AQUABE 2019

Souvenir

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International Conference on
Aquatic resources and
blue economy

28-30 November 2019

Kerala University of Fisheries and Ocean Studies (KUFOS)
Panangad, Kochi-682 506, Kerala, India
www.kufos.ac.in

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November, 2019

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BLUE ECONOMY - OUTLOOK FOR INDIA

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Oceans cover 72 % of planet earth and provide food and livelihood to a substantial portion of global population. We know that 80 % of global trade is through the ocean surface. Marine and coastal environment provide key source of economic development and the oceans provide unlimited opportunities for industrial and trade development. Ever since Gunter Paul's book :"The Blue Economy: 10 years, 100 innovations, 100 million jobs" written in 2010, mankind's attention brought the Blue Economy concept to prominence.

Some have a mistaken notion that blue economy is only about fish production from the oceans through capture and culture. It is not true. It pertains to all uses of the oceans for economic development and benefits for mankind. It encompasses the multiple uses of the oceans: ocean for food, oceans for fresh water, ocean for energy, ocean for transport, ocean for mineral, ocean for water, ocean for leisure and ocean for health.

Why mankind is looking at the oceans for economic benefits? Agriculture is the mainstay of every economy as it provides food for its people. With urbanization the cultivable land area has been declining. The productivity of soil has been declining with increased use of fertilizers. Climate change has impacted the agricultural production and profitability on land. Focus of farmers has changed from a crop agriculture to horticulture, industry, real estate, tourism, aquaculture and other areas. Water as a medium for income is an underutilized potential gold mine for every country. Freshwater sources are limited, polluted and there are multiple users. Blue economy refers to healthy ocean, supporting higher productivity, promote trade, tourism, sustainable use of resources, make itself an agent of change for economic gains. It aims at promoting smart, sustainable and inclusive growth and employment opportunities leading to overall development of the country . It could provide economic benefits for current and future generations. Blue economy provides social benefits for current and future generations. It can restore, protect and maintain the diversity, productivity and intrinsic value of marine ecosystems, thus contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, tourism and political stability, and the natural capital upon which the country's prosperity depends.

Blue Economy has special importance to the Indian Ocean. The alliance of Indian Ocean Rim Countries (IORA) was established in 1997. IORA is a dynamic organization of 21 Member States and 7 Dialogue Partners, with an ever-growing momentum for mutually beneficial regional cooperation through a consensus-based, evolutionary and non-intrusive approach.IORA ministerial meeting in Perth, Australia in 2014 recognized the importance of Blue Economy as top priority for generating income, employment, food security, poverty alleviation and ensuring sustainability in business and economic models. Indian Ocean Rim Countries members are the Commonwealth of Australia, People's Republic of Bangladesh, Union of Comoros, Republic of India, Republic of Indonesia, Islamic Republic of Iran, Republic of Kenya, Republic of Madagascar, Malaysia, 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.

Fisheries, which is a vital oceanic resource forms the core of the Blue Economy, as one of the main resources of the Indian Ocean which provide food to hundreds of millions of people and greatly contribute to the livelihoods of coastal communities. It plays an important role in ensuring food security, poverty alleviation and also has a huge potential for business opportunities. To meet the increasing public demand in seafood products, natural fisheries resources are being overexploited and threatened. Therefore, the urgent need to find a balance between population need and resource health has provided impetus to the promotion of sustainable fishing and aquaculture. India's total marine fish landings was 3.63 million tonnes. The value of marine fish landings at the landing centre was estimated at 48,381 crores. At the retail level, the value was 73,289 crores. India exported 1134948 MT of seafood in 2016-17 valued at INR 37,871crores (US$ 5.78 billion). In 2018 the marine products exports touched an all time peak of 47600 crores . This increase is mainly due to increased aquaculture product exports and world market price fluctuations, not because of high increase in marine capture fisheries. There is no large scope for capturing more fish as most of the fish stocks are optimally exploited. Our marine scenario presents a picture of over capacity. There are :Mech. vessels: 58911; Motorised: 75591; Non Motorised: 104,270; Well-managed fisheries can deliver billions more in value and millions of tonnes more fish each year. But it is only wishful thinking in India. About 50% of fisheries are fully exploitd, 15 % are overfished, 20 % are moderately exploited, 6 % are depleted, 6 % are underexploited and 2 % are recovering.(CMFRI data). Similarly, our fishing fleet has excess capacity to the tune of 457 % in Gujarat, 268% in Kerala, 207% in West Bengal and 196% in Tamil Nadu. The average share of a single fisherman in India is only 3 tons per year.

Ocean Farming is an ideal way to increase yield of food from the seas. Aquaculture has the potential for continued strong growth to supply the food requirements of a growing world. Aquaculture activities are predicted to cover about 73% of world fish production. Aquaculture, which offers huge potential for the provision of food and livelihoods under the Blue Economy. However it must incorporate the value of the natural capital in its development, respecting ecological parameters throughout the cycle of production, creating sustainable and decent employment to people and offer high value commodities for domestic consumption and export.

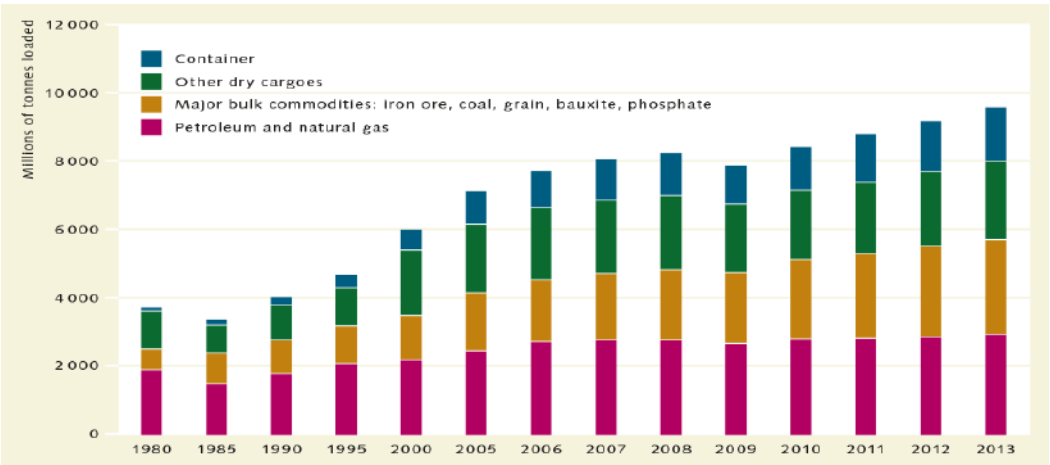
Globally India ranks the second position, after China, with regard to annual fisheries and aquaculture production. India is a major exporter of shrimps to many countries.In three decades, aquaculture production increased from 0.37 million tonnes in 1980 to about 7 million tonnes in 2016.More than 14.5 million people depend on fisheries activities.The national average annual consumption of fish and fish products is 7.85 kg/capita. In the coastal state of Kerala, fish is consumed the most, with 22.7 kg/per capita. Open sea mariculture is a fast growing activity along coastal waters in India. Across the world there are millions of open sea cages growing high value seafood such as Salmon, Seabass, Tuna, Perches, Plaice, Lobsters, Oysters, Mussels, Scallops, Clams and Sea weeds.Open sea cage culture was introduced to India in 2005 by the present

author through CMFRIwit funding support from Ministry of Agriculture, Govt. of India. This has spread to several states along the coast and currently most of these are managed by SHG or Fisher Cooperatives.Up to 7 lakhs per harvest are realized by the farmers from each cage with Sea bass(*Barramundi*). Great potential exists for many fold growth.

Ocean for energy is another component of the Blue Economy. The world population is expected to increase to an estimated 9 billion people in 2050, which is 1.5 times greater than the current population, resulting in an increase in countries' demands on fossil fuels. IORA Member States now consider alternative renewable sources of energy. Renewable sources of energy such as solar and wind are already being implemented worldwide. The ocean offers vast potential for renewable "blue energy" from wind, wave, tidal, thermal and biomass sources.

In line with the above efforts, it is also proposed to bring together the offshore oil and gas community with the renewable ocean energy community to undertake a gap analysis in relation to Oil and Gas exploration. In this regard the potential for the development of the offshore oil and gas industry in the Indian Ocean region should be taken into consideration.Since industrial oil extraction began in the mid-19th century, 147 billion tonnes of oil have been pumped from reserves around the world – half of it during the past 20 years. There is no doubt that extraction will soon be unable to keep pace with annually increasing needs. Experts anticipate that in the next 10 years so-called "peak oil" will be reached, the point at which the world's oil supplies go into irreversible decline. Currently the conventional oil reserves are estimated to be a good 157 billion tonnes. Of this amount, 26 % (41 billion tonnes) are to be found in offshore areas. In 2007 1.4 billion tonnes of oil, the equivalent of about 37 per cent of annual oil production, was derived from the ocean. The proportion of offshore production is therefore already relatively high. The most productive areas are currently the North Sea and the Gulf of Mexico, the Atlantic Ocean off Brazil and West Africa, the Arabian Gulf and the seas off South East Asia.Liquefied natural gas (LNG) plays a crucial role in our energy agenda. It is cheaper to transport cooled and liquefied natural gas across the oceans in huge tankers than through pipelines. LNG already accounts for a quarter of today's global trade in gas. In future, natural gas is more likely to be moved by ship than overland through pipelines. LNG proportion of the natural gas trade will substantially increase in future. The market is expected to grow by 8 per cent annually over the next 15 years. India has just started the LNG usage. You maybe aware of the LNG terminal in Vallarpadam, Kochi. The LNG is planned to be transported through pipeline to Mangalore and Bangalore very shortly as the pipe laying by GAIL is nearing completion. In the Indian energy scenario LNG brought through ships from the Gulf is going to play a major role

Ocean for Transport is another important area. Several items of cargo are transported through sea channels and the traffic has been constantly growing. (see Figure below);



Tankers, bulk carriers and container ships are the most important means of transportation of our time. Each year they carry billions of tonnes of goods along a few principal trade routes. Containerization has revolutionized global cargo shipping, bringing vast improvements in efficiency. The seaport and maritime transport sector is one of the important priority sectors under the Blue Economy.Regional cooperation is important for unlocking the bottlenecks to ports development and maritime economy expansion in the Indian Ocean so as to enhance blue growth through economic cooperation and trade relations between Member States.Ocean shipping can roughly be divided into two sub-markets – on the one hand liquid cargo such as oil and petroleum products, on the other dry cargo. Dry cargo is made up of bulk goods, the five most important being iron ore, coal, grain, phosphates and bauxite. Other dry cargo consists of bulk materials such as non-ferrous metal ores, feed and fertilizers, and particularly a variety of goods packaged in smaller transportation units. The single most significant type of cargo worldwide is crude oil, which alone accounts for roughly a quarter of all goods transported by sea. The major importers are the European Union, the United States of America and Japan. All three are supplied by the Middle East, the most important oil-producing region. North America also obtains oil from West Africa and the Caribbean, while Europe imports from North and West Africa.The transportation costs between where goods are manufactured and where these goods are consumed have been reduced considerably. Dry cargo such as automobile and machinery parts – until now transported by conventional means – has been increasingly containerized, contributing to the growth in container traffic. Until the global economic downturn the demand for new ships was great, but as the effects of the crisis were felt the tide turned and many companies cancelled their orders. All the same we can assume that even more ma- rine transport capacity will become available in the near future.

Ocean for Minerals is an area in which several nations have shown interest. The UN body , the International Seabed Authority (ISA) regulates exploitation of the ocean floor beyond 370-kilometre territorial limits to prevent a free-for-all. Several governments and the mining industry who have their eyes on the underwater riches. Scientists and environmentalists raised concerns about venturing into this unknown territory.Deep inside the ocean is a world as vibrant and rich as the one outside. There are mountain ranges, ridges, forests, seamounts, volcanoes and a unique ecology that defies common knowledge. Life here thrives without sunlight. This barely explored territory is also believed to hold vast quantities of precious metals and minerals that can sustain the modern world for centuries.Mineral deposits on land are decreasing while industrial demands are increasing. Exploration and mining of the seabed in gaining attention.

The seabed contains minerals that represent a rapidly developing opportunity for economic development in both the Exclusive Economic Zones of coastal nations and beyond the limits of national jurisdiction.Seabed exploration in the Indian Ocean has already started, but the major constraints in the commercialization of these resources lie in the fact that Member States have limited data on the resources their exclusive economic zone (EEZ) possesses, lack capacity for exploration, mining and processing of these minerals. Therefore, improved information is needed to assess the potential across the region.The vast repository of minerals, including the precious cobalt, zinc, manganese and rare earth materials that are needed for smart phones, laptops and hybrid cars, are present in three forms of ore—polymetallic manganese nodules that remain strewn across the ocean floor; cobalt-rich ferromanganese crusts that cover the seamounts; and massive polymetallicsulphide deposits around hydrothermal vents. These vents are cracks in volcanic areas of the ocean floor through which seeps iron- and sulphur-rich magma. As these minerals meet cold bottom water, they precipitate, creating high-gradedeposits. Typically, an ore from seabed deposit is seven times enriched with minerals than that mined from land. This beguiles governments who are fast running out of reserves on land.

Both state-owned and government-sponsored companies from India, France, Russia, Germany, China, Singapore and the UK had sought permission for minerals prospecting in the high seas. Four licences have been granted for the Pacific and two

licences for the Indian Ocean Ridge, one for Rio Grande Rise in the southern Atlantic. These are significant chunks of seabed. By now the ISA has opened up a vast 1.2 million square kilometres of seabed—one-third the size of India—for exploration of mineral deposits under 26 licences issued since 2001.

Ocean for drinking water is the future for drinking water for the world population. The ocean has two unique features as a water source – it's drought-proof and is practically limitless. Over 50 % of the world's population lives in cities bordering the ocean. In many arid parts of the world such as the Middle East, Australia, Northern Africa and Southern California, the population concentration along the coast exceeds 75 %. Seawater desalination provides a logical solution for the sustainable, long-term management of growing water demand.At the end of 2015, there were approximately 18,000 desalination plants worldwide, with a total installed production capacity of 86.55 million m^3/day . Around 44% of this capacity (37.32 million m^3/day) is located in the Middle East and North Africa. While desalination in that region is projected to grow continuously at a rate of 7 to 9 % per year, the "hot spots" for desalination development over the next decade are Asia, the US and Latin America. There is great scope for India. No major technology breakthroughs are expected to dramatically lower cost of seawater desalination in the next several years. But the steady reduction of production costs, coupled with increasing costs of water treatment driven by more stringent regulatory requirements, are expected to accelerate the current trend of increased reliance on the ocean as a water source.

This will further establish ocean water desalination as a reliable,drought-proof alternative for many coastal communities worldwide.Technology advances are expected to reduce the cost of desalinated water by 20% in the next five years, and by up to 60% in the next 20 years, making it a viable and cost-effective competitor for potable water production.

Ocean for Leisure is a fast growing sector. Marine tourism, with its related marine activities (including cruise tourism), is a growing industry that represent an important contributor to the economy of countries and for generating employment.Beach tourism, beach sports and leisure activities, beach resorts, oceanarium and aquarium are all becoming popular.However, these activities,if not managed sustainably, could develop a parasitic relationship with the environment, leading to destruction and degradation of marine habitats and environment, loss of biodiversity, marine pollution and overexploitation of resources. This necessitates actions for environmental protection in order to prevent any irreversible impacts that may arise from marine tourism industry. Protecting local marine resources is one of the most urgent needs in promoting sustainable tourism. Sustainable coastal tourism can assist with the preservation of artisanal fishing communities, allow for subsistence fishing, protect the environment, and make positive contributions to sustainable economic development.In view of addressing these issues, there is a need to: create more and increase the size of marine protected areas (MPAs); establish and promote sustainable marine tourism; create opportunities for financing MPAs; develop more marine parks, among others.In addition to providing areas for recreation and enjoyment, marine parks support billions of dollars of vital ecosystem services worldwide.Sustainable and environment friendly tourism parks are to be developed through coastal area management plans. Huge economic opportunities exist here.

Ocean for Health is an area which has caught attention of scientists and pharma industry. Marine biotechnology (or Blue Biotechnology) is an area of great interest and potential due to the contribution for the building of an eco-sustainable and highly efficient society. A fundamental aspect is related to aquaculture, whereby new methodologies will help in: selective breeding of species; increasing sustainability of production; and enhancing animal welfare, including adjustments in food supply, preventive therapeutic measures, and use of zero-waste recirculation systems. Aquaculture products will also be improved to gain optimal nutritional properties for human health. The development of renewable energy products and processes, for example through the use of marine algae. In addition, the marine environment is a largely untapped source of novel compounds that could be potentially used as novel drugs, health, nutraceuticals and personal care products. Two

marine-derived drugs are already in use — an anti-tumor medication derived from sea squirts and a painkiller from a cone snail. More than a dozen drugs are in clinical trials, including ones to treat Alzheimers and lung cancer.There are several phases in marine product research: specimen collection; establishing taxonomy; extracting possible active molecules; using screening techniques to evaluate therapeutic activity; identifying and isolating the structure responsible for the activity; and using organic synthesis to ensure a supply. Patent applications are immediately filed for promising molecules. These molecules are then tested and, if the results are positive, studies are carried out on human subjects in clinical trials. Once this last phase has been completed, the product is registered as a new drug and brought to market. Novartis, Aventis, Eli Lilly, Inflazyme Abbott, Wyeth and Taiho Pharmaceuticals Co. have marine-derived therapeutic products in the pipeline.

Recently many countries are turning to ocean for housing. Shimizu Corporation which is a Japanese engineering firm have proposed a radical idea which could see humans living under the ocean's surfaces by the year 2030.Designated Ocean Spiral, the project aims to bring an entire human civilization into a sustainable habitat that's entirely supported by the ocean's resources.Two central bodies will form the foundation of Ocean Spiral with one being a 500 metre diameter spherical metropolis which boasts a central tower accommodating up to 5,000 people in homes and workspaces.The second part is a spiral structure which connects the sphere to a base station 4km below on the ocean floor. This base structure takes advantage of the varying degrees of temperature and water pressure to generate power for the spherical city above whilst also providing drinkable water via a desalination plant.Natural resources will also be extracted from the sea bed via a research centre in the base station. Food will also be a self-sustainable affair with Ocean Spiral boasting large underwater farms for cultivating fish, crustaceans and edible aquatic plants.Sounds crazy? This plays as an indication as to where the human race could be heading in the next century to ensure its survival.People are splashing out almost £1 million to actually live under the sea in Dubai. The 42 underwater villas are part of the Heart of Europe project, a new resort being built by the Kleindienst Group, 4km off the Dubai coast. The 1,700 square foot apartments are for Dhs5 million (£894,000 Each of the three-story properties will feature a sea-level, which will offer 'magnificent views of the spectacular sea world.' The kitchen, dining room, living room and bathroom will all be on the bottom floor, 13ft under water. On the second floor you'll find your master bedroom and bathroom and then there's a roof terrace on the top level for gazing out over the ocean.

Blue Economy opens out a grear opportunity for investment. Areas such as oil exploration, sea bed mining, energy from ocean, desalination. deep sea fishing, fish processing & value addition, Aquaculture, ship building, shipping & transport, pharmaceuticals, beach tourism, harbours& warehouses, cold chains, beach resorts, marine patrols & navy, beach resorts, beach sports & diving, hatcheries, aquaria, oceanaria, underwater housing, cruise tourism, offshore terminals, infrastructure development, service sectors, allied industries*etc*. provide great avenues for investment.

Indian Initiatives so far

Since 2014, several capacity building programmes have been carried out covering a wide range of areas, including *inter alia:* fisheries and aquaculture; seafood processing, handling and storage; seafood quality and safety; seaport and shipping; maritime connectivity; banking and artisanal fisheries; marine spatial planning and ocean forecasting/ observatory. The First IORA Ministerial Blue Economy Conference (BEC) was held in Mauritius on 2-3 September 2015 where the Blue Economy Declaration was adopted. Reflecting on the global trends, this Declaration seeks to harness oceans and maritime resources to drive economic growth, job creation and innovation, while safeguarding sustainability and environmental protection.The Govt. of India has created a **Sagaramala** initiative to convert the entire coastal belt in to economic hubs based on Oceans.

Economic and Trade Potential

The Indian Ocean Region is abundant with resources, particularly in the sectors of fisheries, aquaculture, ocean energy, sea-bed mining and minerals, and provides tremendous economic opportunities to develop marine tourism and shipping activities. Among these resources, fisheries and minerals are the most commercially viable industries. Commercial and artisanal fisheries sustain the livelihoods of more than 14 million people in India.In the Indian Ocean, fish production increased drastically from 861,000 tons in 1950 to 11.5 million tons now.The United Nations Food and Agriculture Organization (FAO) report states that while other world oceans are nearing their fisheries limit, in certain areas, the Indian Ocean's resources have the potential to sustain increased production.Polymetallic nodules and polymetallic massive sulphides are the two mineral resources of They contain nickel, cobalt, iron, and manganese. India received exclusive rights for the exploration polymetallic nodules in 1987, in the Central Indian Ocean Basin. Since then, it has explored four million square miles and established two mine sites. A strong impetus on Research and Development, and Innovation in the areas of Ocean Energy, Marine Biology and Biotechnology must be provided for the nation to achieve significant market shares in these sectors.It is necessary for India to tap the enormous potential of the Ocean based Blue Economy, which will propel the nation into a higher growth trajectory. The development of Blue Economy can serve as a growth catalyst in realizing the vision to become a $10 trillion economy by 2032.Additionally, the Indian Ocean Region is of strategic importance to India's economic growth as the most of the country's oil, and gas is imported through the sea. Further, this dependency is expected to rise by 2025 exponentially.The Indian Ocean Region presents tremendous trade potential for the country. The countries in the Indian Ocean Rim Association (IORA) exhibited significant dynamism in the past few years as the trade in the region increased by over four times from US$ 302 billion in 2003 to US$ 1.2 trillion in 2012 .

The Sagarmala project, launched by the Ministry of Shipping, is the strategic initiative for port-led development through the extensive use of IT enabled services for modernisation of ports. It tackles the issue of underutilized ports by focusing on port modernization, efficient evacuation, and coastal economic development. The government has allocated over Rs. 3 lakh crore to fund 199 projects under the Sagarmalaprogramme to be implemented in the next three years. Of these identified programmes, projects of more than Rs. 1 lakh crore are already under implementation. Moreover, the Union Budget of 2017-18 has increased the allocation to the project from Rs. 406 crore (RE 2016-17) to Rs. 600 crore (BE 2017-18), giving further impetus to the port-led development.

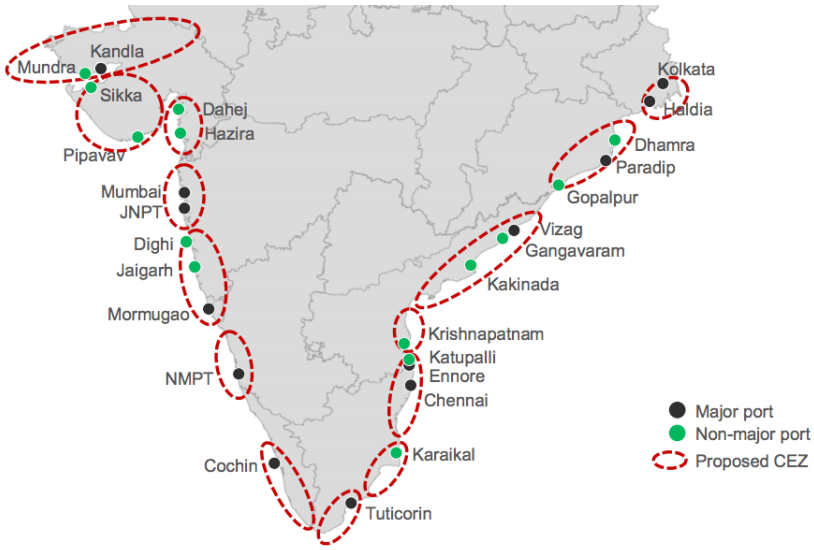
Under the Make in India program of the Government, shipbuilding industry can benefit from a major thrust. This industry has a high multiplier effect on investment and can accelerate industrial growth along with its large number of associated industries. In December 2014, India had a fleet strength of just over 1,200 ships, which is expected to reach over 1,600 by 2025 . A strong push in India's commercial shipbuilding and ship repair sectors, complementing the Sagarmala project of port development have the potential to drive economic transformation.

Under SagarmalaProgramme, 577 projects, at an estimated investment of approximately [1] 8.570500 lakh crore (US$120 billion), have been identified across port modernization & new port development, port connectivity enhancement, port-linked coastal economic zone industrialization and coastal community development for phase wise implementation over the period 2015 to 2035. As per the approved implementation plan of Sagarmala scheme, these projects are to be taken up by the relevant Central Ministries/Agencies and State Governments preferably through private/ PPP mode. As of 31-Mar-2018, a total of 492 projects ([1] 4.255630 lakh crore (US$62 billion)) were under various stages of implementation, development and completion.

Port-Modernization under Sagarmala.Since about more than 90% of India's trade by volume is conducted via the country's maritime route, there is a continuous need to develop India's ports and trade-related infrastructure to accelerate growth in the manufacturing industry and to assist the 'Make in India' initiative. India has 12 major ports and approximately 200 non-major ports administered by Central and State Governments respectively.

As per the studies conducted under the SagarmalaProgramme, it is expected that by 2025, cargo traffic at Indian ports will be approximately 2500 MMTPA while the current cargo handling capacity of Indian ports is only 1500 MMTPA. A roadmap has been prepared for increasing the Indian port capacity to 3500+ MMTPA by 2025 to cater to the growing traffic. This includes port operational efficiency improvement, capacity expansion of existing ports and new port development.

Under Project Unnati, the global benchmarks were adopted to improve the efficiency and productivity KPIs for 12 major ports. Around 116 initiatives were identified across 12 major ports to unlock more than 100 MTPA capacity just through efficiency improvement. Out of which, 86 initiatives have been implemented to unlock around 80 MTPA capacity.



Port-linked Industrialization under Sagarmala.Coastal Employment Zones (CEZ) and Coastal Employment Units (CEU). Coastal Employment Zones (CEZ) is an important component of the SagarmalaProgramme aimed at port-led industrial development of 14 business-friendly Coastal Economic Zones (CEZ) with the investment of ¹4,639,700 million (equivalent to ¹4.9 trillion, US$70 billion or •63 billion in 2018), centered around ports in India spread across national coastline of 7,500 km, by using Make in India indigenous manufacturing scheme. Sectors targeted for manufacturing units are maritime and inland waterways, water transport, coastal and cruise shipping, and solar and wind energy generation, auto, telecom and IT, etc. Each CEZ will cover economic region consisting of several coastal districts with strong linkage to the ports in that region. Each CEZs will also create synergy with industrial corridors passing through the region, such as Delhi–Mumbai Industrial Corridor Project, Mumbai-Bangalore economic corridor, Dedicated Freight Corridor, Chennai Bangalore Industrial Corridor, Visakhapatnam–Chennai Industrial Corridor and Amritsar Delhi Kolkata Industrial Corridor, etc. Each CEZ will have several Coastal Employment Units (CEU), and in turn each CEU will have several Port-Linked Industrial Clusters (PLIC). "Coastal Employment Units" (CEUs) serve as nodes within CEZ, each CEU industrial is an industrial estates with multiple industries. Each "Port-Linked Industrial Clusters" (PLIC) within CEU will have several manufacturing units.Benefits include national GDP growth with ease of doing business by boosting export by US$100 billion, 150,000 job creation by 2025, reduction in export cargo logistics cost and time, and increased global competitiveness of Indian exports.

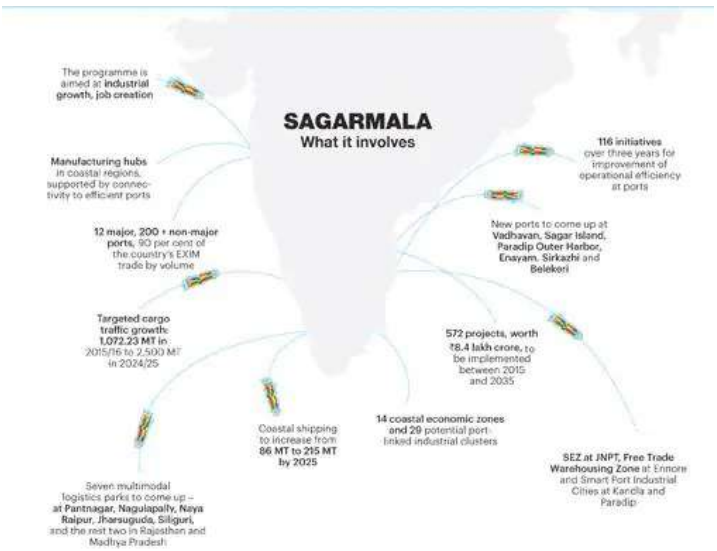
A totalof 14 CEZs are planned to be developed in phases across coastal India. These are Kachch CEZ which is linked to KandlaDeenDayal port and Mundra Port, spread acrossKachch district in Gujarat, Saurashtra CEZ. linked to Port Pipavav and Sikka port, stretched across Junagarh, Amreli and Bhavnagar to Ahmedabad districts in Gujarat, Suryapur CEZ, Linked to Dahej port and Hazira Port,stretched from Bharuch, Surat and Navsari to Valsad districts in Gujarat, North

Konkan CEZ, linked to Jawaharlal Nehru Port lalall Mumbai Port Trust, stretched from Nashik, Thane, Mumbai and Pune to Raigad districts in Maharashtra, South Konkan CEZ, linked to Dighi, Jaigarh and Mormugao port,stretched from Ratnagiri, Sindhudurg and North Goa to South Goa districts in Maharashtra and Goa, Dakshina Kannada CEZ, linked to New Mangalore Port, stretched from Udupi, Dakshina Kannada and Kodagu to Mysuru districts in Karnataka, Malabar CEZ, linked to Cochin Port, stretched from Ernakulum, Alappuzha, and Kollam to Thiruvananthapuram districts in Kerala,Mannar CEZ, linked to VOCPT port, stretched from Kanyakumari and Tirunelveli to Thoothukudi districts in Tamil Nadu,Poompuhar CEZ, linked to Cuddalore port, Stretched from Cuddalore, Perambur, Ariyaur, Tiruchirappalli,Thanjavur and Thiruvarur to Nagapattinam districts in Tamil Nadu, VCIC South CEZ, linked to Chennai Port, Kamarajar Port and Kattupalli Shipyard,stretched from Thiruvallur and Chennai to Kancheepuram districts in Tamil Nadu, VCIC Central CEZ, linked to Krishnapatnam Port, stretched from Chittoor to Nellore districts in Andhra Pradesh, VCIC North CEZ, linked to Visakhapatnam Port and Kakinada Port, stretched from Guntur, Krishna, West Godavari, East Godavari, Visakhapatnam, Vizianagaram to Srikakulam districts in Andhra Pradesh, Kalinga CEZ, linked to Paradip Port and Dhamara Port, stretched from Puri, Jagatsinghapur, Cuttack, Kendrapara, Jajapur to Bhadrakdistricts in Odisha, Gaud CEZ, linked to Port of Kolkata and Haldia Port, stretched from Purba Medinipur to South 24 Parganas districts in West Bengal.

Connectivity

Of the 51numbers of port connectivity projects costing [1] 446 billion (US$6.5 billion or •5.8 billion), 11 projects are already complete and rest are under execution. The Port-Linked Industrial Clusters (PLIC) are as below. Total 37 port-linked industrial clusters across several sectors. These include Discrete Manufacturing Cluster,(total 23), Petrochemical Cluster, (total 4), Power Cluster,(total 4), Steel Cluster,(total 2), Maritime Cluster,(total 2), Cement Cluster,(total 2).

There are other initiatives for promoting port-linked industrialization under Sagarmala. In November 2017, with the development of first Special Economic Zone centered around the busiest cargo ports in India that handles 40% of India's export-import volume, Jawaharlal Nehru Port east of Mumbai, was initiated. Several large companies from telecom, auto and IT sectors are expected to bid for the 200 hectares of export-oriented manufacturing units in the SEZ to reduce export logistics cost, thus also generating direct jobs by infusing new technology, investment and world's best management practices.Further, development of Smart Industrial Port City (SIPC) at Paradip and at Kandla ports and Coastal Employment Units (CEUs) at V.O. Chaidambarnar Port Trust and Kamarajar Port Limited is under progress.



Under SagarmalaProgramme, the endeavor is to provide enhanced connectivity between the ports and the domestic production/consumption centres. More than 210 connectivity projects have been identified. Some of the types of connectivity projects considered are Coastal Berths at various major and non-major ports, National waterways prioritized for development in the first phase, Heavy haul rail corridor from Talcher to Paradip, Connectivity to Dedicated freight corridors, Last mile rail and road connectivity projects, Major rail connectivity projects, Freight friendly Expressway projects connecting the major ports, Development of

Multi-Modal Logistics Parks, POL Pipelines. The Government has taken various initiatives for promotion of Coastal Shipping such as dedicated Coastal Berths in Major Ports, financial assistance to State Government for Coastal Berth, concession in Cargo related and Vessel-related charges to the extent of 40%, encourage to Ro-Ro/Ropax services and offering 80% discount in Port charges and ease of customs procedures, etc.

Skill Development

Under SagarmalaProgramme, an integrated approach is being adopted for improvement in quality of life with focus on skill building and training, upgrading of technology in traditional professions, specific and time-bound action plan for improving physical and social infrastructure in collaboration with the coastal states.

On the skill development front, the skill gap study of 21 coastal districts has been completed and domain ministries & concerned state governments have been asked to implement the district action plans. To address the skill gap in ports and maritime sector in these 21 coastal districts, the Ministry of Shipping will also be funding skill development under DDU-GKY to train 10,000 persons annually for next 3 years. Skill gaps survey for Kanyakumari and Palghar have been taken up under SagarmalaProgramme. Under coastal district skilling programs in convergence with DDU-GKY, 1,917 candidates have been trained and 1,123 candidates have been placed.

The government is also funding the fire safety training project for workers at Alang-Sosiya Shipyard and the cutting-edge skills training project in Ports & Maritime Sector. So far 4,036 people have been trained. The course curriculum has been revised and updated to conform to the common norms for skill development schemes under National Skill Qualification Framework notified by the Ministry of Skill Development & Entrepreneurship. Indian Register of Shipping (IRS) is now conducting third-party assessments.

A world class, state of the art Centre of Excellence in Maritime and Shipbuilding (CEMS), first of its kind in Asia, a startup in skill development for maritime and shipbuilding sector with campuses at Vishakhapatnam and Mumbai was launched by Minister of Shipping on 17 November 2017. The cost of CEMS is ₹ 766 cr. out of which 87 % in-kind grant is being provided by Siemens. Siemens is also providing technology and expertise for the centre. Ministry of Shipping is providing a non-recurring one-time grant of ₹ 50.07 cr. for creation of 24 hi-tech labs (18 in Vishakhapatnam and 6 in Mumbai). Its capacity of training is 10,500 trainees per annum. The Centre is likely to be operational in May 2018.A Multi-Skill Development Centre linked to JNPT is being set up in coordination with Ministry of Skill Development & Entrepreneurship.

The National Technology Centre for Ports, Waterways and Coasts (NTCPWC), at IIT Madras is being set up to study engineering issues related to ports, waterways, and coasts and in the country. NTCPWC will act as a technology arm of Ministry of Shipping for providing the needful technological support to Ports, Inland Waterways Authority of India (IWAI) and all other related institutions. The cost of setting up the centre is ₹ 70.53 cr. which is being shared by MoS, IWAI and the Major Ports. MoS's grant is towards capital expenditure for creating facilities like Field Research Facility (FRF), Sedimentation and Erosion Management Test Basin (SEMaTeB) and Ship/Tow Simulator. Memorandum of Agreement has been signed on 26.02.2018 between Ministry of Shipping and IIT Madras and Sh. NitinGadkari, Minister for Road Transport & Highways, Shipping and Water Resources, River Development & Ganga Rejuvenation laid foundation stone for setting up of NTCPWC at IIT Madras at Chennai.

Fisheries

SagarmalaProgramme in coordination with related Central Ministries and State Governments would fund capacity building, infrastructure, and social development projects related to value addition in fisheries, aquaculture and cold chain development. As part of the coastal community development component of the SagarmalaProgramme, Ministry is part-funding fishing harbour projects in convergence with Department of Animal Husbandry and Dairying (DADF). However, sadly there have been no concerted efforts to upscale the post harvest handling, quality control and value additionof marine products under the Sagarmala Project, perhaps due to the lack of consultative mechanisms between the Ministry of Shipping and the Ministry of Agriculture and Ministry of Commerce. Currently the maximum attention and funds are diverted towards infrastructure development in the harbours and developing connectivity to harbours. Other ignored sectors are oil and natural gas, coastal shipping, leisure, sports and coastal tourism, oceans for energy,oceans for drinking water, oceans for pharmaceuticals, oceans for minerals, oceans for aquaculture etc. In my opinion, such unbalanced development points out to the need of inputs from experts in areas other than shipping and ports. This lacuna will result in subdued utilization of the Blue Economy concept in India.

Coastal Tourism

For promoting tourism in maritime states under Sagarmala, projects have been identified in convergence with Ministry of Tourism and tourism development departments of maritime state governments. Key coastal tourism projects include development of coastal circuits under SwadeshDarshanscheme of Ministry of Tourism, development of infrastructure for promoting cruise tourism, development of lighthouses, national maritime heritage museum complex at Lothal, underwater viewing gallery and restaurant at Beyt, Dwarka.

A fall out of the Blue Economy is the international relations and security. The Indian Ocean has always enjoyed a place of prominence in global strategy. Many nations have established a presence in the region to ensure their strategic interests. India was very active in the UN Adhoc Committee that was set up on the Indian Ocean and supported the cause of keeping the Indian Ocean, a Zone of Peace during Cold War.However, with the re-emergence of piracy issues and growing importance to secure the oceanic ecosystem, India has been pro-actively involved in cooperative arrangements with like-minded neighboring countries. The 'Trilateral Cooperative in Maritime Security between India, Sri Lanka, and Maldives' is one such example. The *India Maritime Security Strategy* published by the Indian Navy articulates country's policy in the Indian Ocean region. In this era of advanced technology, oceans will become new centers of economic activity. Oceans already account for significant trade and commerce in the fields of shipping, offshore oil and gas, fishing, undersea cables, and tourism. Besides these areas, there are other emerging industries such as aquaculture, marine biotechnology, ocean energy and sea-bed mining that have the potential to create jobs and spur worldwide economic growth.The Indian Ocean region needs a sustainable and inclusive framework for international partnerships. Countries in the region need to not only coordinate and manage the growing security challenges in the region but also realize the substantial economic potential the Indian Ocean area presents.

India has significantly upped its development efforts in Seychelles, Mauritius, Africa, and Sri Lanka. The future offers great scope for quantum jumps for Indian economy. However, it is sad to notice that much of the efforts and funds are being designed to be spent in the state of Gujarat, ignoring many other more potential maritime states. As of now, the government's vision appears to be parochial and skewed. It is important that the vision is widened and supported by dedicated mission oriented projects, taking in to its hold all those areas currently overlooked, and with liberal outlook and focused planning. This will help realize the full potential of the Blue Economy to India.