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# Harnessing the Blue Economy India's Path to Sustainable Marine Resource Utilization and Economic Growth

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## ABSTRACT

Blue Economy has introduced a completely new array of opportunities for India to expand upon its economy while having keeping an eye on the sustainability of its marine resources. It also helps that this idea implements perfectly with the strategic positioning of the coastline. India's potential to increase its economic growth with the help of Blue Economy through various policies which could be implemented into its economic framework. India has even taken steps to promote this with various projects like the Sagar Mala Project or the Deep Ocean mission. The main focus right now should be based on the process of upgrading the infrastructure related to port, upgrading marine technology while also focusing and promoting sustainable aquafarming and preservation of marine resources. In simple words it strives to create of balance of both the economic growth as well the conservation of the aquatic resources and marine life. Marine sectors require investments but in return it will certainly lead to the boost in India's GDP as it will lead to the many benefits like creating major job benefits, and it will improve the lifestyle of coastal communities. However, with such ambition the implementation of these policies remains a huge challenge, it requires more than just discussing policies it requires complete involvement from both the Government and the community. Overall, if India uses its tactically perfect positioning in terms of blue economy it could become of the biggest blue economic models in the world. India's blue economy could contribute hugely to both the Nation and global efforts to spread the message of economic growth along with the preservation of the ocean life.

## INTRODUCTION

The blue Economy refers to an integrated approach that exploits the sustainable use of the ocean to promote economic growth, better livelihoods, and healthy ecosystems. It includes activities associated with fisheries, marine biotechnology, coastal tourism, renewable marine energy, and seabed mining. According, to the world bank in economics blue economy is related to the Preservation, Exploitation and Regeneration of the marine resources. Moreover, The World Bank describes the blue economy as "the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs, while preserving the health of the ocean.[1] Furthermore, the concept of the blue economy is given by the Gunter Pauli in his book, The Blue Economy 10 Years, 100 innovations, 100 million Jobs. His book pictured

[1] *What is the Blue Economy?* (n.d.). World Bank. Retrieved November 13, 2024, from https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy

multiple potential innovations based on models working with nature, not against it. This helped bring clear vision of blue economy as an economic paradigm centered on sustainable use and environmental protection of oceans.

In the Early 1970 to 1980 marine conservations began to gain attention as there is too much of overfishing, water pollution, and many more other activities that harm the ocean health. The United Nations and Environmental organizations looked into this for the sustainable ocean management. They make some policies to prevent this pollution, protecting marine biodiversity, and establishing marine protected areas. etc. However, these efforts did not align with the economic growth as they were more focused on the conservation and sustainability of the ocean health. In 1992, Earth Summit was held in Rio de Janeiro, Brazil on the concept of the sustainability in which sustainable development was a universal Goal, yet the concept of blue economy was hardly being known around the world. This Rio summit brought significant attention and international pressure towards protecting the ocean also taking consideration its role in economic development. Later, in 2012 United Nation conducted a conference on sustainable development also known as Rio+20, the blue economy formally recognized as one of the crucial elements of sustainable development. In this Context most nations particularly developing states and coastal states began promoting the blue economy as a pathway to economic resilience. [2]Later in 2015 blue economy gained a significant boost when United Nations (UN) adopted 2030 agenda for Sustainable Development Goals (SDG) which include 17 Sustainable Development Goals (SDG). These goals provide a blue print towards achieving a better future for all, facing challenges of poverty, inequalities, climate change, environmental degradation, and peace. Among these all SDG 14 - Life below water Especially aims to conserve sustainability using the oceans, seas, marine resources. This SDG inspired many countries to create National Blue Economy Policies. Countries like Kenya, Seychelles and India. Thus, history of blue economy reflects a gradual shift in global perspective on the ocean health.

**Blue Economy in India**

India's blue economy encompasses sustainable approaches toward the utilization of ocean resources for economic development, employment generation, and preservation of resources. Being the country with the third-longest coastline, at 7,517 kilometers, India has an expansive Exclusive Economic Zone that offers significant sectors of fisheries, aquaculture, marine biotechnology, and energy production. This impacts the livelihoods of over 4 million coastal inhabitants, largely in terms of fisheries and remains an important stakeholder in food security and economic sustenance in coastal communities. India also has 95 percent of its trade business by ports and contributes an estimated 4% to its Gross Domestic Product (GDP). The country has 12 Major Ports and 200 Non-Major Ports. The major ports are namely Chennai, Cochin, Deendayal (Kandla), Jawaharlal Nehru (Nhava Sheva), Kolkata, Mormugao, Mumbai, New Mangalore, Paradip, V.O. Chidambaranar (Tuticorin), Visakhapatnam, and Kamarajar Port Limited under the administrative control of Ministry of shipping. None of these major ports have been privatized, as the ownership of the land and waterfront remains with the government. And non-major ports are under the jurisdiction of the respective state government. Maritime trade thus becomes an integral part of the economy. [3]

[2] *United nations conference on sustainable development, rio+20 .:. Sustainable development knowledge platform*. (n.d.). Retrieved November 28, 2024, from https://sustainabledevelopment.un.org/rio20

[3] *Ports wing*. (n.d.). Ministry of Ports,Shipping and Waterways. Retrieved November 13, 2024, from https://shipmin.gov.in/division/ports-wing

The Sagar Mala Project in 2015 is a government-led initiative towards the modernization of such ports to bring down the cost of logistics and increase coastal connectivity, creating a base for port-led development and employment opportunities. Another rising area of India's blue economy, apart from industry, is marine and coastal tourism. Also, Water activities such as recreational fishing and cruise-based tourism along with beach-based tourism can be organized to take place by focusing more on sustainable tourism. The tourism undertaken may involve more development of islands like the Andaman and Nicobar. An area of significant potential for marine renewable energy is offshore wind, tidal, and wave energy, which can reach up to thousands of megawatts. The investment costs are quite high, but the sector goes pretty well within the sustainability goals of India. Overall, India's blue economy strategy aims to leverage marine resources for socioeconomic development, energy security, and environmental sustainability, positioning it as a promising driver of future growth.

**Policy, Governance, and Legal Framework**

**Sagamala Project**

The Concept of the Sagar mala initiated in 25th March 2015 by the union cabinet. National Perspective Plan (NPP) was developed to guide the development of Indias coastline and marine sector. Later in April 14,2016 it was launched by the Prime Minister of India during 2016 Marine Summit. It was initiated to transform the marine sector and coastal infrastructure to promote port led development and reduce the logistic costs and enhance trade efficiency. This project seeks to harness Indias 7500 km of long coastline,14500 km of potentially navigable waterways and some strategic locations along global trade routes.

The Sagarmala Project consists 5 main components,

1. **Port Modernization and New Port Development:**

India has 12 major ports and 200 non-major ports managed by state and central government. Over 90% of India's trade is conducted via marine routes, necessity continuous port and development. This focuses on upgrading existing ports and to construct the new ports to increase cargo volumes. One of aim of this project is to make the ports more effective and efficient to handle both domestic as well as international trade.[4]

2. **Port Connectivity Enhancement:**

Connectivity is an essential enabler for ports and the overall efficiency of the logistics enhances the competitiveness of the maritime industry. The accreted or total available capacity at ports, building with new technology and capacity building, is able to meet demand, though it would not be able to respond to additional traffic if evacuation to and from the port were limited. More importantly, in India the for smooth connectivy to ports is needed because the cargo generating centers lie more in the hinterland rather than the coastal region. High lead distance increase logistics cost and Variability in time within which cargo can be delivered.[5]

3. **Port-led Industrialization:**

It is to reduce logistic cost and time for the movement of (EXIM) and domestic cargo by promoting the development of port-proximate industrial capacities. To achieve this goal the program introduced some

[4] *SAGARMALA*. (n.d.). Ministry of Ports,Shipping and Waterways. Retrieved November 15, 2024, from https://shipmin.gov.in/division/sagarmala

[5] *SAGARMALA*. (n.d.). Ministry of Ports,Shipping and Waterways. Retrieved November 15, 2024, from https://shipmin.gov.in/division/sagarmala

concepts like Coastal Economic zones (CEZ), Coastal Economic Units (CEU),Port-linked industrial and marine time Clusters and Smart Industrial Port Cities. Each CEZ consists Several CEZ with one or more industrial clusters accommodating several units within a CEU. First priority areas would be those having deep-draught ports, with available land parcels readily available and high potential for manufacturing activity. The idea of this is to provide industrial clusters and hubs near ports with the objective of attracting industries considerably dependent on import and export orders like petrochemical, automobile manufacturers, and food industries. Industries which locate within ports save transport costs, optimize supply chain efficiency, and promote the development of economies along coasts.[6]

**4. Coastal Community Development:**

Around 18% population resides in 72 coastal districts, constituting 12% of the mainland. The Sagarmala Project does this by improving the quality of life of these communities through marine sector activities such as fisheries, maritime tourism, and skill development; it also promotes cruise and lighthouse tourism, among other initiatives. Upgrading of physical and social infrastructure and technology modernization in the traditional professions in collaboration with coastal states through integrated policies skill building and training programs.

**5. Promotion of Coastal Shipping and Inland Waterways in India:**

It is to encourage coastal shipping and inland waterways as a shift towards more sustainable and cost-effective transportation. This approach aims to reduce congestion on roads and railways by reducing carbon emissions, and saving the cost of transporting bulk goods. Despite having vast inland waterways, the mode of freight transport based on water is grossly underutilized in India, constituting merely about 6% of the transportation, which is considerably lesser than most developed and even many developing countries. However, coastal shipping is expected to increase. The traffic is expected to increase by 2025 at 250 MMTPA (Million Metric Ton per Annum). The commodities that will be handled include coal, cement, and food grains, among others. Similarly, the inland waterways are also expected to handle 150 MMTPA (Million Metric Ton per Annum) cargo by the same year. Aspects of infrastructure improvement will have to be made to support such growth in traffic by providing dedicated coastal berths, bunkering facilities, and enhancing the connectivity on hinterland transport.[7]

**National Fisheries Policy**

The National Fisheries Policy of India brings together the other existing frameworks such as National Policy on Marine Fisheries 2017, Draft National Inland Fisheries and Aquaculture Policy, and Draft National Mariculture Policy to formulate a harmonious framework that would support sustainable fisheries and aquaculture practices for the nation at large. This approach tends to enhance the fish production as well as achieving the environmental sustainability and socio-economic development for the fishing communities. Being the third-largest fish producer in the world, it provides almost 8% of global fish production, the country reached about 162.48 lakh tons of fish production in fiscal year 2021-22 with big contributions from both marine and inland fisheries. The fisheries sector is highly supportive of the Indian economy. Over 28 million people are employed by this sector, and it contributes much to food security

[6] *SAGARMALA*. (n.d.). Ministry of Ports,Shipping and Waterways. Retrieved November 15, 2024, from https://shipmin.gov.in/division/sagarmala

[7] *SAGARMALA*. (n.d.). Ministry of Ports,Shipping and Waterways. Retrieved November 15, 2024, from https://shipmin.gov.in/division/sagarmala

and nutrition. [8]Formulated in this context, the National Fisheries Policy of 2020 targeted the cure of maladies like overfishing, environmental degradation, and socio-economic disparities at fishing communities for the development of an ecologically healthy, economically viable, and socially inclusive fisheries sector towards ensuring food security while looking for sustainable practices. The other major goals are proper and prudent management of the resources to remain sustainable, prosperity of the stakeholders' economy, security through increased productions of fish, equality in access for marginalized communities, and environmental sustainability. Implementation strategies identified under the policy are formulating FMPs to scientifically regulate marine resources; capacity building through training programs by fishers; promotion of PPP in infrastructure development, and also ensuring development of Integrated Fisheries Development Plans for coastal areas. Latest data available with the Ministry of Fisheries indicate that the annual potential yield of the Marine Fisheries resources in the Exclusive Economic Zone (EEZ) of India was estimated at 5.31 million tonnes while actual landings for 2022-23 was recorded at 4.43 million tonnes, thereby ensuring sustainable harvests. Problems such as overfishing, environmental degradation, skewed socio-economic conditions among small-scale fishers, and climate change effects persist[9]. Such policy issues shall be dealt with, focusing on environmentally friendly practices such as banning destructive fishing methods and possibly a seasonal fishery closed season during breeding periods. Since fisheries management is mostly a state subject in India, the state governments are central to implementing the central policies at the local level; regulating fishing activities within territorial waters; while the central government regulates activities undertaken in the EEZ. States should, therefore, identify plans along with national objectives meant to ensure there is a harmonized approach towards the sustainable development of fisheries. Altogether, the National Fisheries Policy was a giant step in realizing the aspirations of sustainable development for that vital branch of the economy as it would present many policies under one harmonized framework in an attempt to raise fish production but to fairly benefit all stakeholders while protecting aquatic resources for future generations.[10]

**O-SMART**

The Ocean Services, Modelling, Application, Resource, and Technology scheme was launched in 2018 by the India government to further strength the blue economy model. This was launched to strategically strengthen the to enhance coastal and aquatic capabilities of the nation-SMART is supervised and looked over by the Ministry of Earth Sciences. This scheme shows India's statement towards developing scientific research towards marine conservation along with economic growth of the aquatic and marine sector. This policy's goals include improving ocean observation system along with optimizing resource management by applying advanced data analyses. This process helps in finding ways of sustaining resources while also taking into consideration the economic requirements. This is a massive step towards the growth of our blue economy model. One of the major components of O-SMART is the development and implementing of ocean observation systems. This system had various technologies like sensors, buoys, and remote sensing technologies made specifically made to get data related parameters like the of the temperature, salinity, currents, and various other factors related to the ocean. O-SMART also helps in the process of

[8] *National Fisheries Development Board*. (n.d.). Retrieved November 15, 2024, from https://nfdb.gov.in/

[9] *About Indian Fisheries*. (n.d.). National Fisheries Development Board. Retrieved November 15, 2024, from https://nfdb.gov.in/welcome/about_indian_fisheries

[10] *'National fisheries policy (2020).'* (n.d.). Retrieved November 15, 2024, from https://pib.gov.in/PressReleasePage.aspx?PRID=1654543

weather-forecasting. This is extremely helpful in getting details about potential disasters like tsunamis and cyclones. Which in turn helps in mitigating the effects of such atrocities and safeguard coastal areas.
The O-SMART scheme also consists of advanced ocean modelling and data analyses along with the observation capabilities. Researchers can have an even better understanding of climate changes, sea level regulations, and overall situation of the ocean life. This is done by a process which includes simulating and forecasting the ocean behavior and then taking actions accordingly. This model is highly important as it helps in predicting the impacts of climate changes. This is extremely crucial when we take into consideration how much it could affect our coastal areas. With the help of such technology, we can comprehend the effects of climate change in India's coastal regions and develop adaptation plans for them. Not only does it help to safeguard coastal areas but also is important information for sectors like tourism and fishery. It also takes into consideration sustainability of marine resources that are extremely essential for the sake of conservation of the marine lifestyle. By taking into account of fish reserves, coral reefs, and other such important habitats which needed critical attention. These technologies help them to manage all the resources mainly to prevent any type over-exploitation. This is done so these marine resources can be conserved so that they may be available for the use of future generation. This sustainability will be in line with India's blue economy goals which will help in increasing both the lifestyle of millions of people which depend upon the ocean for their survival and livelihood.

**Deep Ocean Mission**

The Deep Ocean Mission (DOM) is the mooring of the new paradigm of exploration and harvesting of vast resources of the deep ocean in the Exclusive Economic Zone (EEZ) of India, announced by the Ministry of Earth Sciences in 2021. ₹4,077 crore has been sanctioned towards the mission for a period of five years where the areas focus on the development of several crucial parts, such as advanced technologically capable deep-sea mining and developing a manned submersible called Matsya6000 that will travel all the way down to 6,000 meters. [11]From such a depth, polymetallic nodules containing rich minerals like nickel, cobalt, and copper can be systematically gathered. This advisory service on ocean climate change is aimed at developing services that monitor changes that take place in the ocean because of climate change effects through employing observation tools for predicting future changes. The review places significant importance on exploration and biodiversity conservation such that marine ecosystems do not suffer at the hands of deep-sea mining activities. The mission will also conduct full explorations of all the exploitable deep-sea resources in minerals and energy resources, provide a way of technological development for extracting energy from oceanic sources such as wave energy, and for desalinating seawater for freshwater. Recent success includes trials of the underwater mining system Varaha to a depth of 5,270 meters, and plans to build the largest indigenously built Ocean Research Vessel (ORV) for India, which could sponsor several scientific surveys necessary for DOM. This would bring India into the international fraternity of deep-sea explorations and step up to global issues of resource scarcity and climate change. India will be increasing its technological know-how while responsibly managing resources when it allegedly keeps about 380 million tonnes of polymetallic nodules in the designated area of the Central Indian Ocean Basin. In a nutshell, DOM is the first step in a change towards better understanding and exploitation of oceanic resources responsibly as India moves forward towards the new frontiers while being held up against the urgent global challenges.

[11] *Home*. (n.d.). Ministry Of Earth Sciences. Retrieved November 16, 2024, from https://www.moes.gov.in/schemes/dom?language_content_entity=en

**Importance of Conservation and sustainability**

In the journey of India to achieve substantial growth towards the model of blue economy. India should focus on conservation and sustainability of the marine resources. Conservation and sustainability are the most integral part of blue economy as it ensures economic growth while also taking into consideration the needs of the future generations. They are multiple reasons why blue economy as a concept focuses on the sustainability of the marine resources like long term economic growth, better lifestyle and even creating job opportunities. This is even more important for India as with its vast coastline and rich aquatic resources provides it a huge potential to develop itself into a robust blue economy. This would not only lead to India's GDP growth increasing but also lead towards achieving the goals laid out by international and national ideas of sustainability. By implementing sustainable development ideas and conservation practices India could create a balance in economic growth and environmental responsibility. This approach is even more relevant in the contemporary world due to increasing global awareness and emphasis on sustainability of ocean resources and marine life.

One of the main objectives of India's blue economy model is to apply conservation ideas and practices to prevent the exploitation of aquatic resources. Unchecked overexploitation of resources in various sectors related to ocean economy like fishing, minerals extraction and even in the tourism sector. This poses a massive risk to the idea of sustainability and which in turn leads to hampering the growth of the economy. By using strict sustainability practices, India can save these resources from getting overexploited while also focusing on the economic needs. This is particularly important for the people who live by the coast whose livelihoods are dependent on the health of marine environment. Marine protected areas provide a base for the conservation strategy of India under the blue economy policy. Under these areas economic activities are allowed but are regulated such that there is no exploitation of resources. These areas serve as a prime example of sustainable development ideas in practice. Not only does it help in sustainability of resources but also helps in boosting tourism and economic growth. Environmentalists from various parts of the world visit these areas helping India's aim to grow with marine tourism. By investing and expanding upon MPAs India can promote sustainability of marine resources while also contributing to the economic aspect of blue economy. As stated, before Marine protected areas are one of the biggest steps taken towards India's goal of a robust blue economy.

India has worked on implementing many policies concerning waste management in the coastal areas to try and reduce the effects of marine pollution, which is a massive threat to the sustainability aspect of Blue Economy. In addition to harming life of aquatic creatures, marine pollution also hurts industries such as the tourism or fishing industry, as both require clean waters. While fishing requires clean waters for the sake of the safety and rearing of the fishes, tourism requires clean waters so people do not get disgusted by unwanted waste material stored upon the shores and coastal areas. India has included the National Marine Litter and Plastic Elimination policy in its Blue Economy model understanding the value of waste management. These policies mean that the plastic near coastal areas would be reduced in turn leading to the decrease in pollution near such area. This would be done by monitoring the generation and disposal of plastic near such areas. Along with above mentioned policies India has also taken the "Swachh Bharat to Swachh Sagar" initiative, which has taken an initiative to given a wider the scope to the already existing Swachh Bharat Mission. This means that it would now include the idea of waste management into coastal areas as well instead of just bigger cities. Along with the implementation of such policies, India has increased the awareness of Industries in turn making them focus on the aspect of responsible waste management for the sake of the nation.

As a way of ensuring the sustenance of marine resources and livelihoods for those along the coasts, this framework promotes sustainable fisheries use. This position endangers the fish populations as well as the future of the fishing industry itself due to unsustainability in the form of overfishing or destructive fisheries that harm millions of people in India. On the other side of the coin, the practice of managed fisheries bases itself on environmental sustainability. For instance, the seasonal fishing ban, especially the breeding season will permit the replenishment of the stocks to ensure a steady and renewable supply of resources. This means introducing technology-based solutions such as Vessel Monitoring Systems (VMS) would prevent the practice of monitoring and controlling fishing activities that would prevent illegal fishing activities to happen. Thus, the stock of fish will be maintained, and the fishing in future times would be sustainable for the future generations.

In conclusion, it can be concluded that India's Blue Economy strategy is based on sustainability and conservation. Management for the use of ocean resources involves policies controlling pollution, eco-friendly tourism, marine protected areas, and sustainable fishing practices. Thus, it maintains the health of marine life without giving economic growth. Due to such strategies, India will be able to fully work on its potential to turn into a major Blue Economy. Along with being a big blue economy, it will also work upon the idea of being a role model for other countries. The long-term economic and environmental goals will be achieved by growth and conservation ideas laid down by the policies. While GDP growth will be exponential and it would give a huge boost to the lifestyle of that depend upon on the ocean for their livelihood. It has been also well understood that India's progressive policies in favour of sustainability have been the benchmark by which it has balanced economic growth and marine life. Thus, India has been on the correct path of the growth of the economy and if it continuous on this path, it would lead to a thriving and robust blue economy.

## Conclusion

The research paper concludes India's Blue Economy strategy is more oriented towards sustainability and conservation, supporting economic growth. The policies used include protection against pollution, eco-tourism, marine protected areas, and sustainable fishing. Such practices aim to conserve marine ecosystems while improving the livelihood of coastal communities. This paper articulates and explains India's potential to become the global role model of the Blue Economy, considering its long coastline and extensive aquatic resources available to it. Innovative policies like those from the Sagar Mala Project, National Fisheries Policy, and O-SMART scheme, besides helping to combat world threats on climate change, help the country achieve sizeable growth in the GDP, improve the quality of life for people along the coasts, and also invoke international sustainability goals. In the future, if India continues to walk on this path, it is better prepared to be a stronger contender for a leading Blue Economy with a balanced economic development and stewardship of the environment.

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