges for global ocean observation: the need for increased human capacity	2019	Journal of Operational Oceanography
SR54	Mthuli S.A., Biyela A.C.	An African perspective on the relationship between home town location and course enrolment in maritime education training: the case of Kwazulu-Natal, South Africa	2019	Gender and Behaviour

SR55	Mulazzani L., Malorgio G.	Blue growth and ecosystem services	2017	Marine Policy
SR56	Murray F., Needham K., Gormley K., Rouse S., Coolen J.W.P., Billett D., Dannheim J., Birchenough S.N.R., Hyder K., Heard R., Ferris J.S., Holstein J.M., Henry L.-A., McMeel O., Calewaert J.-B., Roberts J.M.	Data challenges and opportunities for environmental management of North Sea oil and gas decommissioning in an era of blue growth	2018	Marine Policy
SR57	Nel M., Vrey F.	Africa's rising maritime agenda: public goods at sea	2016	Acta Criminologica: African Journal of Criminology and Victimology
SR58	Nguyen K.A.T., Jolly C.M., Nguelifack B.M.	Biodiversity, coastal protection and resource endowment: Policy options for improving ocean health	2018	Journal of Policy Modeling
SR59	Niavis S., Papatheochari T., Kyratsoulis T., Coccossis H.	Revealing the potential of maritime transport for 'Blue Economy' in the Adriatic-Ionian Region	2017	Case Studies on Transport Policy
SR60	Nogué-Algueró B.	Growth in the docks: ports, metabolic flows and socio-environmental impacts	2020	Sustainability Science
SR61	Papadimitriou, A., Pangalos K., Duvaux-Béchon I., Giannopapa C.	Space as an Enabler in the Maritime Sector	2019	Acta Astronautica
SR62	Posner S.M., Fenichel E.P., McCauley D.J., Biedenweg K., Brumbaugh R.D., Costello C., Joyce F.H., Goldman E., Mannix H.	Boundary spanning among research and policy communities to address the emerging industrial revolution in the ocean	2020	Environmental Science and Policy
SR63	Potgieter T.	Oceans economy, blue economy, and security: notes on the South African potential and developments	2018	Journal of the Indian Ocean Region
SR64	Qi X., Zhao B., Zhang J., Xiao W.	The drawing of a national blue product space and its evolution	2020	Marine Policy
SR65	Rahman M.R.	Blue economy and maritime cooperation in the bay of Bengal: Role of Bangladesh	2017	Procedia Engineering

SR66	Rayner R., Gouldman C., Willis Z.	The Ocean Enterprise–understanding and quantifying business activity in support of observing, measuring and forecasting the ocean	2019	Journal of Operational Oceanography
SR67	Rayner R., Jolly C., Gouldman C.	Ocean observing and the blue economy	2019	Frontiers in Marine Science
SR68	Reinertsen H., Asdal K.	Calculating the blue economy: producing trust in numbers with business tools and reflexive objectivity	2019	Journal of Cultural Economy
SR69	Rickels W., Weigand C., Grasse P., Schmidt J., Voss R.	Does the European Union achieve comprehensive blue growth? Progress of EU coastal States in the Baltic and North Sea, and the Atlantic Ocean against sustainable development goal 14	2019	Marine Policy
SR70	Rilov G., Fraschetti S., Gissi E., Pipitone C., Badalamenti F., Tamburello L., Menini E., Goriup P., Mazaris A.D., Garrabou J., Benedetti-Cecchi L., Danovaro R., Loiseau C., Claudet J., Katsanevakis S.	A fast-moving target: achieving marine conservation goals under shifting climate and policies	2020	Ecological Applications
SR71	Rogerson C.M., Rogerson J.M.	Emergent planning for South Africa's blue economy: Evidence from coastal and marine tourism	2019	Urbani Izziv
SR72	Sangha K.K., Stoeckl N., Crossman N., Costanza R.	A state-wide economic assessment of coastal and marine ecosystem services to inform sustainable development policies in the Northern Territory, Australia	2019	Marine Policy
SR73	Sarker S., Bhuyan M.A.H., Rahman M.M., Islam M.A., Hossain M.S., Basak S.C., Islam M.M.	From science to action: Exploring the potentials of Blue Economy for enhancing economic sustainability in Bangladesh	2018	Ocean and Coastal Management
SR74	Smith-Godfrey S.	Defining the blue economy	2016	Maritime Affairs

SR75	Spamer J.	Riding the African Blue Economy wave: A South African perspective	2015	2015 4th IEEE International Conference on Advanced Logistics and Transport, IEEE ICALT 2015
SR76	Stanca C., Olteanu A., Stinga V.	The labor market in the Blue Economy	2018	Journal of Physics: Conference Series
SR77	Steven A.D.L., Vanderklift M.A., Bohler-Muller N.	A new narrative for the Blue Economy and Blue Carbon	2019	Journal of the Indian Ocean Region
SR78	Suárez-de Vivero J.L., Rodríguez Mateos J.C.	Forecasting geopolitical risks: Oceans as source of instability	2017	Marine Policy
SR79	Suárez-de Vivero J.L., Rodríguez-Mateos J.C.	Food security as a security issue. A perspective from maritime policy and maritime security initiatives	2018	Ocean & Coastal Management
SR80	Surís-Regueiro J.C., Garza-Gil M.D., Varela-Lafuente M.M.	Marine economy: A proposal for its definition in the European Union	2013	Marine Policy
SR81	Thiele T., Gerber L.R.	Innovative financing for the High Seas	2017	Aquatic Conservation: Marine and Freshwater Ecosystems
SR82	van Wyk J.-A.	Defining the blue economy as a South African strategic priority: toward a sustainable 10th province?	2015	Journal of the Indian Ocean Region
SR83	Voyer M., Barclay K., McIlgorm A., Mazur N.	Using a well-being approach to develop a framework for an integrated socio-economic evaluation of professional fishing	2017	Fish and Fisheries
SR84	Voyer M., Quirk G., McIlgorm A., Azmi K.	Shades of blue: what do competing interpretations of the Blue Economy mean for oceans governance?	2018	Journal of Environmental Policy and Planning
SR85	Voyer M., Schofield C., Azmi K., Warner R., McIlgorm A., Quirk G.	Maritime security and the Blue Economy: intersections and interdependencies in the Indian Ocean	2018	Journal of the Indian Ocean Region

SR86	Voyer M., van Leeuwen J.	'Social license to operate' in the Blue Economy	2019	Resources Policy
SR87	Weller R.A., Baker D.J., Glackin M.M., Roberts S.J., Schmitt R.W., Twigg E.S., Vimont D.J.	The challenge of sustaining ocean observations	2019	Frontiers in Marine Science
SRB01	Alharthi, M., Hanif, I.	Impact of blue economy factors on economic growth in the SAARC countries	2020	Maritime Business Review
SRB02	Andriamahefazafy, M., Kull, C.A.	Materializing the blue economy: Tuna fisheries and the theory of access in the Western Indian Ocean	2019	Journal of Political Ecology
SRB03	Apitz, S.E.	Building a Sustainable Blue Economy While Supporting Life Beneath the Seas	2020	Integrated Environmental Assessment and Management
SRB04	Belton, B., Little, D.C., Zhang, W., Edwards, P., Skladany, M., Thilsted, S.H.	Farming fish in the sea will not nourish the world	2020	Nature Communications
SRB05	Boschetti, F., Bulman, C.M., Hobday, A.J., Fulton, E.A., Contardo, S., Lozano-Montes, H., Robinson, L.M., Smith, A.D.M., Strzelecki, J., Ingrid van Putten, E.	Sectoral Futures Are Conditional on Choices of Global and National Scenarios – Australian Marine Examples	2020	Frontiers in Marine Science
SRB06	Brodie, G., Brodie, J., Maata, M., Peter, M., Otiawa, T., Devlin, M.J.	Seagrass habitat in Tarawa Lagoon, Kiribati: Service benefits and links to national priority issues	2020	Marine Pollution Bulletin
SRB07	Caswell, B.A., Klein, E.S., Alleway, H.K., Ball, J.E., Botero, J., Cardinale, M., Eero, M., Engelhard, G.H., Fortibuoni, T., Giraldo, A.-J., Hentati-Sundberg, J., Jones, P., Kittinger, J.N., Krause, G., Lajus, D.L., Lajus, J., Lau, S.C.Y., Lescrauwaet, A.-K., MacKenzie, B.R., McKenzie, M., Ojaveer, H., Pandolfi, J.M., Raicevich, S., Russell, B.D., Sundelöf, A., Thorpe, R.B., zu Ermgassen, P.S.E., Thurstan, R.H.	Something old, something new: Historical perspectives provide lessons for blue growth agendas	2020	Fish and Fisheries
SRB08	Childs, J., Hicks, C.C.	Securing the blue: Political ecologies of the blue economy in Africa	2019	Journal of Political Ecology

SRB09	Cochrane, K.L.	Reconciling sustainability, economic efficiency and equity in marine fisheries: Has there been progress in the last 20 years?	2020	Fish and Fisheries
SRB10	Copping, A.E., Hemery, L.G., Overhus, D.M., Garavelli, L., Freeman, M.C., Whiting, J.M., Gorton, A.M., Farr, H.K., Rose, D.J., Tugade, L.G.	Potential environmental effects of marine renewable energy development—the state of the science	2020	Journal of Marine Science and Engineering
SRB11	Dundas, S.J., Levine, A.S., Lewison, R.L., Doerr, A.N., White, C., Galloway, A.W.E., Garza, C., Hazen, E.L., Padilla-Gamiño, J., Samhouri, J.F., Spalding, A., Stier, A., White, J.W.	Integrating oceans into climate policy: Any green new deal needs a splash of blue	2020	Conservation Letters
SRB12	Fenichel, E.P., Addicott, E.T., Grimsrud, K.M., Lange, G.-M., Porras, I., Milligan, B.	Modifying national accounts for sustainable ocean development	2020	Nature Sustainability
SRB13	Finke, G., Gee, K., Gxaba, T., Sorgenfrei, R., Russo, V., Pinto, D., Nsiangango, S.E., Sousa, L.N., Braby, R., Alves, F.L., Heinrichs, B., Kreiner, A., Amunyela, M., Popose, G., Ramakulukusha, M., Naidoo, A., Mausolf, E., Nsingi, K.K.	Marine Spatial Planning in the Benguela Current Large Marine Ecosystem	2020	Environmental Development
SRB14	Finke, G., Gee, K., Kreiner, A., Amunyela, M., Braby, R.	Namibia's way to Marine Spatial Planning – Using existing practices or instigating its own approach?	2020	Marine Policy
SRB15	Gerhardinger, L.C., Andrade, M.M.D., Corrêa, M.R., Turra, A.	Crafting a sustainability transition experiment for the Brazilian blue economy	2020	Marine Policy
SRB16	Hassan, D., Ashraf, M.A.A.	Institutional arrangements for the blue economy: Marine spatial planning a way forward	2019	Journal of Ocean and Coastal Economics
SRB17	Hassanali, K.	CARICOM and the blue economy – Multiple understandings and their implications for global engagement	2020	Marine Policy

SRB18	Herrera-Racionero, P., Martínez-Novo, R., Lizcano, E., Miret-Pastor, L.	Sea-based aquafarming and traditional fishery: Oceans apart?	2020	Journal of Rural Studies
SRB19	Howe, D., Nader, J.-R., Macfarlane, G.	Experimental investigation of multiple oscillating water column wave energy converters integrated in a floating breakwater: Wave attenuation and motion characteristics	2020	Applied Ocean Research
SRB20	Hussain, M.G., Failler, P., Sarker, S.	Future importance of maritime activities in Bangladesh	2019	Journal of Ocean and Coastal Economics
SRB21	Kadagi, N.I., Okafor-Yarwood, I., Glaser, S., Lien, Z.	Joint management of shared resources as an alternative approach for addressing maritime boundary disputes: the Kenya-Somalia maritime boundary dispute	2020	Journal of the Indian Ocean Region
SRB22	Kang, W.-L., Zou, Y.-K., Wang, L., Liu, X.-M.	Measurements and factors of biased technological progress in China's marine economy	2020	Polish Journal of Environmental Studies
SRB23	Karani, P., Pierre Failler	Comparative coastal and marine tourism, climate change, and the blue economy in African Large Marine Ecosystems,	2020	Environmental Development,
SRB24	Karim, M.S., Techera, E., Arif, A.A.	Ecosystem-based fisheries management and the precautionary approach in the Indian Ocean regional fisheries management organisations	2020	Marine Pollution Bulletin
SRB25	Laffoley, D., Baxter, J.M., Amon, D.J.,Claudet, J., Hall-Spencer, J.M., Grorud-Colvert, K., Levin, L.A., Reid, P.C., Rogers, A.D., Taylor, M.L., Woodall, L.C., Andersen, N.F.	Evolving the narrative for protecting a rapidly changing ocean	2020	Aquatic Conservation: Marine and Freshwater Ecosystems
SRB26	Mallin, F., Barbesgaard, M.	Awash with contradiction: Capital, ocean space and the logics of the Blue Economy Paradigm	2020	Geoforum

SRB27	Munien, S., Gumede, A., Gounden, R., Bob, U., Gounden, D., Perry, N.S.	Profile of visitors to coastal and marine tourism locations in cape town, South Africa	2019	Geojournal of Tourism and Geosites
SRB28	Mas, I. M.	The fishing footprint of a tourism-based economy: Displacing seafood consumption from local to distant waters in the Balearic Islands	2015	Journal of Political Ecology
SRB29	Obura, D.O.	Getting to 2030 - Scaling effort to ambition through a narrative model of the SDGs,	2020	Marine Policy,
SRB30	Okafor-Yarwood, I., Kadagi, N.I., Miranda, N.A.F., Uku, J., Elegbede, I.O., Adewumi, I.J.	The blue economy-cultural livelihood-ecosystem conservation triangle: The African experience	2020	Frontiers in Marine Science
SRB31	Paterson, S.K., Le Tissier, M., Whyte, H., Robinson, L.B., Thielking, K., Ingram, M., McCord, J.	Examining the Potential of Art-Science Collaborations in the Anthropocene: A Case Study of Catching a Wave	2020	Frontiers in Marine Science
SRB32	Patil, P.G., Virdin, J., Colgan, C.S., Hussain, M.G., Failler, P.	Initial measures of the economic activity linked to Bangladesh's ocean space, and implications for the country's blue economy policy objectives	2019	Journal of Ocean and Coastal Economics
SRB33	Purdon, J., Shabangu, F.W., Pienaar, M., Somers, M.J., Findlay, K.	Cetacean species richness in relation to anthropogenic impacts and areas of protection in South Africa's mainland Exclusive Economic Zone	2020	Ocean and Coastal Management
SRB34	Rasowo, J.O., Orina, P., Nyonje, B., Awuor, S., Olendi, R.	Harnessing Kenya's Blue Economy: prospects and challenges	2020	Journal of the Indian Ocean Region
SRB35	Ryabinin, V.	Management of Large Marine Ecosystems in Africa: A commentary from Vladimir Ryabinin, the IOC Executive Secretary,	2020	Environmental Development,
SRB36	Sarker, S., Hussain, F.A., Assaduzzaman, M., Failler, P.	Blue economy and climate change: Bangladesh perspective	2019	Journal of Ocean and Coastal Economics
SRB37	Schutter, M.S., Hicks, C.C.	Networking the blue economy in Seychelles: Pioneers,	2019	Journal of Political Ecology

		resistance, and the power of influence		
SRB38	Shao, Qinglong	Nonlinear effects of marine economic growth and technological innovation on marine pollution: Panel threshold analysis for China's 11 coastal regions,	2020	Marine Policy,
SRB39	Stebbings, E., Papathanasopoulou, E., Hooper, T., Austen, M.C., Yan, X.	The marine economy of the United Kingdom	2020	Marine Policy
SRB40	Surbun, V	Charting South Africa's global maritime foreign policy and its global and regional memberships in the maritime realm	2019	South African Journal of Military Studies
SRB41	Tirumala, R.D., Tiwari, P.	Innovative financing mechanism for blue economy projects	2020	Marine Policy
SRB42	Toplu Yilmaz, Ö.	Analysis of fisheries support estimate for sustainable blue economy	2020	Yuzuncu Yil University Journal of Agricultural Sciences
SRB43	van den Burg,S.W.K., Maximilian Felix Schupp, Daniel Depellegrin, Andrea Barbanti, Sandy Kerr,	Development of multi-use platforms at sea: Barriers to realising Blue Growth,	2020	Ocean Engineering,
SRB44	van Nieuwkerk. A, Manganyi, C	South Africa's maritime foreign policy: a conceptual framework	2019	South African Journal of Military Studies
SRB45	Van Vranken, C., Vastenhoud, B.M.J., Manning, J.P., Plet-Hansen, K.S., Jakoboski, J., Gorringe, P., Martinelli, M.	Fishing Gear as a Data Collection Platform: Opportunities to Fill Spatial and Temporal Gaps in Operational Sub-Surface Observation Networks	2020	Frontiers in Marine Science
SRB46	von Schuckmann, K., Holland, E., Haugan, P., Thomson, P.	Ocean science, data, and services for the UN 2030 Sustainable Development Goals	2020	Marine Policy
SRB47	Voyer, M., Anna K. Farmery, Lana Kajlich, Astrid Vachette, Genevieve Quirk,	Assessing policy coherence and coordination in the sustainable development of a Blue Economy. A case study from Timor Leste	2020	Ocean & Coastal Management,

SRB48	Vrey, Francois	Operation Phakisa: Reflections Upon an Ambitious Maritime-Led Government Initiative	2019	South African Journal of Military Studies
SRB49	Walker, T	SADC's pursuit of maritime security in a region lacking regionalism	2019	South African Journal of Military Studies
SRB50	Whisnant, R.	Investing in the new blue economy: The changing role of international development organizations in catalyzing private sector investment in support of regional strategic action programmes for the sustainable development of coasts and oceans	2019	Journal of Ocean and Coastal Economics
SRB51	Winther, J.-G., Dai, M., Rist, T., Hoel, A.H., Li, Y., Trice, A., Morrissey, K., Juinio-Meñez, M.A., Fernandes, L., Unger, S., Scarano, F.R., Halpin, P., Whitehouse, S.	Integrated ocean management for a sustainable ocean economy	2020	Nature Ecology and Evolution
SRB52	Zhang, Y., Ravesteijn, W.	Sustainable port development based on the blue economy framework in China: The example of Gingdao port	2019	WIT Transactions on the Built Environment

Appendix 2: Geographical list identifying countries grouped by region for Figure 2.4.

Geographical Focus (e.g., global, regional, country-level)	Country
Global	General global oceans focus
North America	USA
South America	Brazil
CARICOM	CARICOM
Australia	Australia
Indian Ocean Region	Indian Ocean region
Pacific Islands	Kiribati
	Pacific Islands
	Papua New Guinea
Europe	EU
	Spain
	Balearic Islands (Spain)
	Ireland
	Northern European
	Norway
	UK
Asia	Bangladesh
	China
	Bay of Bengal
	Bangladesh/South Asia
	East Asia
	South Asia
	Taiwan
	Timor Leste
Africa	Africa

	South Africa
	Namibia
	Seychelles
	Western Indian Ocean
	Benguela Current
	Kenya
	Somalia
	SADC region
	Southwest Indian Ocean

Appendix 3: 'Blue Economy' definitions analysed for Chapter 2

'Blue Economy' definitions and references as provided in the thirty-three peer-reviewed articles which provided a definition. Note that this does not include the terminology review papers as discussed in Figure 2.6. The text has been colour coded to identify the economic, social and environmental inclusion, i.e. what is the 'Blue Economy' meant to achieve or who should it benefit.

Blue –focus on economic development, economic growth, industry development, resource use

Green – focus on environmental sustainability, ecosystem protection, sustainable management

Gold - focus on social development, inclusion, community job creation, livelihood improvement

Article Code	Definition provided in the text	References noted	Social Development and Inclusivity	Environmental Sustainability	Economic Development
SR01	Concept for the **sustainable management** of natural maritime and freshwater resources. Blue Economy conceptualizes oceans and seas as **'development spaces'**.	-		x	x
SR03	The concept of blue economy, in the context of marine resource use in coastal countries, comprises "the range of **economic and related policies** that together determine whether the use of the oceanic resources is **sustainable**" and "seeks to promote **economic growth**, **social inclusion, and the preservation or**	World Bank (2017)	x	x	x

	improvement of livelihoods while at the same time ensuring **environmental sustainability** of the oceans and coastal areas”				
SR06	Rather than seeing opposing interests and contradictory dynamics between the search for **growth and economic profit** on the one hand and **conservation and restoration** of ocean resources in order to **tackle and mitigate climate change** on the other hand, blue growth envisions ‘triple-benefit’ solutions, where everybody supposedly wins: **coastal communities**, the **environment** and **investors**.	Silver et al. (2015), FAO (2015)	x	x	x
SR07	The decoupling of **socio-economic activities and development** from **environmental** degradation and optimizing the benefits which may be derived from marine resources.	UNCTAD (2014a)		x	x
SR08	The Blue Economy 'aims to **capitalize** on living and non-living marine resources'	Ehlers (2016), World Bank (2017), Silver et al. (2015)			x
SR09	**Socially equitable** and **sustainable development** encapsulate international interest in the growth of ocean-based **economic development**	Campbell (2016), Silver et al. (2015), UNCTAD	x	x	x

		(2014a), Michel (2017)		
SR15	The blue economy agenda builds on development rhetoric and is professed to **sustainably utilise** ocean resources for **economic growth** without compromising the health of the ecosystem	World Bank (2017)	x	x
SR16	The 'program is aimed at promoting coastal **economic industries** according to the principles of **sustainable development** so as to meet the sustainable development goals (SDGs)'	Whisnant and Reyes (2015), OECD (2016), Patil et al. (2016)	x	x
SR19	The Blue Economy aims to tap into the estimated USD 24 trillion in potential goods and services (i.e., energy generation, mining, tourism, maritime transport, aquaculture, and capture fisheries), derived from the world's oceans, and to balance industrialization of oceans with environmental protection	Hoegh-Guldberg et al. (2015), The Economist (2015)	x	x
SR23	A 'sustainable ocean (or "blue") economy emerges when **economic activity** is in balance with the long-term capacity of ocean ecosystems to support this activity and **remain resilient and healthy**,'	The Economist (2015)	x	x
SR27	A sustainable ocean economy, where economic activity is in balance with the long-term carrying capacity of ocean ecosystems	Silver et al. (2015)	x	x

SR28	"[A] practical ocean-based **economic model** using green infrastructure and technologies, innovative financing mechanisms and proactive institutional arrangements for meeting the twin goals of protecting our oceans and coasts and enhancing its potential contribution to **sustainable development**, including **improving human well-being**, and **reducing environmental risks and ecological scarcities**."	PEMSEA (2012)	x	x	x
SR31	‘‘[B]lue economy’’ concept seeks to retain the benefits of the **growing ocean economy** while developing it in a responsible way to ensure the **sustainable use of the ocean’s resources** to **increase well-being and equity** in coastal and island societies	Roberts and Ali (2016)	x	x	x
SR33	Sustainable development of ocean resources	-		x	x
SR40	The blue economy includes all **industries** that are dependent in some way for their development on ocean resources	-			x
SR41	Socio-economic activity is in balance with the long-term ecological sustainability of the natural environment	The Economist Intelligence Unit (2015)		x	x
SR44	Blue economy includes established **ocean industries**, such as catch fisheries, maritime transport, and tourism, as well as emerging and new activities, such as aquaculture, marine biotechnology and bioprospecting, and seabed extractive activities	-			x

SR46	A commonly used phrase to refer to **economic activity** dependent upon marine ecosystems or the seabed	-		x
SR50	Blue economy [is a] strategy for sustainably **exploiting**, managing and **conserving** of South Africa's marine resources	WWF-SA (2016)	x	x
SR59	"Blue Economy" includes all the uses depending on the sea (located either on land or sea) and **producing an economic output**	-		x
SR63	Blue economy growth refers to the **economic potential** of ocean resources, but balanced with the need to **ensure ocean health and sustainability**.	-	x	x
SR64	The term is an evolving concept that realizes the need to maximize the enormous **economic potential** presented by marine and coastal regions that currently have a **direct or indirect economic impact**.	Treloar et al. (2016), Roberts and Ali (2016)		x
SR65	Blue economy defines sustainable **economic development** through utilizing the advantage and strategy of exploring the resources of the blue water	bdnews24.com (2016)		x
SR67	Encompasses both the **economic uses** of the ocean and ocean resources, and the **natural assets and ecosystem services** that the ocean provides (sustainable ocean economy)	-		x

SR68	The blue economy must secure the value of both **nature** and the **economy**	-		x	x
SR70	“[B]lue economy” aims to support and improve human welfare and social stability, while at the same time to reduce environmental risks and ecological losses	UNEP et al. (2012)	x	x	
SR71	“[A]t the core of the concept is the awareness of maritime resources and their capacity to contribute to **poverty reduction, human welfare** and **economic opportunity**”, 'ocean resources always should be used in a **sustainable, stable** and **inclusive** manner'	Doyle (2018), Masie & Bond (2018)	x	x	x
SR73	A concept of economic growth through the sustainable utilization of ocean resources with technological inputs to improve livelihoods and meet the growing demands for jobs without hampering the health of the ocean ecosystem	-	x	x	x
SR75	The [d]efinition in broad relates to ‘**economic and trade activities** that integrate the **conservation and sustainable use and management** of biodiversity, including maritime ecosystems, and genetic resources’	van Wyk (2015)*		x	x
SR76	To '[E]nsure environmental sustainability while promoting social inclusion, economic growth and preservation or improvement of livelihoods'	UNCTAD (2014a),	x	x	x

		UNCTAD (2014b)			
SR77	The Blue Economy encompasses activities that explore, develop and use the ocean's resources, that use the ocean's space and that protect the ocean's ecosystems	World Bank (2017), Voyer et al (2018a), Voyer et al. (2018b)		x	x
SR82	'**[E]conomic and trade activities** that integrate the **conservation and sustainable use and management** of biodiversity, including maritime ecosystems, and genetic resources'	UNCTAD (2014c)		x	x
SR87	"[T]he sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health."	Noted as the World Bank definition but no reference provided.	x	x	x

*This definition referenced the paper by van Wyk (2015), which used the definition provided by UNCTAD (2014c).

Appendix 4: Questionnaire invitation circulated to ocean stakeholder groups as discussed for Chapter 3.

Survey Participation Request - Exploring the 'Oceans Economies' of Western Indian Ocean Coastal Countries

Dear [Stakeholder Network],

The economic development of the oceans is currently receiving much attention with many national, regional and international initiatives being undertaken within the last decade, with the upcoming Oceans Decade likely to bring further focus to the environmental, economic and social importance of the oceans. This is therefore an opportune time to explore how ocean development has been or is being envisioned and implemented across African coastal countries of the Western Indian Ocean (Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, Mauritius, Seychelles and Comoros).

This survey is targeted at researchers, government employees, policy advisors and NGO's working within the marine/maritime sectors of the above listed countries.

This survey forms an important part of a Cape Peninsula University of Technology (CPUT) Masters study - Exploring the 'Oceans Economies' of Western Indian Ocean Coastal Countries. The student is supervised by Prof Ken Findlay.

The information collected in this study will be used to inform policy advice to countries of the Western Indian Ocean and the broader Indian Ocean Rim community.

Please find the link to the survey here: https://forms.gle/NNkV8p365rf1kdLG8

The survey will close on the [date].

Your participation will be greatly valued.

For any further information on the project, please contact Ms Nicole du Plessis - oceans.economy@gmail.com

Appendix 5: Copy of the Questionnaire as discussed for Chapter 3

Exploring the 'Oceans Economies' of Western Indian Ocean Coastal Countries

The economic development of the oceans is rapidly expanding across the planet with many national, regional and international initiatives being undertaken within the last decade. The upcoming United Nations Decade of Ocean Science for Sustainable Development is likely to bring further focus to the environmental, economic and social importance of the oceans and the numerous benefits humans derive from them. It is therefore an opportune time to explore how ocean economic development has been (or is being) envisioned and implemented across African coastal countries of the Western Indian Ocean (including Somalia, Kenya, Tanzania, Mozambique, South Africa, Madagascar, Mauritius, Seychelles and Comoros).

We are consequently conducting this questionnaire survey in this regard and are interested in receiving survey returns from ocean practitioners involved in ocean economy research, policy development and implementation, management and governance within marine and maritime fields within countries of the Western Indian Ocean Region.
This survey forms an important component of a Cape Peninsula University of Technology (CPUT) Masters study that explores the 'Oceans Economies' of Western Indian Ocean Coastal Countries, and ocean governance aspects of expanding ocean economies in the region. The study is being carried out from CPUT's Centre for Sustainable Oceans and is being supervised by the CPUT Research Chair: Oceans Economy, Prof Ken Findlay. It is hoped that the information collected in this study allow comparisons of ocean and blue economy expansion initiatives and processes (and sustainability and inclusivity aspects thereof), and will be used to inform broad policy decisions in countries of the Western Indian Ocean and the wider Indian Ocean Rim community.

For the study 'oceans economy' is used as a general term for the use (whether considering economic, environmental or social aspects) of the oceans.

No personal information will be collected.

Your participation is voluntary and you may request to have your submission removed and deleted by sending an email to the researcher (email: oceans.economy@gmail.com).
Your input will be much appreciated and highly valued.

This survey will take approximately 15-20 minutes to complete.

Thank you for taking the time to complete this survey.

Institutional or Personal Capacity

Please indicate if you are completing the survey in your institutional capacity (Section A) or in your personal capacity (Section B) by completing the relevant section

Section A

Please complete Section A if you intend to complete the survey in your institutional capacity.

1. Ministry/Department/Institution/Organisation

2. Occupation/Designation

3. Country

4. Briefly state what your involvement has been regarding oceans economies at the national and/or international level

Section B

Please complete Section B if you intend to complete the survey in your personal capacity.

5. Occupation/Designation

6. Country

7. Briefly state what your involvement has been regarding oceans economies at the national and/or international level

Section 1: Oceans Economy Terminology

8. What is the preferred term for the economic development of your country's Exclusive Economic Zone?

Mark only one oval.

- ◯ Oceans Economy
- ◯ Blue Economy
- ◯ Maritime Economy
- ◯ Marine Economy
- ◯ Blue Growth
- ◯ Ocean Economy
- ◯ Other: _____

9. What is your understanding on the term listed above?

10. What is the national working definition for the term listed above?

11. If you have heard the term "blue economy" used on national and international platforms, what is your understanding of the term "blue economy"?

Section 2: National Economic Priorities

12. Please list ALL the ministries in your country responsible for the economic development of the ocean.

13. Does your country have a dedicated oceans economy programme, and if yes, what is the programme called?

14. Are there any maritime sectors considered as mature/well developed in your country (older than 10 years)?

Mark only one oval.

- Yes
- No

15. If you answered yes to the above question, please list these sectors

Tick all that apply.

- [ ] Aquaculture
- [ ] Fisheries
- [ ] Fish Processing
- [ ] Shipbuilding and Repair
- [ ] Ports and Warehousing
- [ ] Maritime Transport
- [ ] Offshore Oil and Gas
- [ ] Coastal Tourism
- [ ] Blue Bioeconomy/Biotechnology
- [ ] Desalination
- [ ] Offshore Wind Energy
- [ ] Ocean Energy
- [ ] Marine Environmental Management and Protection
- [ ] Maritime Security

Other: ☐ _____

16. Are there any new maritime sectors which have been established in your country (i.e. last 5-10 years)?

Mark only one oval.

- ◯ Yes
- ◯ No

17. If you answered yes to the above question, please list these sectors

Tick all that apply.

- [ ] Aquaculture
- [ ] Fisheries
- [ ] Fish Processing
- [ ] Shipbuilding and Repair
- [ ] Ports and Warehousing
- [ ] Maritime Transport
- [ ] Offshore Oil and Gas
- [ ] Coastal Tourism
- [ ] Blue Bioeconomy/Biotechnology
- [ ] Desalination
- [ ] Offshore Wind Energy
- [ ] Ocean Energy
- [ ] Marine Environmental Management and Protection
- [ ] Maritime Security

Other: [ ] _____

18. Are there any maritime sectors which have been identified as important to be developed as emerging sectors in your country?

Mark only one oval.

- ( ) Yes
- ( ) No

19. If you answered yes to the above question, please list these sectors.

Tick all that apply.

- [ ] Aquaculture
- [ ] Fisheries
- [ ] Fish Processing
- [ ] Shipbuilding and Repair
- [ ] Ports and Warehousing
- [ ] Maritime Transport
- [ ] Offshore Oil and Gas
- [ ] Coastal Tourism
- [ ] Blue Bioeconomy/Biotechnology
- [ ] Desalination
- [ ] Offshore Wind Energy
- [ ] Ocean Energy
- [ ] Marine Environmental Management and Protection
- [ ] Maritime Security

Other: ☐ _____

20. Does your country include Natural Accounts contributions in its estimations of National Accounts?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not sure

21. If answered yes to above, do these estimations include measurement of the natural capital contributions of non-market related assets?

Mark only one oval.

- ◯ Yes
- ◯ No

22. Has your country determined the oceans economy contribution to the National Accounts?

Mark only one oval.

- Yes
- No

23. If answered yes to above, does your country publicly report or publish the oceans economy contributions to the National Accounts?

Mark only one oval.

- Yes
- No

24. Does your country adhere to the International Standard Industrial Classification of All Economic Activities (ISIC) codes when reporting National Accounts?

Mark only one oval.

- Yes
- No
- Not sure

25. If answered yes to above, which ISIC codes have been used for the selection of sectors when determining the ocean economy contributions to the National Accounts?

26. If possible, please provide a brief description of the methodologies used in the estimation of the National Accounts?

27. If possible, please provide the methodologies used in estimation of natural accounts contribution to the National Accounts if this is calculated in your country.

28. Does your country consider the entire value-chain in estimations of the oceans contributions to the National Accounts, i.e. if the fish processing factory is based inland, would this still form part of the oceans economy?

Mark only one oval.

- Yes
- No
- Not sure

29. Please provide the oceans contributions to the National Accounts as part of the GDP, if this is calculated for your country

Section 3: The Regulatory Environment

30. Please provide the length (km) of your country's coastline.

31. Please list any applicable laws and regulations responsible for your country's oceans.

32. To what extent is compliance monitoring and effectiveness of the above carried out?

33. Have Marine Protected Areas (MPAs) been established in your country?

Mark only one oval.

- Yes
- No
- Not sure

34. If you answered yes to the above, how many MPAs are there?

35. Are the MPA' s representative of all ecosystems in the EEZ?

Mark only one oval.

- Yes
- No
- Not Sure

36. Are there any national processes to evaluate the effectiveness and efficiency of the MPA programme (e.g. World Bank's Management Effectiveness Tracking Tool)?

Mark only one oval.

- Yes
- No
- Not Sure

37. What percentage of the EEZ do the MPAs cover?

38. Does your country have a Marine Spatial Plan (MSP) in place?

Mark only one oval.

- Yes
- No
- Not sure

39. If yes to above, does the MSP make provision for the inclusion of economic, environmental and social stakeholders?

Mark only one oval.

- Yes
- No
- Not Sure

40. Does your country have a national marine and coastal information management system in place?

Mark only one oval.

- Yes
- No
- Not Sure

Section 4: Country-level Skills

41. Has your country conducted a skills-level assessment to determine competencies and skills gaps within the oceans economy sectors?

Mark only one oval.

- Yes
- No
- Not sure

42. If yes to the above, did the skills assessment include ocean governance and environmental protection sectors?

Mark only one oval.

- Yes
- No
- Not Sure

43. If a skills assessment has been conducted, please list the skills gaps identified?

44. Are there programmes in place to address the training needed for developing and emerging oceans economy sectors?

Mark only one oval.

- Yes
- No
- Not sure

45. If yes to the above, are the required skills programmes being addressed through new courses and qualifications being offered at institutions of higher education nationally?

Mark only one oval.

- Yes
- No
- Not Sure

46. If the skills programmes are not being offered nationally, which countries are being partnered with to develop such qualifications?

Section 6: Social Accounts

47. Does your country have equitable access to ocean-based economic opportunities?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not Sure

48. Do the benefits of the oceans economy accrue to particular sectors?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not Sure

49. Do the oceans economy sectors have any environmental or social costs/impacts?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not Sure

50. If yes to the above, could you identify these costs/impacts?

_____

51. Please identify any regulations or government policies to measure these costs/impacts, if these exist.

52. Are there any particular sectors which encourage the involvement of the youth?

Mark only one oval.

- Yes
- No
- Not Sure

53. Please list these sectors, and if possible provide the name of any national programmes.

54. Are there any particular sectors which encourage the involvement of women?

Mark only one oval.

- Yes
- No
- Not Sure

55. Please list these sectors, and if possible provide the name of any national programmes.

Section 6: National Environmental Priorities

56. Please list ALL the ministries responsible for the environmental protection of the ocean.

57. Are there dedicated programmes for developing/implementing environmental management of impacts of maritime sectors in your country?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not sure

58. Has your country implemented any SDG targets related to the ocean (NOT ONLY RELEVANT TO SDG 14)?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not sure

59. If answered yes to above, please list the goals and the targets being addressed.

60. Are you aware of any Ecosystem-based Approaches to Climate Change in your country?

Mark only one oval.

- Yes
- No
- Not sure

61. Please list ALL the Ministries that are engaged in ocean activities.

Section 7: Regional and International Engagements

62. Please list all treaties, commissions and associations that pertain to your country's Exclusive Economic Zone.

63. Do these instruments listed above inform national policies and laws?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not Sure

Section 8: Oceans Development in the time of Covid-19

64. Have there been any impacts to the operations of existing maritime industries, implementation of emerging industries or marine protection-related activities due to the Covid-19 epidemic?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Not sure

65. If you answered yes to the above, please elaborate on this.

Appendix 6: Information on the WIO Regional Strategic Action Programmes

Programme	Problem Areas		Strategic Areas/Components	Cross-cutting Themes	Indicators	Management Tools
WIO-SAP: Protection of the Coastal and Marine Environment of the Western Indian Ocean from Land-based Sources and Activities (WIO-LaB)	Physical alteration and destruction of habitats		Protecting, Restoring and Managing Critical Coastal Habitats	Climate Change Adaptation and Mitigation		
	Water and sediment quality degeneration due to pollution		Ensuring Water Quality			
	Alteration in freshwater flows and sediment loads from rivers		Managing River Flows Wisely			

			Strengthening Governance and Awareness			
WIO-SAP: Sustainable Management of the Western Indian Ocean Large Marine Ecosystems	Water Quality Degradation		An Ecosystem Monitoring Programme		Indicator Theme 1: Fish and Fisheries	Use of Marine Spatial Planning and Development of Marine Protected/Management Areas
	Habitat and Community Modification		A Capacity Building and Training Programme		Indicator Theme 2: Productivity	
	Declines in Living Marine Resources		A Science-Based Governance and Adaptive Management Programme		Indicator Theme 3: Ecosystem Health	
	Environmental Variability and Extreme Events		Community Engagement and Stakeholder Involvement for more Inclusive and Effective Implementation of a		Indicator Theme 4: Water Quality and Pollution	

			Strategic Action Programme for LME Management			
					Indicator Theme 5: Socio-Economics	
SAPPHIRE (Proceeding from WIO-SAP LME)			Component 1: Supporting Policy Harmonization and Management Reforms towards improved ocean governance			
			Component 2: Stress Reduction through Community Engagement and Empowerment in Sustainable Resources			

			Component 3: Stress Reduction through Private Sector/Industry Commitment to transformations in their operations and management practices			
			Component 4: Delivering best practices and lessons through innovative ocean governance demonstration			
			Component 5: Capacity Development to Realise improved ocean governance in the WIO region			
WIOSAP (proceeding from WIO-LaB)			Component A: Sustainable management of critical habitats			

			Component B: Improved water quality			
			Component C: Sustainable management of river flows			
			Component D: Governance and regional collaboration			

Appendix 7: Information on the Regional Economic Communities relevant to the WIO region.

REC (of which WIO State is Member)	WIO Member States	Purpose (Taken from https://au.int/en/organs/recs)	Ocean Programmes and/or Policies	Focus and Intensions of the Programmes and/or Policies	Webpages	Documents	Notes
Common Market for Eastern and Southern Africa (COMESA) (21 MS)	Comoros	The Common Market for Eastern and Southern Africa (COMESA) was established in 1993 by the COMESA Treaty, which has the primary purpose of creating a free trade region. Article 3 of the Treaty provides that the aims and objectives of COMESA are to: attain sustainable growth and development of Member States; promote joint development in all fields of economic activity; cooperate in the creation of an enabling environment		BE one of the nine key priorities of the COMESA industrial policy: Agro-processing, Energy, Textile and Garments, Leather and Leather Products, Mineral Beneficiation, Pharmaceuticals, Chemicals and Agro-Chemicals, Light Engineering and the Blue Economy. These priority areas have been identified as those that will have the greatest impact on the sustainable and inclusive economic growth for COMESA Member States.	https://www.comesa.int/	COMESA. 2019. Action Plan for the COMESA Industrialization Strategy 2019-2026. CS/INDUSTR/III	While BE mentioned under agriculture tab, no additional information was provided on any other webpages or documents.

		for foreign, cross-border and domestic investment; promote peace, security and stability among the Member States; and cooperate in strengthening relations between the Common Market and the rest of the world.					

	Kenya		Implementing part of the MASE programme to combat money laundering. Not specifically focused on maritime interventions.	In the Industrial Strategy 2017-2026 BE dealt with under it's own section as a sector. Text: The development of the Blue Economy holds immense promise for the affected COMESA member States (i.e. Indian Ocean region, large rivers and lakes and Exclusive Economic Zones). Apart from providing routes for trade and commerce, the regions are also endowed with a wealth of natural resources, which are as yet, largely untapped. The development of the Blue Economy in the regions is expected to yield a number of benefits including; providing a boost to coastal and national economies, generating new employment and	https://www.comesa.int/governance-peace-security/	COMESA. 2017. COMESA Industrialization Strategy 2017-2026. CS/INDUSTR/1	COMESA BE Strategy under development. The draft strategy was presented to Member States in April 2022. The formulation of COMESA Blue Economy Strategy was financially supported by the Kingdom of Norway through the African Union Inter-African Bureau for Animal Resources (AU- IBAR).

				capacities, promoting entrepreneurship in new areas of economic activity, facilitating the interconnectedness of the regional economy, utilizing the vast, untapped potential of the regional areas and contributing to sustainable development and climate change mitigation. The areas that must be strategically focused on in the Blue economy are therefore fisheries and aquaculture, renewable ocean energy, transport and logistics, tourism, ocean knowledge clusters, research and development, seabed exploration and minerals. The Blue Economy approach will therefore provide an inclusive and sustainable economic			

				transformation on COMESA Member States whose strengths are in marine and coastal sectors as well as freshwater inland rivers, lakes and economic zones.			

	Madagascar		Blue Economy under Industry and Agriculture	Vision of the Industrial Strategy: “A Globally competitive environmental-friendly, diversified industrial sector which is based on innovation and manufacturing as tools for transforming regional resources into sustainable wealth and prosperity for all”. Strategy also has 'Promoting Sustainable Industrialization' as a policy direction to ' Promoting investment in green technologies to ensure environmental preservation, climate change adaptation and mitigation'	https://www.comesa.int/industry-agriculture/		BE a standalone priority in COMESA Industrialization Strategy 2017-2026.

	Mauritius			Industry and Agriculture: Blue Economy - Support investment in sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem. Services: • We promote and support increased investment in diversification of existing ocean-based economic sectors (particularly fisheries, tourism and ports) to realize greater value and efficiency from the existing resource base; • We support exploration and feasibility of new and emerging maritime sectors (for example sustainable fisheries, marine-based aquaculture, tourism); • We support improved prevention of ocean/blue	https://www.comesa.int/coming-soon-a-regional-blue-economy-strategy/		No specific activities on BE are mentioned in Action Plan 2019-2026. Generalised actions.

				economy risks including illegal, unreported and unregulated (IUU) fishing, marine pollution and climate change through integrated approaches to effective regional cooperation on maritime security.			
	Seychelles						
	Somalia						

Community of Sahel–Saharan States (CEN–SAD) (29 MS)		The Community of Sahel–Saharan States (CEN–SAD) was formed in 1998 with the primary objective of promoting the economic, cultural, political and social integration of its Member States. Article 1 of the Treaty establishing the Community provides that the aims and objectives of CEN–SAD are to: • Establish a comprehensive economic union with a particular focus in the agricultural, industrial, social, cultural and energy fields • Adopt measures to promote free movement of individuals and capital • Promote measures to encourage foreign trade, transportation			Webpage unavailable.		

		and telecommunications among Member States • Promote measures to coordinate educational systems • Promote cooperation in cultural, scientific and technical fields					
	Comoros						
	Somalia						
	Kenya						
East African Community (EAC) (7)	Kenya	The East African Community (EAC) was initiated in 1999 as the regional inter-governmental organisation of the five East African countries. Article 5 of the Treaty for the Establishment of the East African Community States that the objectives of the			http://www.eac.int/		No BE documents.

		community shall be “to develop policies and programmes aimed at widening and deepening co-operation among the Partner States in political, economic, social and cultural fields, research and technology, defence, security and legal and judicial affairs, for their mutual benefit”. The EAC countries established a Customs Union in 2005 and a Common Market in 2010. EAC aims to create a monetary union as the next step in integration and ultimately become a political federation of East African States.					

	UR of Tanzania		Blue Economy under Environment and Natural Resources - Aquatic Ecosystems	The Blue Economy describes the sustainable use and conservation of aquatic resources in both marine and freshwater environments. This includes oceans and seas, coastlines and banks, lakes, rivers and groundwater. It comprises activities that exploit aquatic resources (fisheries, mining, petroleum, biotechnologies, etc.) or use aquatic environments (maritime transport, coastal tourism, etc.), once they are done in an integrated, fair and circular manner. These activities help to improve the health of aquatic ecosystems by establishing protective and restorative measures.	https://www.eac.int/environment/aquatic-ecosystems/blue-economy	EAC. 2021. Sixth EAC Development Strategy 2021/22 - 2025/26. [Funded by USAID-funded (RIGO SSA) Regional Intergovernmental Organization Systems Strengthening Activity Nairobi, Kenya and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Support to East-African People-Centred and	

						Market-Driven Integration (SEAMPEC) On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)]	
				The EAC endeavors to ensure sustainable use of water resources for economic growth, improved livelihoods, and jobs while preserving the health of water ecosystems through economy coping with global water crisis; innovative development economy and	https://www.eac.int/press-releases/141-agriculture-food-security/2081-lake-victoria-fisheries-organization-project-aimed-at-promoting-fish-farming-launched [ECOFISH Programme set to contribute to sustainable fisheries for the blue economy of the Eastern and Southern Africa and Indian Ocean regions]	EAC. 2018. 2nd EAC Regional Pharmaceutical Manufacturing Plan of Action 2017 – 2027. Funded by GIZ on behalf of the Federal Ministry for Economic	

				development of **marine economy**.		Cooperation and Development (BMZ), Germany. Blue biotechnoogy not mentioned as part of strategic actions.	
				Focus on maritime transport and port development. Target of 'Sustainable blue economy policies in place by 2026'.	https://www.eac.int/infrastructure/81-sector/infrastructure	EAC.2011. EAC Climate Change Policy.	Placing BE policy development under marine transport may limit the scope of the development of BE policies and implementation. Aspects of BE spead across EAC sectors.

				Climate Change documents recognised the need to protect marine and coastal ecosystems includin implementing ICZM. 'Due to the importance of the sea and coastline, the welfare of the population living by the coast and the socio-economic value to the countries, the coastline has to be protected against any effect of climate change.'	https://www.eac.int/infrastructure/meteorology-sector	EAC. 2011. East African Community Climate Change Strategy 2011-2016. Final Draft	
				ECOFISH programme (sustainable fishing) focused on Lake Victoria. Supported by EU.		EAC. 2011. East Africa Community Climate Change Master Plan 2011-2031	

				Maritime Transport and Ports also addressed under Infrastructure: 'the Treaty for the establishment of the East African Community States that the Partner States' provision of basic infrastructure shall be one of the Operational Principles of the Community. It outlines in greater detail the need for co-operation in infrastructure and services within the EAC and identifies the key aspects of this co-operation and these include: harmonisation of regulatory laws, rules and practices; construction and maintenance of infrastructure in Partner States and review and re-design of intermodal transport systems,		EAC. 2021. Sixth EAC Development Strategy 2021/22 – 2025/26. Comprehensive Planning and Implementation Matrix [Funded by USAID-funded (RIGO SSA) Regional Intergovernmental Organization Systems Strengthening Activity Nairobi, Kenya and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	

				among others. Transport'.		GmbH Support to East-African People-Centred and Market-Driven Integration (SEAMPEC) On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)]	
				EAC has a 'meteorological sector' project aimed at developing strategies that will ensure the establishment and improvement of data processing and forecasting systems for better distaster risk management.			

Intergovernmental Authority on Development (IGAD) (8 MS)	Kenya	The Intergovernmental Authority on Development (IGAD) was established in 1996 to represent the interests of States in the Eastern Africa region. Under article 7 of the Agreement establishing IGAD, its aims and objectives include promoting joint development strategies; harmonising Member States' policies; achieving regional food security; initiating sustainable development of natural resources; promoting peace and stability in the sub-region; and mobilising resources for the implementation of programmes within the framework of sub-regional cooperation.			https://igad.int/	IGAD. 2022. Concept Note. Ministerial Validation Meeting for IGAD Blue Economy Strategy	

	Somalia		BE under Agriculture and Environment, Sustainable Environment Protection division		https://igad.int/agriculture-environment/; https://igad.int/agriculture-environment/environment-protection-2/; https://igad.int/agriculture-environment/environment-protection-2/igad-blue-economy/	IGAD. 2020. Regional Blue Economy Strategy and Implementation Plan for 5 years (2021-2025). Draft document for discussion at the Ministerial Validation Meeting for IGAD Blue Economy Strategy (2021-2025)	Many newsletter articles on BE activities on ESP page and BE page. Advert for consulatncy to draft BE strategy. National validation workshops for BE strategies. Draft IGAD BE Strategy document as part of meeting notification. Document outlines development of national and regional framework for BE and

							specific activities. IGAD-BE endorsed by Ministers in April 2022.
			Maritime Security under Peace and Security division. The IGAD Integrated Maritime Strategy covers the following priority areas: • maritime governance; • maritime domain critical routes and		https://igad.int/peace-security/maritime-security/	IGAD. 2022. Declaration of Ministers of IGAD Member States on the IGAD Regional Blue Economy Strategy (IGAD-BE)	Part of the MASE (EU) Programme. 2015-2030 IGAD Integrated Maritime Strategy (2015-2030 IGAD IMS) validated in December 2015 in Djibouti. Unable to find a copy.

			infrastructures; • sustainable development and protection of the marine environment; • maritime economy; and • maritime research and mapping.				
			Three main principles that underpin the implementation of the Blue Economy are the circular economy; good governance and environmental and social sustainability.		https://igad.int/about-the-igad-maritime-security-programme/		Tourism under Economic Cooperation, Trade Industry and Tourism division

			The IGAD Blue Economy Strategy and Implementation Plan intend to structure the Blue Economy implementation at both national and regional levels while increasing cooperation and regional integration, and strengthening support to the member States to effectively translate policies into concrete actions. It will also contribute to the effective implementation of the Africa Blue Economy			IGAD. 2020. IGAD Regional Strategy 2021-2025: Implementation Matrix	Maritime Security seen as enabler of BE.

			Strategy (and its up-coming Action Plan). More specifically, the IGAD Blue Economy Strategy aims to: improve the implementation of the BE in all IGAD members States; contribute to the implementation of the Africa Blue Economy Strategy; develop strong harmonizing regional BE initiatives; increase cooperation and regional integration by				

			using the BE as a catalyst to stimulate a converging dynamic of interests and efforts. IGAD has signed a project (enhancing blue economy in the IGAD coastal member States for biodiversity conservations and livelihood diversification) aimed at promoting Blue Economy with funding from Sweden. One component of the strategy is to strengthen the IGAD BE Unit to				

			implement the strategy. Before implementing the strategy, it needs full adoption by MS at Ministerial level.				

			Three main principles that underpin the implementation of Blue Economy are: the circular economy; good governance and environmental and social sustainability.				Strategic Manual for Valuation of Blue Economy was validated in 2019. Unable to find a copy.
			the {BE] definition agreed by member States during the June 2019 Workshop at validation of BE assessment manual: "Blue economy covers water resources, aquatic and marine spaces,				BE development part of the IGAD Regional Strategy 2021-2025

			including oceans, seas, coasts, lakes, rivers and underground waters; Blue economy sectors include productive sectors such as fisheries, aquaculture, tourism, transport, shipbuilding/repair, energy, bioprospection and biotechnologies, underwater mining and other emerging activities; Blue economy also encompasses a sustainability component and				

			includes social and environmental dimensions".				
Southern African Development Community (SADC) (16 MS)	Comoros	The Southern African Development Community (SADC) was formed on 17 August 1992. Under article 5 of the Treaty establishing SADC, as amended in 2001, its objectives include: promoting sustainable and equitable economic growth and development; promoting common political values and systems; consolidating democracy, peace, security and stability; achieving complementarity	Mentioned under Industrial Development and Food, Agriculture and Natural Resources.		https://www.sadc.int/	SADC Secretariat. 2020. Southern African Development Community (SADC) Regional Indicative Strategic Development Plan (RISDP) 2020–2030, Gaborone, Botswana, 2020	Consultancy advert for a study on the development of SADC BE Strategy in 2018. No further information on website.

		between national and regional strategies; maximising productive employment and use of resources; achieving sustainable use of natural resources and effective protection of the environment; and combating HIV/AIDS and other diseases.					
	Madagascar		SADC RISDP mentions focus on sustainable development of integrated Green and Blue Economies that will be expected to generate revenue and employment under Industrial Development and Market Integration (IDMI)		https://www.sadc.int/pillars/fisheries	SADC Secretariat. 2015. SADC Climate Change Strategy and Action Plan	Programme for Improving Fisheries Governance and Blue Economy Trade Corridors in SADC region (PROFISHBLUE). Funded by AfDB. Procurement advert for

			pillar with the outcome of 'Sustainably developed SADC Blue, Green, and Circular Economies'				consultants, 2022.
	Mauritius		SADC RISDP 2020-2030 - IDMI Strategic Objective 4: Deepened regional market integration which is connected to the continental and global markets, Outcome 3: Enhanced cooperation and regional coordination on matters relating to tourism, Key Intervention 3:		https://www.sadc.int/procurement-opportunities/programme-improving-fisheries-governance-and-blue-economy-trade-2	SADC Secretariat. 2015. Green Economy Strategy and Action Plan for Sustainable Development	SADC RISDP 2020-2030 mentions that for progress under the RISDP 2015-2020 - Environment and development : Technical and financial support is being sought to produce and implement the Blue Economy

			Transfrontier conservation areas (including coastal and marine parts) to boost cross-border tourism to TFCAs developed and implemented.				Strategy, and the Secretariat is supporting Member States to develop national blue economy strategies. There is not a a strong focus on marine and coastal developments in RISDP, possibly as BE strategy not yet developed.
	Mozambique		Peace, Security, and Good Governance pillar, Strategic Objective 3, Outcome 2:				Green Economy Strategy called for, within the fisheries sector, the

			Improved regional maritime security. Key Interventions 1. Regional Maritime Security Strategy adopted and implemented in Member States. 2. Maritime security domain awareness increased.				expansion of MPAs, law enforcement for IUU, aquaculture development . Desalination as part of Water sector.
	Seychelles		SADC Climate Change Strategy and Acton Plan 2015 calls for activities to increase marine and coastal knowledge for CC actions.				
	South Africa						

	UR Tanzania						