
An Emerging New Development Paradigm of the Blue Economy in IORA; A Policy Framework for the Future

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1. Introduction

The new emerging development paradigm of the Blue Economy which is inclusive of the Ocean Economy, Green Economy, Coastal Economy and Marine Economy has a great potential for higher and faster GDP growth scale in the Indian Ocean Region (IOR). Blue Growth focusing on the long-term sustainability of oceans has become a realistic policy frame within IORA during the last two years, beginning from October, 2014. The Blue Economy advocates the same outcome as the Green Economy, namely improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. The subjective of this policy paper is to provide an in-depth analysis of the ongoing developments in the Member States of IORA with a view to recommend a policy frame, essential for the achievement of sustainable development in the region.

Oceans are essential to human life as they provide food security and income for millions of people and act as a highway to global trade. This century is known as the “Maritime Century”. The upcoming new technologies are paving the way for human interaction with the oceans. They drive economic growth and bring as huge benefits to society. Approximately 350 million jobs are linked with oceans, international trade in fish products spans 85 Nations and involves an estimated \$102 billion per year and about \$9 billion is made in ecotourism related to coral reefs.

Ecological Health, Economic Productivity and Marine based Renewable Energy Potential:

The ecological health and economic productivity of marine and coastal ecosystems can be increased by shifting a more sustainable economic paradigm that taps their national potential – from generating renewable energy and promoting ecotourism, to sustainable fisheries and transport. At a global level the potential economic gains from reducing fishing capacity to an optimal level and restoring fish stocks; currently 32% of the global stocks are estimated to be overexploited, depleted or recovering from depletion – is in order of \$50 billion a year, apart from this, there is the renewable energy potential.

According to the Intergovernmental Panel on climate change, the technically exploitable potential for marine based renewables excluding offshore wind, would reach 7400 EJ per year, exceeding the current global energy needs. However marine based renewable energy represented less than 1% of all renewable energy production in 2008. Marine based renewable energy also carries significant potential for green job creation.

This will involve the transition from a conventional economy in the ocean economy to a 'Blue' or 'Sustainable' economy. This could be a big economic and investment opportunity, but there are great risks and challenges. A new and intensive phase of economic activity in the ocean needs to be linked with science's warnings that seas are facing unprecedented pressures from humans; and that time to save them is quickly running out.

The gap between the economic activity and ocean health needs to be bridged soon; otherwise 'Blue Speak' in terms of a sustainable ocean economy may recede rather than advancing or flourishing.

The Pillars of the Blue Economy:

There is no shortage of forward thinking business, industry groups, scientists, government and ocean advocates putting their minds to settle to bring the Blue Economy into existence. The main pillars of the Blue Economy are; Good Governance, Vision, Technology, Blue Management, Monitoring, Institutional and Regulatory Reforms which are shown in the figure below:



Figure 1: The Pillars of the Blue Economy

The questions that need to be answered in order to implement the Blue Economy are:

- Estimation of the size of the opportunity?
- The Nature of risks involved?
- Understanding of sustainable investment in the ocean?
- Nature of necessary investment framework?
- The capital available and how can it be scaled up as well as scaling up of blue industries?

In order to answer these questions, we need to develop a national accounting framework within IORA. In some of the countries in which the Blue Economy play an important role - such as USA, China, South Korea, E.U, and Australia, Canada, France, the United Kingdom, Ireland, and the Philippines – a significant progress has been made in this direction. Professor Colgan in his paper Measurement of the Ocean Economy from National Income Accounts to the Sustainable Blue Economy, Journal of Ocean and Coastal Economics, Volume 2 Special Issue: Oceans and National Income, February, 2016, the importance of measuring the contribution of the Blue Economy to the gross domestic product (GDP) of a country is highlighted. According to him, the measurement of a sustainable Blue Economy would depend as much, or more, on the building of capacity to undertake that measurement, as it would on resolving the theoretical, empirical, and practical issues.

Within IORA; Mauritius & Seychelles have made very good progress. In Mauritius the Ocean Economy (Blue Economy) has been identified as one of the pillars of its economic development – leading to its transformation into a high income economy by 2025. At present the Blue Economy contributes to around 10-11% of its gross domestic product (GDP). In the Seychelles there is a Ministry of Finance Trade and Blue Economy. A budget of - SCR 796480879 (USD 58,845,066.66); has been approved by the government in December, 2016 for the year 2017. Learning from the best practice of Mauritius and the Seychelles, we may develop a 'mechanism for financing' of the Blue Economy within IORA. However, innovative thinking on all these questions needs to be continued. A joint accounting framework as well as study group may be constituted for a national accounting framework as well as for finding answers to these important questions.

2. “Established” and “Emerging” Industries under the Blue Economy:

Economic activity in the ocean is expanding rapidly, driven primarily by developments in global population, economic growth, trade and rising income levels, climate and environment, and technology. Looking to 2030, many ocean-based industries have the potential to outperform the growth of the global economy as a whole, both in terms of value added and employment. The projections suggest that between 2010 and 2030 on a “business-as-usual” scenario basis, the Blue Economy could more than double its contribution to global value added, reaching over USD 3 trillion. Particularly strong growth is expected in marine aquaculture, offshore wind energy, shipbuilding and repairs, port activities and seafood processing.

The following ocean-based industries have been identified:

Established	Emerging
Capture Fisheries	Marine aquaculture
Seafood Processing	Deep-and-ultra-deep water oil and gas
Shipping	Offshore wind energy
Ports	Ocean renewable energy
Shipbuilding and Repair	Marine and seabed mining
Offshore oil and gas (shallow water)	Maritime safety and surveillance
Marine manufacturing and construction	Marine biotechnology
Maritime and coastal tourism	High-tech marine products and services
Marine business services	Other
Marine R&D and education	
Dredging	

Source: OECD (2016) The Ocean Economy in 2030

Coastal and marine areas support a wide variety of established industries, such as shipping, fisheries and coastal tourism, and advancing technology is allowing us to access new resources through emerging industries, such as renewable energy, marine aquaculture, offshore wind energy, marine biotechnology and seabed mining. These Blue Economy industries contribute significantly towards the creation of employment opportunities and economic output. It is to be noted that these industries vary from country to country. The industries mentioned above contribute roughly USD 1.5 trillion (2.5%) to global gross value added. Calculations on the basis of the OECD’s Ocean Economy Database value the ocean economy’s output in 2010 (the base year for the calculations and subsequent scenarios to 2030) at USD 1.5 trillion in value added, or approximately 2.5% of world gross value added (GVA). The Blue Economy industries contributed to some 13 million full-time jobs in 2010 around 1% of the global workforce (and about 1.5% of the global workforce actively employed).

The Blue Economy of the next 20 years is being driven primarily by developments in the global population growth, urbanization and coastal development. Along with the population growth is the economy which is one of the most dynamic drivers for development within the Blue Economy industries.

3. Initiatives undertaken by Member States of IORA in the Blue Economy:

The best way to promote and develop the Blue Economy is to adopt a 'Sub-Regional Approach'; initiating development cooperation in the likeminded Member States who have been able to identify common areas of interests within the Blue Economy. India, Mauritius, Seychelles Bangladesh and Thailand – as a part of IORA, as well as BIMSTEC, are taking concrete steps to strengthen capacity building, as well as technical cooperation.

Country:	Steps/Protect undertake to promote the Blue Economy
India	<p>The Niti Aayoa initiated a consultation process for integration defense and internal security with a 15 year vision.</p> <p>Also started discussions to leverage India's status as a Maritime Nation with a long Coast line and the potential to become a significant Blue Economy.</p> <p>Maritime Trade accounts for 75% value; and more than 90% of volume of Indian trade enjoys strategic location within the Indian Ocean region.</p> <p>Ranks 17th in the world in ship building industry and needs to be more competitive.</p> <p>Vast potential for deep see fishing. Potential for ocean thermal energy; and deep see mining.</p> <p>To jointly promote the Blue Economy in collaboration with Mauritius, Seychelles, Sri-Lanka and Maldives (the latter likely to become an IORA Member in the future, focusing on environment and ecology).</p> <p>To assist in increasing Africa's maritime capabilities through "sgar-mala". Maritime development in terms of domestic and international capacity building: coastal area development, port infrastructure buildings, connectivity and see-bed capacities, see-air transportation, fisheries, marine sciences, renewable energy and hydrography.</p> <p><u>Threats:</u> Sea-borne terror and piracy as two key challenges to maritime security. Natural disasters; tsunami destruction and cyclones.</p>
Mauritius	<p>Mauritius has the vision to transform the country into an "ocean state" by promoting the ocean as one of the main pillars of their economy. The Government of Mauritius developed a ministry dedicated to marine resources, fisheries, shipping and outer dedication to ocean related activities. The opportunities arising from the Blue Economy are vast including development in fisheries, aquaculture, energy, transport and trade, tourism and marine biotechnology.</p> <p>Mauritius has a total economic zone of 1.96 million square kilometer, a maritime zone of 2.3 million square kilometers and a continental shelf of 396,000 square kilometers co-managed with the Republic of Seychelles.</p> <p>Key Investment opportunities for the ocean economy includes:</p> <ul style="list-style-type: none"> i) Fishing, seafood processing & aquaculture ii) Seabed exploration for hydrocarbons and minerals iii) Marine Services iv) Ocean Knowledge v) Deep Ocean Water Applications (DOWA)

DOWA obtain valuable resources through the deep sea waters by making use of the coldness and nutrient rich properties to develop commercial activities which can be classified as upstream and downstream. Upstream refers to the extraction of deep sea water for the sale and production of green cooling and production technologies.

Downstream activities include exceptional aquaculture developments such as seaweed-culture, agrochemicals & cosmetic and pharmaceutical products. There are currently two DOWA projects in Mauritius based near the airport and port which will be implemented in July 2017 for downstream projects.

The Fisheries Training and Extension Centre (FITEC), invest in training programmes to educate local fishermen in various fields such as fish handling. Investment projects such as good fishing practices, sustainable tourism, cleaner ports and increased aquaculture are a priority. Mauritius adopted a greener approach in the beginning of 2016 whereby 'a plastic bag-free Mauritius' was adopted, amending the Environment Protection Regulations at the end of 2015.

In collaboration with the University of Mauritius a capacity building workshop on the Blue Economy was held on Tuesday, 1st of September 2015. On the 29th February 2016, the Dean of the Faculty of Ocean Studies and the Chair in Indian Ocean Studies (CIOS) decided that selected topics would be prepared for special lectures by the eminent scholars in those areas. An international conference on capacity building was held in June 2016 with the CIOS.

The Budget of Mauritius 2016-2017 makes provision for contributing to the Blue Economy by developing aquaculture and incentives for setting up infrastructure for fish processing. Two studies are being concluded with regard to generating electricity through ocean waves and offshore wind. A Memorandum of Understanding will be signed with the National Institute of Oceanography; in Goa, India, for the setting up of a world class Research Institute of Oceanography in Mauritius.

As regards to the fisheries sector, a total of Rs 20 million has been earmarked for the acquisition of a multi-purpose vessel which will be used for research, surveys and training of fishermen and skippers. This measure is in line with Government's objective to promote outer-reef and bank fishing.

A grant of 50%, up to a maximum of Rs 4 million, will be made available to cooperative societies to acquire semi-industrial vessels. Provision is also being made for Rs 12.5 million to finance the purchase of 10 floating cage structures to Fishermen Cooperatives to promote small-scale aquaculture. In a bid to provide shelter for approximately 120 fishing vessels the Mauritius Ports Authority will undertake the construction of breakwaters at Fort William.

A new incentive scheme comprising an 8-year tax holiday will be offered to attract industrial fishing companies to operate from Mauritius and contribute to the development of their

	<p>seafood hub. To address the human resources constraint, the Mauritius Maritime Training Academy will increase its intake by 50% to bring it to 1,200 trainees annually.</p> <p>The Mauritius Ports Authority (MPA) launched in December 2016 a project named 'Tree-Planting Month' as part of their ongoing projects to make the harbor in the capital city of Port Louis a Greener Harbour. This initiative is focused towards the "Embellishing and Greening Mauritius, Africa and Planet Earth" Campaign of the Ministry of Environment, Sustainable Development, and Disaster and Beach Management.</p> <p><u>Threats:</u> Severe coastal erosion and land degradation are among the factors affecting Mauritius. The land mass of Mauritius has lost 11% of its coastline since the 1960's due to erosion. Climate change; droughts, flash floods and tropical storms.</p>
Seychelles	<p>The Government of Seychelles has embraced the development of the Blue Economy as a pillar to sustain economic development. The Republic of Seychelles intends to implement the concept of the Blue Economy at national level as a framework to develop and integrate programmes: A Blue Economy for a 'Sustainable Future'.</p> <p>Main goals included in the framework are:</p> <ul style="list-style-type: none"> i) Food Security ii) Economic Diversity iii) Creation of jobs and iv) Sustainable management of the marine environment <p>The Republic of Seychelles has been recognised as a global advocate of a strategy championed by its president, James Michel: the development of the Blue Economy, which seeks to harness locally available marine, land and other resources in a responsible, sustainable and connected manner as a mainstay of long-term development.</p> <p>The Republic of Seychelles comprises of 115 islands which are spread over an Exclusive Economic Zone (EEZ) of 1.4 million square kilometer. The Seychelles has 99.96% of territory which is ocean-based, with a land area of only about 454 square kilometer.</p> <p>In developing the Blue Economy goals, Seychelles focus on the following aspects:</p> <ul style="list-style-type: none"> i) The creation of high value jobs ii) Ensuring food security iii) Managing and protecting the marine life environment in a sustainable and responsible manner for present and future generations. iv) Economic diversity <p>Under the current 'National Development Strategy', as well as the 'Seychelles Sustainable Development Strategy' (SSDS), 2012–2020, fisheries and marine resources have been identified as the most important key that must underpin all future development in Seychelles. Projects such as Fisheries Management Plans and an Aquaculture Master Plan are developing to contribute toward the national development process.</p> <p><u>Threats:</u> Climate Change; sea level rise, sea surface temperature & increased intensity of storms. Illegal, unregulated and unreported (IUU) fishing.</p>

Bangladesh	<p>Bangladesh organised the first ever international workshop on the Blue Economy in Dhaka in September 2014, followed by a high-level panel discussion on the side lines of the 71st session of ESCAP in Bangkok. Other countries in Asia such as India, Maldives, Sri Lanka, Indonesia, Thailand, the Philippines, Cambodia and Viet Nam also has a strong emphasis on the Blue Economy and sustainable use of marine resources for inclusive growth.</p> <p>In promoting the Blue Economy, Bangladesh has taken a number of steps such as establishing an Oceanographic Research Institute in the Maritime University, and a National Adaptation Programme of Action as part of developing a strategy to better govern marine resources under its 7th five-year development plan, SDGs Implementation Strategy and Climate Change Resilience Action Plan.</p> <p>The objective of the Blue economy initiative – the maritime pillar of the future strategy – is to promote smart, sustainable and inclusive growth and employment opportunities in Bangladesh’s maritime economic activities in the short, medium and long-term time frames. The Blue economy initiative specifically aims to promote synergies and foster framework conditions that support specific maritime economic activities and their value chains.</p> <p><u>Threats:</u> Protecting the area from international smugglers and fish pirates. Preserving mangrove and sea grass. Addressing climate change and managing carbon emission. Maintaining sea level rise and change in ecosystem and temperatures, from coral bleaching.</p>
Thailand	<p>Thailand views the Blue Economy as a means to advance conservation and sustainable management of oceans, fisheries and aquaculture in support of sustainable development and economic growth of the country. With the fisheries and aquaculture sector playing an important role, the government is looking to promote blue economy models of investment and business, including district level programmes for shrimp and seaweed aquaculture and grouper and lobster mariculture. The government has committed to creating a “Blue Economy Zone” with integrated land- and ocean-based development, applying integrated coastal management (ICM) with pilot projects on the islands of Bali and Lombok.</p> <ul style="list-style-type: none"> i) A total marine area of 316,118.3 km² (territorial water) ii) Exclusive Economic Zone (EEZ): 420,280 km² iii) A total coastal line of approximately 2,815 kilometers iv) Estimated marine resources value (living and non-living): 24 trillion Baht (\$685.7 billion) v) Value of ecosystems and selected endangered species: 37 percent from indirect use and non-use values (including mangrove forests for carbon sequestration, coastal protection, and fish breeding ground and nursery). vi) Export 90 percent of marine and coastal fisheries production; direct or indirect employment for over 650,000 workers. vii) Expanded marine transport and marine tourism industry. viii) Various plans, policies and measurements in place for enhancement and conservation of national environmental quality and for securing natural resources and conservation areas.

	<p><u>Thailand's Blue Economy: Mangrove Governance</u> Mangrove areas changed since 1970's:-due to high population pressure, conversion of mangroves for pond culture, mining and infrastructure development, coastal pollution, and tsunami destruction. Policies and legislative measures adopted since 1979: resolving coastal land-use conflicts (mangrove area conversion for aquaculture and urban development). Implementation of an ICM approach: involving concerned national agencies, local governments, and local communities</p> <p><u>Weakness:</u> Vulnerable to a changing climate due to a combination of uncertain weather patterns, rising sea levels, and changing trans boundary river flows. Water stress throughout the region: upstream development activities and climate change. Marine environment threatened by pollution (discharge of untreated or inadequately treated domestic, industrial and agricultural wastewater, inadequate solid waste management, routine operational discharges of oil from shipping and dumping of waste oil by vessels and vehicles on land) which can be trans boundary in nature.</p>
South Africa	<p>In October 2014 initiated "Operation Phakisa" – a maritime project aimed specifically at unlocking and developing Blue Economy. The objective is to promote economic growth and jobs in the country's Blue Economy. It (Phakisa) has four priority sectors as new growth areas.</p> <ul style="list-style-type: none"> (i) Maritime Transport and Manufacturing Activities such as coastal shipping, trans-shipment, boat buildings, repair and refurbishment ; (ii) Offshore oil and gas exploitation; (iii) Aquaculture and (iv) Marine protection services and ocean governance. <p>Creation of a coherent maritime system achievement agenda – 2063 of African Union (A.V.). Structural transformation through the Blue Economy. UN-ECA's publication "Africa's Blue Economy: A Policy Handbook". Focuses how 54 African states out of which 38 are coastal may be benefited from the Blue Economy 90% Africa's imports and exports are conducted by sea. Africa's maritime zones are about 13 million sq/km equivalent to 2/3 of Africa's landmass. Larger sectors are: fisheries, aquaculture, tourism transport, posts, coastal mining and energy, biotic resources, resource based industrialization and global trade in value added products. To create 1 million jobs by 2030 and add ZAR 177 billion to the country's GDP.</p> <p><u>Weaknesses:</u> Yet to obtain a license from international seabed authority (ISA) for deep sea mining. Delimitation of maritime and transnational aquatic boundaries to remove tensions among states. Managing complex dynamics of rapid population growth, coastal urbanization, climate change and license use of aquatic and maritime resources. Need to develop a holistic and integrated approach.</p>

4. Conclusions & Policy Implications

The following are the main conclusions and policy implications of the study;

- 1) India, Mauritius, Seychelles, Thailand and Bangladesh have already initiated a process of bilateral cooperation for the promotion and strengthening of the Blue Economy. This process may be further incorporated at Sub-Regional and Regional Level.
- 2) The future policy-framework for the success of the Blue Economy may focus on structural collaboration; translating research in products, holistic approach to the Blue Economy; and motivating & training young generations.
- 3) It is also recommended to develop a new sustainable vision; developing cross sectorial skills; changing universities' syllabus; and establishing linkages between science and society's challenges.
- 4) Concentration on major Blue Economy sectors such as; fishing & aquaculture; ocean renewable energy; tourism; seaports and shipping; and seabed exploration and minerals (developing a cautious approach).
- 5) It is recommended that SME's may be encouraged and integrated with the Blue Economy to ensure that it becomes employment generate oriented and 'inclusive'.
- 6) The Blue Economy is innovative, therefore, the main barriers to innovation include; access to finance; inventor- investor dilemma; the lack of entrepreneurship culture; regulatory uncertainty; and integration of industries etc.;- need to be eliminated by developing an Blue Economy approach policy-framework at regional, national and international level.

