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The Emerging Blue Economy: Its Development and Future Prospects

Abstract

Oceans cover approximately 71 per cent of our planet's surface. They provide food and livelihood to the major part of the global population and almost 80 per cent of international trade is carried out through water, which makes it a key source for economic development. As a step to preserve these resourceful water bodies, the UN has included marine preservation in its sustainable development goals - SDG14 "Conserve and sustainably use the oceans, seas and marine resources for sustainable development." To work towards this goal, the concept of Blue Economy was first introduced in the UN conference on sustainable development in Rio, 2012.

Blue Economy as a concept aims for socio-economic development and the preservation and improvement of several livelihoods while maintaining environmental sustainability of the oceans and coastal areas. It is not limited to just marine products and resources but also encompasses coastal tourism, maritime transport, aquaculture, offshore renewable energy and various biotechnology aspects. Blue Economy has evolved largely from the concept of Green Economy. This article will focus on three basic aspects.

First, the introduction of the Blue Economy and its impact on achieving economic and social tranquillity and a major solution to attain sustainability. Continuing from the evolution of this concept, the second will analyse India's increasing steps in the development of the Blue Economy and its impact on its relations with other countries such as Bangladesh and Small Island Developing States (SIDS). Third, this

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article will analyse the impact of the Blue Economy on a select few nations with growing economies and the challenges the Blue Economy will bring forth. This article seeks to analyse the Blue Economy as an area of development for nation-states to improve society, the environment and individual economic capabilities.

Keywords: *Blue Economy, Green Economy, India, UN-SDG14, Socio-Economic development*

Introduction

A lot is heard about the concept of 'green growth' and 'green economy', which aims for well-being of humanity and social equity while significantly reducing ecological scarcities and environmental risks. A similar concept of 'Blue Economy' was first articulated by Gunter Pauli in 2010 and was officially discussed as a concept at the UN Conference on Sustainable Development in 2012 in Rio de Janeiro. (Doyle, 2018) The term 'Blue Economy' is very vast, and it aims for socio-economic development, preservation and improvement of livelihood of people all over the world, while maintaining environmental sustainability of the oceans and coastal areas. In a Blue Economy, the ecological disturbance is reduced to a great level and therefore the economic activity is in parity with the long-term capacity of ocean environments which helps this movement stay versatile and sound. The Blue Economy is understood to be a long-term system that supports sustainable economic growth though ocean divisions and exercises and also at the same time enhances human prosperity and social value while protecting the earth. (DESA, 2017).

India has one of the longest coastlines in the world though neighbouring countries also share it. As a developing economy, it should be using its vast ocean accessibility to its advantage. The Prime Minister of India, Narendra Modi has reaffirmed in his swearing-in speech in 2014 the strategic necessity of developing a Blue Economy and stated that it could be a tool for developing India, and made it a feature of his vision for the sea in Security and Growth for All in the Region – SAGAR. (Doyle, 2018) The Indian Ocean Rim Association (IORA) was also introduced to the concept of Blue Economy in October 2014 at the 14th IORA Ministerial Meeting.

Since the Blue Economy declaration of 2014 by the IORA, all member-states have recognised the need to prioritise it for resolution of issues such as food security, employment generation, poverty alleviation and sustainability of business and economic models in the Indian Ocean. The IORA recognised six aspects as priorities in development of the Blue Economy. These include Fisheries and Aquaculture, Seaports and Shipping, Marine Biotechnology and its research and development, Tourism, Renewable Ocean Energy and Seabed Minerals and

Offshore Hydrocarbons. (IORA, 2017) The awareness created among the littoral states including the islands in the Indian Ocean, concerning the economic potential of the maritime environment, is an important benefit of focusing on the Blue Economy. The government can formulate plans and direct political and economic resources to the region for better administration of the assets of the Indian Ocean. (Doyle, 2018)

India shares the Indian Ocean and the Bay of Bengal with Sri Lanka and Bangladesh respectively. Sri Lanka is a small Island nation located to the south of India, with a sea expanse area figuring almost 7 times more than its land area. Therefore, even though it falls under the specific category of Small Island Developing States, (SIDS) it has a vast scope of developing its economy through the oceans because of its abundantly available resources. Since long, the Sri Lankan waters have been a hub for transportation of narcotics and human trafficking with the help of the local fishermen, waste dumping, unauthorised fishing practices and non-eco-friendly tourism. To overcome these issues and move towards development, Sri Lanka should adopt the practices of SIDS like Mauritius and Seychelles in fishing and tourism policies. (Ranasinghe, 2017)

Similarly, India shares the Bay of Bengal with Bangladesh. The Bay of Bengal is the largest bay in the world, and can be a powerhouse of economy in the next few years. Bangladesh settled its maritime boundary delimitation dispute with Myanmar and India in 2014, after which discussion on the Blue Economy started in the country. The inorganic resources of the Bay of Bengal such as its fish stocks can contribute a great proportion to the country's economy. Bangladesh also ranks 5th in the top 10 countries for its freshwater aquaculture. (Alam, Faller, Karim, & Khurshed, 2017) The first, international, Blue Economy dialogue was held in Dhaka in 2014 and the then Prime Minister Sheikh Hasina became the first head of the state to give a national and international televised speech on Blue Economy. (Patil, 2018) Since it is still in the growing stages, this article will show what steps Bangladesh is taking as of today and is further likely to take in the future. Along with more information about steps the Indian government is taking towards developing its Blue economy this article will focus on the relationship between India and its neighbouring countries namely, Bangladesh and Sri Lanka. It will also show advancements in India's relations with the SIDS namely, Seychelles and Mauritius. Lastly, the article will put forth the challenges faced in achieving the potential Blue economy.

India's Blue Economy

The geopolitical significance of the Indian Ocean Region (IOR) comes from the significant development of Asia in the world economy. More than 60 percent of all oil and oil-based goods are transported through the Indian Ocean regional

waters and more than 70 percent of the worldwide trade movement is carried through the waters of this sea. The Indian Ocean Region is not only the intersection for world trade but is also a rich source for marine resources. Among other countries in the region, India shares a prominent place as the biggest country overlooking the stability and security of the IOR. (Baru, n.d.) With the growing importance of the IOR, the countries whose shore is washed by the ocean formed the IORA for better understanding and mutually beneficial ties between each other. The six priority focus areas of the IORA are:

1. Renewable Ocean Energy,
2. Seabed Minerals and Offshore Hydrocarbons,
3. Marine Biotechnology and its research and development,
4. Tourism,
5. Seaports and Shipping and
6. Fisheries and Aquaculture.

India has the seventh longest coastline in Asia at 8129 km, covering nine states and 2 two union territories. This results in the following two aspects as being the most prominent for Indian economy:

1. Fisheries and Aquaculture
2. Seaports and Shipping (Maritime Services)

1. Fisheries and Aquaculture

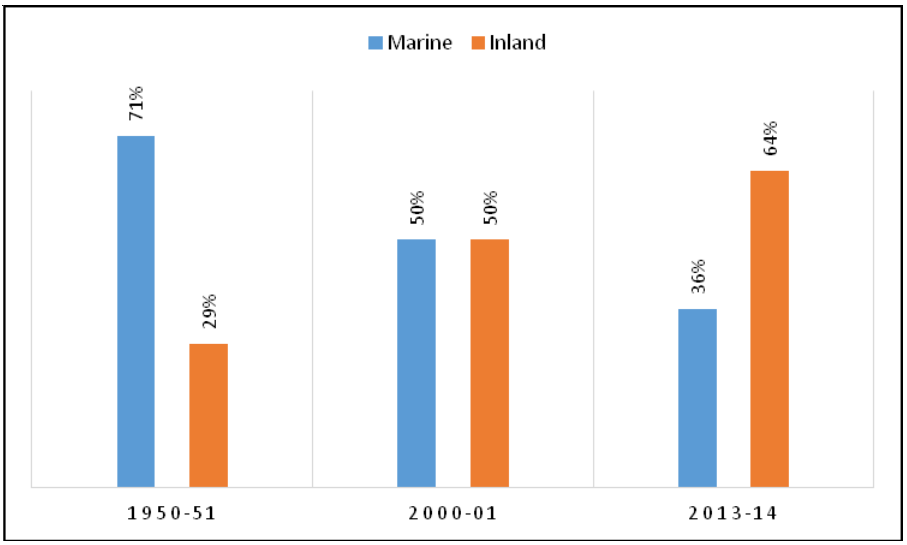
Fisheries is a fundamental maritime asset and it shapes the centre of the *Blue Economy*. It is considered as one of the primary assets of the Indian Ocean providing sustenance to a large group of individuals and extraordinarily adding to the employment of waterfront networks. With such an elongated coastline, about 17 per cent of India's population resides in the coastal areas and fisheries and aquaculture provide employment to around 14.5 million people. India produced 11409.45 tonnes of fish in the time-period of 2016-17 as reported by the Department of Animal Husbandry, Dairy and Fisheries of India. Constituting about 6.3 percent of the global fish production, the sector contributes to 1.1 percent of the GDP and 5.15 percent of the agricultural GDP. (NFDB, 2017).

Table-1: Overall Scenario of Indian Fisheries as of 2017

Indian Fisheries	
Global Position	***3rd in Fisheries 2nd in Aquaculture***
Contribution of Fisheries to GDP (%)	1.07
Contribution to Agricultural GDP (%)	5.15
Annual Export Earnings (Rs. in Billion)	334.42
Employment in Sector (Million)	14.0

Fish production is mainly of two types: Marine production and Inland production, of which marine fish production is the culture of fishes from the marines and inland fish production includes freshwater and brackish water fisheries. While comparing the shares of both in the total production, we can see a significant shift in India from marine fisheries to inland fisheries. From 1950-1999, for about 50 years, the production of marine fish, of about 0.53 million tonnes in 1950-51, was higher than the production of inland fish, of about 0.21 million tonnes in the same year. However, in 2012-13, the production of inland fish was 5.7 million tonnes, which is significantly higher than the production of marine fish which was only 3.3 million tonnes. (Panda & Panda, 2016).

Table-2: Contribution of Marine and Inland Fisheries



Aquaculture is the cultivation of aquatic organisms in controlled aquatic environments for any commercial, recreational and/or public purpose. The harvesting and breeding of the aquatic plants and animals can take place in all types of water bodies such as lakes, ponds, oceans, seas, and manmade 'closed' systems on land. (Commerce, 2011) Aquaculture in India is a booming industry. In the past six decades, India has experienced an eleven-fold increase in fish production. Between 1951 and 2014 the aquaculture production in India has increased from 0.75 million tonnes to 9.6 million tonnes, making India the second largest aquaculture producing nation in the world, second after China. (Agriculture, 2014) In addition to this, India is home to over 10 percent of the global fish diversity with more than 14 million people of the population depending on the fish market domestically. So, the total aquaculture production

in India is at a constant rise, with the majority demographic being from the upper middle class, and an immense opportunity for development of aquaculture, to improve food security and the nutrition level in food intake for a majority of Indians. (Kumar, 2016) Furthermore, the aquaculture production is divided into three sections comprising brackish water aquaculture, marine aquaculture and freshwater aquaculture.

Freshwater Aquaculture: Freshwater aquaculture comprises 50 percent of total fish production in India and covers 2.6 million hectares of ponds. Freshwater aquaculture occurs in paddy fields, lakes and irrigation canals. However, only 40 per cent of the available area is in use because of market access issues. (National Aquaculture Sector Overview, India, 2014) Different species of Indian carp contribute to 75 per cent of India's freshwater aquaculture production; carp such as silver carp, grass carp, and catfish. Freshwater aquaculture production is meant for domestic consumption. (Dong, 2017) The government of India has made it a national priority to produce and cultivate catfish as they provide a vast diversity and production potential in India. (Kumar, 2016) The government has aimed to increase the production to 50 hectares from the current 10, because average yields are increasing on a yearly basis.

Marine Aquaculture: Marine Aquaculture focuses primarily on the production of seaweeds, mussels and oysters. There is also a platform for the production of Seabass and Cobia species under marine aquaculture even though marine aquaculture production is relatively less as compared to freshwater and brackish water aquaculture in India. Regardless, this does not mean that there is no scope for marine aquaculture in India; the production of finfish and shellfish in commercial markets is steadily increasing through cage-based aquaculture production methods. In order to improve the quality of this production method better, to cope with Indian weather, the government or private sector can introduce wave resistant floating cages. The total marine aquaculture production export in 2016 was 5 billion Euros. (Ministry of Commerce and Industry, 2016) This consisted of shrimp to a large extent. One of the largest importers of marine aquaculture from India is the littoral state of Vietnam. (Pijl, 2018) Another area of high profit margins in marine aquaculture is seaweed farming since the input costs are low. The seaweed production is not currently used for commercial purposes because of the low yields and is rather used for bio-fertilizers.

Brackish Water: Brackish water is a combination of salt water and fresh water sources such as estuaries. Brackish water aquaculture production in India focused on shrimp production and it is important to mention that a scientific approach of trapping the shrimp in coastal wetlands was carried out. (Dong,

2017) In 2007, the production of shrimp was at its highest peak at 144 tons per year; however, the shrimp production has steadily been decreasing due to a lack of yield and the fact that shrimp farmers in India own less than 2 hectares of land. (National Aquaculture Sector Overview, India, 2014) Another reason for low yields are due to environmental disease and inter-community predation between tiger shrimp and whiteleg shrimp. Brackish water aquaculture presents a strong export sector. Eighty per cent of all shrimp production is for the export market, and considering the fact that a large amount of land for this aquaculture is unutilised there still exists an investment and growth opportunity in the export market. (Ministry of Commerce and Industry, 2016) Shrimp production in brackish water extends across the Indian Ocean into the Pacific Ocean to the United States and Europe. Since shrimp production is on a rise, more emphasis is being placed on traceability of the production chain, which presents opportunities for foreign investments. This is a sector where India can invite direct, foreign investments for improved production. A reduction in production costs will increase the profit margins for farmers.

Furthermore, India is making aquaculture a pivotal feature of its domestic and foreign policies. The government has founded numerous institutions and research centres in order to gain knowledge in the field of aquaculture. The Indian Council of Agricultural Research has eight fisheries for research purposes out of which three focus on aquaculture namely;

1. The Central Institute of Freshwater Aquaculture (CIFA) in Bhubaneswar, which focuses on freshwater aquaculture,
2. The Central Institute of Brackish Water Aquaculture (CIBA) in Chennai which focuses on brackish water aquaculture and
3. The Central Marine Fisheries Research Institute (CMFRI) in Kochi which conducts research on marine fisheries.

The National Fisheries Development Board (NFDB) based in Hyderabad, which is a part of the Ministry of Agriculture of India, actively provides training, storage, transport and production in the field of fisheries and aquaculture. India recognises the importance of aquaculture and the importance it holds in the emerging Blue Economy of India, and in this aspect, promotes the work of the Aquaculture Foundation of India – a non-governmental organisation which works in the field of fisheries and aquaculture.

2. Shipping and Maritime Services

Shipping is the least expensive method of transport, which conveys 80 per cent of the worldwide stock exchange volume and in 2015, transported 10 billion

tons for the first time. In any case, trade volumes stay enduring and subsequently shipping turns out to be the more essential method for transport for the South Asian nations as these locales are prevalent in merchandise products such as India. In line with the 'Digital India' and 'Make in India' initiatives of the Modi government, India must focus on marine ICTs, shipping and the creation of a knowledge hub for marine research and development.

One of the programmes, such as the Sagarmala venture, propelled by the Ministry of Shipping in India, plays a key role in improvements of the seaports through its broad utilisation of empowered administrations for the modernisation of ports. It also handles the issue of under-utilisation of ports by focusing on their modernisation, proficient departure, and seaside monetary advancements. The administration involved, has assigned over Rs. 3000 billion to support 199 activities under the Sagarmala programme, for execution in the next three years. Of these recognised projects, activities of more than Rs. 1000 billion are now being utilised efficiently. Furthermore, the Union Budget of 2017-18 expanded the assignment to the venture from Rs. 4.06 billion (RE 2016-17) to Rs. 6 billion (BE 2017-18), giving further force to the port-driven advancement and its modernisation.

Under the 'Make in India' programme of the Government, the shipbuilding industry can profit immensely. This industry has a high impact on investment and can speed up the process of modern development simultaneously with its related expansive businesses. In December 2014, India had a little more than 1,200 boats, and this is estimated to cross more than 1,600 in number by the year, 2025. A solid push in India's business shipbuilding and ship fixing segments, which supplements the Sagarmala venture of port advancement, can also possibly bring about a significant monetary change. (Maini & Budhraja, 2016)

For India to facilitate its Blue Economy system, it must give careful consideration to its communication network. For one, ocean courses in the Indian Ocean convey up to 90 percent of India's trade. At present, India has 13 major ports for beachfront as well as international trade. India redefined its maritime strategy in 2015 (Ensuring Secure Seas: Indian Maritime Security Strategy) to expand the geographical extent of its strategic interests by including the Indo-Pacific region, the Red Sea, and South-east Indian Ocean; and to develop its role as a 'net security provider' in the IOR. The quantity of vessels and load movement of India has been expanding reliably in the previous decade, achieving some 1,052.21 million tons in 2014-15. As indicated by the Indian Maritime Agenda 2010-2020, it is forecasted that port limit will increase to 3,130 million 18 tonnes by 2020. (Mittra, 2017).

Given the present government's interest in Foreign Direct Investment, it is normal that the same would be executed for the marine area. In the event that the business reaction to 100 percent FDI in basic segments, for example, aviation and defence is to be viewed as a gauge, it would be a stage, which would be invited in the marine division. A Foreign Direct Investment of up to 100 percent and an expanded shipbuilding and ship fixing approach will give colossal venture openings.

'Project Green Ports' spotlights on sustained growth from an ecological point of view. It intends to introduce 160.64 megawatts of sunlight based and wind based power frameworks at all the significant ports the nation over. The administration has likewise marked a few MoUs with nations, for example, Korea and Egypt for participation being developed of ports, sharing of innovation, labour preparing and stimulating steady growth of sea traffic. These activities demonstrate the priority the government has given to the oceanic area and the desire that it will be a key driver of the Make in India programme. (Royce, 2017).

India, Sri Lanka and Bangladesh: Interconnectivity through Indian Ocean

Among the 64 bays on the planet, the Bay of Bengal is estimated to be as one of the biggest. The littoral states surrounding the Bay of Bengal have a populace of approximately 1.4 billion. It is the sea that forms the north-eastern part of the Indian Ocean; 1,300 miles long and 1,000 miles wide, bordered on the west by Sri Lanka and India, on the north by Bangladesh. (Rahmana, 2017)

Bangladesh: Bangladesh has recently started discussions on the Blue Economy after the resolution of its maritime disputes with Myanmar and India, in 2012 and 2014 respectively. Bangladesh is very new to this concept but has a varied scope in ocean economy because of the abundant resources available to it. The country has a coastline of 710 kms and a sea area of 121,110 km. and it is an established fact that the fish stocks and other inorganic resources in the Bay of Bengal can contribute greatly to the economy of the country. Currently the fish stocks obtained are from the shelf and shallow waters only. No fishing activity is seen beyond that because of their technological backwardness and a lack of vessel capacity.

Bangladesh should adopt techniques such as long line and hook fishing to optimally use its ocean resources. With an abundance of *tuna and hilsa,* (50-60 per cent of the total global catch is seen from Bangladesh) the country can earn great foreign exchange from the export of tuna fillets and other international

produce. In comparison to other countries, the marine biotechnology of Bangladesh is highly promising. Marine biotechnology includes novel pharmaceutical drugs, chemical products, enzymes and other industrial products and processes. (Alam, Faller, Karim, & Khurshed, 2017) It is also gifted with diverse coastal habitats such as mangrove forests, salt-marsh and sea grass beds. Mangrove forests in Bangladesh represent over 3 percent of the total global area of Mangrove forests which ranks 12th in the world. Almost all of these mangroves are located within the Sundarbans, providing a range of ecosystem services (such as carbon sequestration) with benefits beyond the country. (Virdin J Patil, Hussain Colgan & Vegh, 2018).

Bangladesh also has a lot of potential scope in areas such as, Oil, Gas and Minerals Mining, Ocean Renewable Energy, Sea Salt Production, Marine Trade, Shipping and Transport, Marine Tourism, Marine Education and Research, Maritime Surveillance and Marine Spatial Planning. (MSP) The Blue Economy in Bangladesh is still developing at a gradual pace because of the lack of implementation and enforcements of management measures. Another aspect which may hinder the acquisition of ocean resources is the lack of planning to declare and establish Marine Protected Areas (MPA). The Aichi target estimates that by 2020, Bangladesh should allocate 10 per cent of its maritime area for the preservation and protection of its marine habitat and ecosystems. For overall conservation of the marine biodiversity in the Bay of Bengal area, a full proof strategy and its planning and implementation for a MPA is absolutely essential. Bangladesh needs to take necessary steps, quickly in order to match up to the development made by India and Myanmar among other Bay of Bengal countries.

Sri Lanka: Sri Lanka, being an island nation, has a very long coastline of 1340 kms. Its geographical placement gives an advantage to the country's trade policies as it lies close to many major trade routes since ancient times. Having a major geographical and territorial advantage, Sri Lanka's potential in Blue economy is immense, if given accurate implication and strategic planning. The fisheries sector in Sri Lanka contributes to about 1.4 per cent of the national GDP and 5.9 per cent of the GDP of the Northern Province. (Foundation, 2017) Though Sri Lanka was already using its resources effectively, many of them still remain untouched or non-registered. It was reported that poaching causes losses of about 0.1 per cent of the national GDP while the Northern Province bears a loss of 2.1 per cent in its GDP. A lot of developments can also be brought to enhance the Blue Economy of the country and optimally use the abundantly available resources.

Colombo as one of the busiest ports in the region can recommend Triple E class (Economy of scale, Energy efficient and environmentally friendly) vessels

to come into operation. Coastal tourism amounts to 70 per cent of the total tourism infrastructure in the country. Coastal tourism can be extended higher than ever but there must be directions set up in, order to manage the activities and control the nature of administration. Coastal management ought to be a noteworthy part of the Sri Lankan Blue Economic strategy. Producing wave, solar, wind and hydroelectric energy should be a potential area for Sri Lanka as it experiences monsoon twice in a year. Wind directions and the amount of sunlight received by the nation also adds to the process. Following Mauritius and Seychelles, Sri Lanka could also adopt Marine Spatial Planning (MSP) as a tool of Blue Economy. MSP is a *public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that are usually specified through a political process.* Sri Lanka though a member of the IORA has not put forth any activity on the global level to address the worldwide challenge of environment change. As a nation whose 25 per cent populace relies upon ocean economy, Sri Lanka should ideally take strategic measures and initiatives to maintain its Blue Economy. (Ranasinghe, 2017)

Connectivity of the Three Nations

To avoid maritime disputes between the neighbouring countries, the United Nations Convention on Law of Sea (UNCLOS) came up with Exclusive Economic Zones (EEZ). According to UNCLOS:

> The exclusive economic zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention. The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured. (UNCLOS, 1997).

In 2008, Bangladesh went in for arbitration over the delimitation of maritime boundary against India and in conclusion was awarded with 19,467 sq. km out of the total 25,602 sq. km sea area of the Bay of Bengal. Since then, Bangladesh has played an active role in establishment of the 'Bay of Bengal Partnership for Blue Economy' and has organised several workshops as a process of advancing the proposal around the UN Blue Economy Initiative, involving both India and Sri Lanka. Bangladesh also recently organised the first ever, international workshop on the Blue Economy in Dhaka in September 2014 where other Asian countries, namely, India, Maldives, Sri Lanka, Indonesia, Thailand, the Philippines, Cambodia and Viet Nam also placed emphasis on the Blue Economy

and sustainable use of marine resources for inclusive growth. (Rahmana, 2017) The Sundarbans mangrove forests extend from the Hooghly River in India to the Baleswar River in Bangladesh, occupying half the extent at the beginning of the colonial era. Current mangrove loss is reported in the Indian portion of the Sundarbans, while re-growth is actually happening in the eastern region in Bangladesh. On India's part, it proves to be an ignored zone, which is affecting that aspect for neighbouring countries as well. (Patil, Virdin J, Colgan, Hussain, & Vegh, 2018)

Sri Lanka too has a substantial EEZ, which is expected to increase by about 75000 sq. km after further delimitation of the continental shelf. Sri Lanka has shown a promising potential of mineral deposits and oil and gas explorations. India and Sri Lanka, situated as they are, at the head of the Indian Ocean, share the major responsibility of ensuring smooth flow of traffic on the sea-lanes in this region. Outlining India's approach to the region, the Prime Minister's vision of SAGAR can be highlighted. While addressing the issue of bilateral cooperation, each state should have respect for each other's interests without adopting a unilateral approach to contentious issues. There is a possibility of collaboration between NIOT (India) and Ocean University (Sri Lanka) for technical services & solutions for management of ocean resources and environment. (Foundation, 2017) The Government of Sri Lanka must implement and monitor the Trilateral Maritime Strategy between India and Mauritius to establish good environmental governance, regional cooperation, connectivity and capacity building for a common cause. (Ranasinghe, 2017) There is potential for agreeable undertaking in assets of Bay of Bengal area for all three nations, for example, preservation of seaside eco frameworks, prevention of marine contamination, and misuse of sea materials and improvement of sea vitality. Maritime cooperation must necessarily take over the centre stage in emerging maritime order.

India and SIDS

Small Island Developing States (SIDS) are a group of small island countries recognised by the UN, which share similar sustainable developmental challenges. The two SIDS this article is going to be talking about are Mauritius and Seychelles. SIDS face several challenges during the process of achieving sustainable development such as small population number, limited resources, exposure to natural disasters and external shocks, and strong dependence on international trade. Their growth and development is often hampered by high transportation and communication costs, unreasonably expensive public administration and infrastructure due to their small size, and little or no

opportunity to create economies of a larger scale. To achieve sustainable ocean-based economy, it was recognised that sustainable fisheries and aquaculture, coastal tourism, the possible use of seabed resources and potential sources of renewable energy are among the main building blocks. It is often argued by SIDS that they should be referred to as large ocean states because of their EEZ size and importance of seas in their livelihood. (DESA, 2017)

Amongst the IORA, Mauritius and Seychelles have made notable progress. Mauritius considers its Blue Economy as one of the main pillars to achieve economic development and become a high-income economy by 2025. In 2017, the Blue Economy contributed to 10-11 per cent of its GDP. In Seychelles, there is a Ministry of Finance Trade and Blue Economy for which a budget of USD 58,845,066.66 had been approved for its prospects and promotion of the Blue Economy in 2017.

Mauritius: The total economic zone for Mauritius stretches to 1.96 million square kilometres, including a maritime zone of 2.3 million square kilometres and a continental shelf of 396,000 square kilometres. Mauritius and the Republic of Seychelles co-manage this economic zone. There are 5 key areas of investment for Mauritius in the blue economy and they include:

i. Fishing, seafood processing & aquaculture
ii. Seabed exploration for hydrocarbons and minerals
iii. Marine Services
iv. Ocean Knowledge
v. Deep Ocean Water Applications (DOWA) (Attri, 2016)

DOWA get significant assets through the cavernous ocean waters by making utilisation of the cold and nutrient rich properties for commercial activities. There are two dorms of commercial activities, upstream and downstream. The upstream commercial activities refer to the mining of ocean water to discover and produce green technologies for cooling and production methods. Now downstream commercial activities refer to the vast projects that the nation state of Mauritius has planned for aquaculture such as agrochemicals, and aquatic flora and fauna culture production. (Attri, 2016).

Furthermore, FITECH, (The Fisheries Teaching and Extension Centre) invest largely in training programmes for the development of indigenous fishermen in the area of aquaculture. The investment attributes to improved ports, development of fisheries, and investment in commercial projects. Additionally, Mauritius is concerned about the sustainability of the environment and its blue economy and therefore it has adopted an environment friendly policy since the year 2016 for a *plastic bag-free Mauritius*. (Attri, 2016).

Moreover, Mauritius has expanded the blue economy into the education sector by collaborating with the University of Mauritius on a *capability building workshop* on the Blue Economy as of September 2015. The Chair in Indian Ocean Studies (CIOS) decided that hand-picked topics would be ready for special lectures by the eminent students in those areas (Attri, 2016). Additionally, a Memorandum of Understanding has been agreed upon with the National Institute of Oceanography; in Goa, India, for the development of a Research Institute of Oceanography in Mauritius. A grant of 50 per cent, 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. (Bank, 2017).

Seychelles: The Republic of Seychelles encompasses 115 islands, which are spread over an EEZ of 1.4 million square kilometres. The sea-based region of Seychelles is approximately 99.96 per cent, and the land territory is 454 square kilometre. Similar to the Mauritius, Seychelles in developing the Blue Economy focuses on the specific key aspects:

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 (Attri, 2016)

Under the current 'National Development Strategy', and the 'Seychelles Sustainable Development Strategy' (SSDS), 2012–2020, aquaculture and marine assets have been distinguished as the most critical area that must support all future advancement in Seychelles. Undertakings, for example, Fisheries Management Plans and an Aquaculture Master Plan are creating to contribute toward the national advancement process. (Bank, 2017).

Seychelles has raised 15 million dollars by offering the world's first 'Blue Bond', in 2018, raised from investors to finance ocean-based projects, to expand its marine protected areas and boost its fisheries sector. About 12 million from this will be allocated in the form of low interest loans and grants to the local fishermen and the remaining amount will finance research on sustainable fisheries. (Attri, 2016).

India's Steps: Learning from Mauritius and Seychelles, India may develop a 'mechanism for financing' of the Blue Economy within IORA. A joint accounting framework as well as study group may be constituted for a national

accounting framework. India considers Seychelles as a long-term maritime partner as well as a trusted neighbour and friend. Since 2015, both the countries have a joint working group for cooperation in every aspect of the Blue Economy. This will result in several benefits to both countries, such as the increase in the understanding of marine ecology and resources; it will also improve the ability to extract new opportunities that the ocean provides in a balanced and sustainable manner. India considers it a privilege to be Seychelles' partner in the development of its security capabilities. India hopes that Seychelles will soon be a full time partner in the maritime security between India, Maldives and Sri Lanka. India also helps in developing human resources and capability building in Seychelles. PM Modi's statement during the visit was:

> Our security partnership is strong. It has enabled us to fulfil our shared responsibility to advance maritime security in the region. Today, I am pleased to announce that we will be giving one more Dornier aircraft to Seychelles. I will have the honour to launch the Coastal Surveillance Radar Project. This is another symbol of our cooperation. These steps will enable Seychelles to secure these beautiful islands and the vast expanse of waters around them. Our agreement today on hydrographic survey adds a new dimension to our maritime cooperation. (Anonymous, 2015).

The relation between India and Mauritius goes way back. Around 68 per cent of Mauritius' population of nearly 1.3 million is of Indian descent. Many are descendants of Indian indentured labour brought to work on sugarcane plantations here in the 19th and early 20th centuries. India and Mauritius agreed to cooperate in the Blue Economy sector in the Indian Ocean during Prime Minister Narendra Modi's visit there in 2015. Modi, in his recent visit to Mauritius, gave similar gestures through the joint commissioning of an offshore patrol vessel (a Barracuda built with Indian assistance) an agreement to develop Agalega Island and a memorandum of understanding (MoU) on ocean economy. (IANS, 2018) Such joint cooperation between member states within the IORA and outside of it will improve overall Blue Economy for the entire world.

The Blue Economy – Challenges

The currently rising Blue Economy will be hindered of its potential due to many reasons. For starters, humankind has always considered the water ecosystem and its resources limitless. Governance of the ocean and its resources has become necessary. The balance between the demanded oceanic resources and their availability is not currently sustainable for the environment. There is over usage of resources due to the constant need of development in countries. Governments are attentive only towards economic development, causing them

to ignore major factors hampering the sustainability of the resources, which include climate change, over-exploitation of marine resources and poor management of fisheries and pollutants in waterways combined with increased emissions of carbon dioxide. (Hasan, 2018)

According to an article by the World Bank, the human impacts that degrade marine resources are:

***Unsustainable Fishing and Extraction*:** These are consequential to poor management of fish stocks and limited access to them because of rising demand and improvement in technology. The Food and Agricultural Organisation estimated that 57 per cent of fish stocks are exploited fully and 30 per cent are over-exploited, recovering or depleted. Primarily, the exploitations take place through illegal, unreported, and unregulated fishing, which amounts to 11-26 million tons of fish catch equal to US$ 10-22 billion of revenue which is not legal or documented for. (FAO, 2016)

***Destruction of Coastal Habitats and Landscapes by Humans*:** The alterations and unplanned changes as well as unregulated advancements has led to a depletion of coastal habitats. It has had a ripple effect on the loss of dire living societies and marginalisation of poor societies; it has caused huge externalities between the various sectors and multiple uses of the same land and marine areas. Due to activities like mining, deforestation coastal improvement and coastal erosion there has been destruction of livelihood and infrastructure, which has affected marine resources.

***Marine Pollution*:** Accidental or purposely carried out oil spills as well as overfishing cause severe harm to the sea environment and life present in it. Even though shipping is considered to be the most carbon free way of transport, it does emit other greenhouse gases which ultimately harm the quality of the water in the oceans. Marine pollution can be understood with examples, such as excess effluents from untreated sewage and marine debris like plastics.

***Unfair Trade*:** EEZ are crucial to the economies of SIDS and often are vastly larger than their corresponding land mass and government's administrative capacity. (In Tuvalu, for instance, the EEZ is more than 26,000 times the size of the land mass.) In the case of fishing agreements allowing access to an EEZ, there is usually a low appropriation of fisheries export revenues by national operators and insufficient transfer to national stakeholders of specific fishing knowledge by foreign fishing companies; so the potential for national exploitation of these resources is reduced in the long run. (DESA, 2017).

Another major issue is illegal trading practices and human exploitation activities. Countries like Sri Lanka are hubs for narcotic drugs and human

trafficking with the help of fishermen. Lack of strict regulations and/or implementation of the laws on trade and immigration practices of the fishermen make the task easier for traffickers who carry out illegal business and transactions on the oceanic areas. The fishing boats are also susceptible for exploitation by the terrorist group as it did during the civil war.

Tourism also proves to be harmful to some extent to the Blue Economy, especially if carried out carelessly and without thinking about the surrounding marine ecosystem. Smart and sustainable tourism plans are essential for growth of the Blue Economy but, leisure and pleasure activities based in coastal areas which are not eco-friendly to the oceans should be stopped or limited to a certain extent. (Ranasinghe, 2017)

Conclusion

The concept of Blue Economy is fairly new to the world. The United Nations and the countries associated with it are working towards achieving a sustainable economy through ocean systems for the betterment of human existence and the surrounding ecosystems. This article aimed to show where India and 4 other select nations stand at present in developing their Blue Economy. In comparison to the members of the IORA, India is a prominent member making quick and fast changes in its policy towards this economic change. India has given importance to the Blue Economy and is building relations with other countries on the basis of improving the same. It shares notable relations with the surrounding littoral nations;- namely Bangladesh, Sri Lanka and SIDS which are represented by Mauritius and Seychelles. Bangladesh is in the first stages of forming its Blue Economy, and has a lot to learn from the neighbouring countries. Bangladesh is seen as prominent because it has taken various steps to enhance the Blue Economy of not just itself but other countries as well by bridging the gap through workshops and conferences and interdependently working with one another.

On a global level, Sri Lanka, on the other hand is not seen trying to bond with other countries but it is also taking strict action for its own economy, to maintain the name 'Pearl of the Indian Ocean' by working towards a sustainable ocean economy. It has been taking steps to remove the illegal trade activities and inhabitants simultaneously while adding more elements or improving the existing elements in its Blue Economy like the increase in its tourism. All three countries have the Indian Ocean as a common resource and have made cooperative agreements with one another in terms of marine security, and research and development aspects. Mauritius and Seychelles have proved to be very important partners for India in terms of Blue Economy. Both the island

states have worked towards utilising their oceanic resources in a speedy and efficient manner. They have worked towards all the aspects of the Blue Economy and have also brought to the table new innovations within like 'the blue bond' for the entire world to use. India and these two countries have combined efforts in terms of securities, technological assistance, building human capacity and tourism aspects. This article tries to show that by working bilaterally and in cooperation with one another, the Blue Economy will be achieved quicker. It also shows the generic challenges that are and will be faced by the nations in achieving the Blue Economy. Necessary measures must be taken by the governments to overcome the challenges and move forward to a better ecosystem.

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