



## India's ocean potential and blue economy strategy: An integrated assessment

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### Abstract

The Blue Economy has emerged as a vital framework for countries seeking sustainable economic growth while protecting ocean ecosystems. This paper examines the global evolution of the Blue Economy concept and analyses India's maritime potential through its long coastline, extensive Exclusive Economic Zone (EEZ), strategic Indian Ocean location, and strong port network. Despite these advantages, India faces several challenges, including the absence of a national ocean policy, limited deep-sea exploration, an underdeveloped seafood industry, weak inland water transport, and inadequate environmental governance. The study highlights the need for strategic reforms such as finalising the national Blue Economy policy, strengthening marine research, promoting sustainable fisheries, expanding waterways, enhancing marine technology, empowering coastal communities, and building global partnerships. With these measures, India can convert its oceanic strengths into long-term economic growth, environmental protection, and social well-being. The paper concludes that a well-managed Blue Economy is essential for India to achieve sustainable development and unlock its full maritime potential.

**Keywords:** Blue economy, ocean governance, exclusive economic zone (eez), sustainable development, maritime transport, deep-sea exploration, fisheries and aquaculture, inland waterways, marine biodiversity, climate change, India's Maritime Strategy, ocean policy, Indian Ocean Region

### Introduction

In recent decades, the world's oceans and coasts have come under serious pressure. Human activities and climate change are harming marine life and weakening ocean health. One major problem is resource depletion. Many fish stocks are over-exploited, coral reefs are shrinking, and important habitats, like mangroves and seagrass beds, are being destroyed. These issues reduce the natural strength of ocean ecosystems<sup>[1]</sup>.

Ocean pollution is another growing threat. Every year, huge amounts of plastic, chemicals, sewage, and heavy metals enter the sea. These pollutants damage food chains, kill marine animals, and disturb the balance of marine ecosystems<sup>[2]</sup>. Pollution makes it harder for oceans to support life.

Habitat destruction adds to the crisis. Coastal construction, dredging, trawling, and other harmful activities have damaged breeding and nursery grounds for many species<sup>[3]</sup>. When these habitats disappear, marine creatures struggle to survive and reproduce.

Climate change makes the situation even worse. Oceans absorb about 30% of human-produced CO<sub>2</sub> and over 90% of excess heat from global warming<sup>[4]</sup>. As oceans warm and become more acidic, coral reefs bleach, fish move to cooler waters, and many marine organisms find it difficult to survive. This threatens global climate stability and human communities that depend on the sea.

Thus, healthy oceans are extremely important. They support many forms of biodiversity, genes, species, and ecosystems. They also provide essential services like fisheries, coastal protection, carbon storage, and tourism. As Chen explain, the ocean is "the largest ecosystem on Earth" and human actions are now disturbing its natural balance<sup>[5]</sup>.

Because of these challenges and opportunities, a new idea called the Blue Economy has emerged. The World Bank defines it as "the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, while

preserving ocean health<sup>[6]</sup>." The Blue Economy tries to link economic growth, social welfare, and environmental protection. It shifts thinking away from oceans as places for extraction or dumping, and toward oceans as valuable, limited systems that need careful management<sup>[7]</sup>.

In short, oceans are facing serious threats. But if countries manage them wisely, oceans also offer huge opportunities for sustainable development. This article therefore looks at the growth of the Blue Economy concept, global practices, and how a maritime nation like India can use this approach for future progress while protecting marine ecosystems.

### Concept and Evolution of the Blue Economy

The idea of the blue economy grew because traditional economic models were failing. Old models focused mainly on taking resources from nature. They often ignored environmental damage and the limits of natural systems. Over time, it became clear that oceans are not just sources of raw materials. They are living ecosystems that must be protected and managed wisely<sup>[8]</sup>.

The blue economy concept is linked strongly to Gunter Pauli, a Belgian thinker and entrepreneur. In 1994, the United Nations University asked Pauli to create business models that produced zero waste and zero emissions. His work was inspired by natural systems, where "waste" from one process becomes input for another<sup>[9]</sup>.

Pauli in his book, showed how innovations based on nature could create jobs and reduce environmental harm<sup>[10]</sup>. Pauli's basic message was simple: economic growth should work with nature, not against it<sup>[11]</sup>. While Pauli gave the first ideas, global institutions developed clear definitions. The World Bank defines the blue economy as: "the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, while preserving the health of ocean ecosystems<sup>[12]</sup>."

This definition highlights three pillars: Economic growth, better livelihoods, and healthy ecosystems. The World Bank

also stresses that all ocean sectors must be developed together, not separately. They must be managed in a way that protects ocean health <sup>[13]</sup>.

The blue economy is different from older ideas like the “ocean economy,” which focused mainly on industries such as fishing, shipping, and oil. The blue economy goes further. It includes, traditional sectors like fisheries, shipping, ports. In new sectors like offshore wind, marine biotechnology, aquaculture. In ecosystem services, carbon storage, coastal protection, biodiversity. In social aspects, livelihoods of coastal communities <sup>[14]</sup>.

It brings together economic, social, and environmental goals. It also encourages cooperation between sectors. For example, port development should consider coastal habitat protection. Fisheries management should consider climate change. Marine systems are “commons,” meaning they are shared spaces. Because of this, the blue economy requires strong rules, monitoring, and shared responsibility <sup>[15]</sup>.

In recent years, the idea has also expanded to include restoration. Today, blue economy models aim not only to use the ocean sustainably but also to repair damaged ecosystems. The idea spread beyond Pauli’s work in the 1990s. It gained major global attention during the Rio 20 Conference in 2012, where many countries supported it as part of sustainable development <sup>[16]</sup>.

Since then, the World Bank, the United Nations, Regional groups, and many national governments have all adopted blue economy strategies. The World Bank’s “Making Waves” report explains how the institution now uses a blue economy approach in financing and development programs <sup>[17]</sup>. Today, the blue economy is seen as a global development framework. It aims to balance growth, inclusion, and environmental protection. It is considered a key tool for climate resilience, sustainable industries, and healthy oceans.

### India’s Ocean Context and Economic Potential

India has a very strong ocean position. Its long coastline, large Exclusive Economic Zone (EEZ), busy ports, and central location in the Indian Ocean give it major economic advantages. These strengths make India well-placed to build a powerful blue economy. India has a coastline of about 7,500 km. One report state that India “has a coastline spanning 7,517 km” <sup>[18]</sup>

India’s EEZ covers about 2 million sq. km. Some legal sources say the EEZ may be as large as 2.17 million sq. km <sup>[19]</sup>. India also has many islands and marine territories, which increase its maritime area. India has a large port network. One analysis mentions 12 major ports and about 200 minor or intermediate ports <sup>[20]</sup>. These ports support India’s growing seaborne trade and logistics. Maritime transport is extremely important for India’s international trade. A Government official stated that 95% of India’s trade by volume and 68% by value moves by sea <sup>[21]</sup>.

This shows that ports, shipping, and coastal infrastructure are critical for the Indian economy. However, India’s trade-to-GDP ratio is still lower than many developed countries. While some advanced economies have 70–75% trade-to-GDP, India’s figure is often estimated at around 42%. This gap suggests that India must improve its logistics and ocean-linked industries to fully benefit from global trade.

India sits at the centre of the Indian Ocean, one of the busiest maritime regions in the world. According to the Indian Ocean Rim Association (IORA), the Indian Ocean

carries half of the world’s container ships, one-third of bulk cargo, and two-thirds of global oil shipments <sup>[22]</sup>.

A study from the Carnegie Endowment also calls the region “critical,” confirming the same figures <sup>[23]</sup>. This gives India major strategic and economic opportunities but also responsibilities to keep sea lanes safe and open. India’s large EEZ contains many living and non-living marine resources. These include:

Fisheries and aquaculture, Offshore minerals and seabed nodules, Renewable ocean energy, marine biotechnology possibilities. Reports note that coastal and marine sectors support millions of people, including over four million fishers and coastal workers <sup>[24]</sup>. Still, many ocean resources remain unexplored or under-used.

India aims to become a USD 5 trillion economy. To achieve this, ocean-based industries can become a major growth engine. Blue economy sectors such as shipping, fisheries, coastal tourism, offshore energy, and port-led development can create jobs, improve trade, boost regional development, raise incomes in coastal areas, strengthen national logistics. Because of this, building a strong blue economy is not optional for India, it is essential.

India has all the right conditions to become a major blue economy leader: A long coastline, A large EEZ, Many ports, Strong maritime trade links, A strategic Indian Ocean location. But to use this potential fully, India must improve port infrastructure, upgrade technology, develop value-added marine industries, and strengthen ocean governance. With the right steps, India’s oceans can drive long-term economic growth.

### Challenges and Gaps

India has strong ocean potential. However, several obstacles still limit the growth of its blue economy. These challenges must be addressed for India to use its marine resources safely and sustainably.

India has no full national ocean or blue economy policy yet. A Draft Blue Economy Policy has existed since 2021, but it has not been approved. Reports say delays happened because of slow bureaucracy, limited coordination, and weak stakeholder consultation <sup>[25]</sup>. INCOIS also notes that India’s ocean governance system is fragmented. Different ministries handle ports, fisheries, energy, shipping, and environment separately. This reduces the effectiveness of blue economy planning <sup>[26]</sup>.

Without a final policy, India lacks a unified vision and strong governance structure. India has a very large maritime area, but deep-sea exploration is still limited. Programs like the Deep Ocean Mission aim to explore minerals, nodules, and deep-sea energy. But India still faces technical and regulatory challenges <sup>[27]</sup>. Globally, scientists estimate that 95% of the ocean remains unexplored <sup>[28]</sup>. India also lacks advanced deep-sea technology, research vessels, and skilled manpower. Because of this, India may under-use or mismanage valuable marine resources.

India is one of the largest fish producers in the world. Yet the domestic seafood industry is underdeveloped. Problems include, weak cold-chain and processing systems, limited value addition, poor regulation, lack of modern technology, sustainability concerns. A study from CMFRI reports that India’s marine fish industry still focuses on increasing catches, instead of improving quality, sustainability, and value creation <sup>[29]</sup>. This means India is not fully benefiting from its growing seafood market.

Inland waterways are a cheap and green transport option. But in India, IWT remains poorly developed. An ASCELA report says that IWT suffers from poor infrastructure, weak vessel standards, low investment, and very little shift from road or rail to waterways <sup>[30]</sup>. This limits the connection between coasts and inland markets, reducing blue economy efficiency.

India's marine ecosystems are under pressure from overfishing, pollution, habitat loss, and climate change. Policies exist, but enforcement is often weak. According to the India Foundation, ocean governance in India struggles to bring conservation and economic growth together in a balanced way <sup>[31]</sup>. Without stronger environmental laws and monitoring, blue economy growth could damage marine biodiversity and threaten long-term sustainability.

Deep-sea exploration needs advanced tools like robotics, sensors, research vessels, and data systems. It also needs trained scientists and engineers. The Indian Academy of Sciences notes that only a small part of the seabed is mapped, and India lacks deep-sea technology and investment capacity <sup>[32]</sup>. If India does not improve its technology and skills, it cannot lead in high-value sectors like seabed minerals, biotechnology, and deep-sea fishing.

### Strategies for Strengthening India's Blue Economy

India has great ocean potential. To use it fully and responsibly, the country needs strong policies, better technology, strong institutions, and community involvement. The following steps can guide India's future blue economy strategy.

India needs a complete national blue economy policy. Right now, only a draft policy exists. It was released by the Ministry of Earth Sciences (MoES) in 2021 and updated in 2022 <sup>[33]</sup>.

INCOIS also confirms that the policy highlights key areas such as governance, marine spatial planning, deep-sea mining, coastal community development, and international cooperation <sup>[34]</sup>. Finalising the policy will help India create a clear national framework, better cooperation between ministries, and a roadmap for sustainable growth.

Good decisions require strong data and research. Reports by KPMG note that India needs better ocean data systems, stronger monitoring, and a national blue economy accounting framework <sup>[35]</sup>. The government has already launched the Deep Ocean Mission to improve deep-sea technologies and marine research <sup>[36]</sup>.

Better ocean observation, remote-sensing systems, and ecosystem monitoring will help protect biodiversity and encourage safer use of marine resources. India has a high demand for seafood. To meet this demand and protect marine life, India must invest in sustainable fisheries and modern aquaculture. The draft policy recommends shifting from simply increasing catches to improving value-added processing, cold-chain facilities, and sustainable practices <sup>[37]</sup>. A study in IJFMR also highlights the need to modernise fisheries and support coastal communities through better market and value-chain systems <sup>[38]</sup>. A Times of India commentary stresses that India must move from "quantity to quality" in fisheries and aquaculture <sup>[39]</sup>. Government schemes like PMMSY also support this transition.

Transport is a key part of the blue economy. The draft policy emphasises inland waterways, coastal logistics, and port-led development as priority areas <sup>[40]</sup>. Projects like Sagarmala aim to modernise ports, improve connectivity,

and support coastal communities. Better ports, industrial clusters, waterway transport, and coastal shipping can reduce logistics costs and link coastal industries with inland markets. New sectors like marine biotechnology, offshore wind, wave energy, and tidal power offer major growth opportunities. The draft policy identifies deep-sea mining and energy as important themes. Encouraging research, public-private partnerships, and technology transfer will help India diversify its marine economy and stay aligned with global green energy trends.

Coastal and island communities must be central to blue economy planning. The policy draft calls for focusing on sustainable livelihoods, skill development, community-based planning, and climate resilience. Promoting alternative livelihoods and fair benefit-sharing will ensure that coastal communities grow together with marine industries.

A strong blue economy requires secure waters. India must strengthen maritime surveillance, coastal security, and legal frameworks. The draft policy lists security and strategic dimensions as a major focus area. India must also align with global standards like UNCLOS, and improve cooperation between defence, fisheries, environment, and port authorities. This will help protect India's vast maritime domain and ensure sustainable development.

Oceans are shared global resources. India must strengthen international cooperation in marine science, technology, deep-sea exploration, and conservation. Partnerships with technologically advanced countries, regional bodies, and global organisations will help India gain expertise and funding, while contributing to global ocean sustainability.

These strategies together form a strong roadmap for India's blue economy future. They include policy reforms, technology improvements, better infrastructure, strong governance, environmental protection, and global cooperation. If India follows these steps, it can fully use its maritime strengths and achieve sustainable ocean-based development.

### Conclusion

India's extensive maritime domain positions it uniquely to harness the benefits of a rapidly expanding global blue economy. With a coastline stretching over 7,500 km and an Exclusive Economic Zone of more than 2 million sq. km, India has access to substantial marine living and non-living resources that can support long-term national development. As multiple scholars and policy institutions argue, a vibrant and sustainable blue economy is not merely an environmental aspiration but an economic imperative for emerging economies such as India.

Ocean-based industries such as fisheries, aquaculture, shipping, port logistics, coastal and marine tourism, offshore renewable energy, and deep-sea mineral exploration—have the potential to generate large-scale employment and stimulate industrial diversification. According to Pauli, blue-economy industries worldwide hold the capacity to create millions of jobs by aligning natural processes with economic innovation. In the Indian context, the integration of these sectors can significantly contribute to the country's ambition of becoming a USD 5 trillion economy by enhancing trade competitiveness, increasing export revenues, and strengthening supply-chain networks.

At the same time, long-term economic prosperity depends on the ecological sustainability of India's marine and coastal

ecosystems. As noted by Chen *et al.* the oceans perform essential climate-regulatory and biodiversity-supporting functions that must be preserved to avoid irreversible ecological decline. Degradation of marine habitats through pollution, over-extraction, coastal erosion, and climate-related stresses, can undermine not only environmental health but also the economic viability of ocean-based industries. Thus, ecological stewardship is not separate from economic development; it is foundational to it.

Realising the full potential of India's blue economy requires clear policy direction and coordinated governance. The Draft National Blue Economy Policy provides an important starting point, but rapid finalisation and effective implementation are essential. Strengthening research, monitoring systems, marine spatial planning, coastal protection frameworks, and community-based management will ensure that growth occurs within a sustainable and equitable framework. India's emerging bilateral and multilateral partnerships such as the India–France Roadmap on Blue Economy and Ocean Governance, further reinforce the need for international cooperation in science, technology, maritime safety, and conservation.

In conclusion, India's vast maritime endowment, combined with technological innovation, community participation, environmental stewardship, and strong governance—can transform the blue economy into a key pillar of national development. If harnessed strategically, the oceans can drive economic growth, enhance climate resilience, create millions of sustainable livelihoods, and ensure long-term national prosperity.

## Reference

- Chen CA, Sidik MJ, Shaleh SRM, Mustafa S. Marine biodiversity and climate change: Multidimensional approaches for “The Ocean We Want” by 2030. In: Implementing the UN Sustainable Development Goals – Regional Perspectives. Springer, 2024, 1429–1459.
- Omics International. Marine pollution: A growing threat to our oceans and ecosystems. Omics International, 2022.
- UK Government. Future of the Sea: Marine Biodiversity Report. UK Government, 2017.
- Marine Pollution Bulletin Editorial Board. Three decades of ocean warming impacts on marine ecosystems: A review. Marine Pollution Bulletin, 2023.
- Chen CA, Sidik MJ, Shaleh SRM, Mustafa S. Marine biodiversity and climate change: Multidimensional approaches for “The Ocean We Want” by 2030. Springer, 2024, P1430.
- World Bank, United Nations Department of Economic and Social Affairs. The potential of the blue economy: Increasing long-term benefits of the sustainable use of marine resources for small island developing states and coastal least developed countries. World Bank, 2017.
- Tanaka Y. Definition and evaluation methodology of the blue economy. OPRI Perspectives, 2023, 026.
- Grantham Research Institute on Climate Change and the Environment. What is the blue economy? London School of Economics and Political Science, 2024. <https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-blue-economy/>
- World Academy of Art and Science. The Blue Economy initiative. World Academy of Art and Science, n.d.
- Pauli GA. The Blue Economy: 10 Years, 100 Innovations, 100 Million Jobs. Paradigm Publications, 2010.
- Development Alternatives Group. Blue economy approach and circular systems. Development Alternatives Group, n.d.
- World Bank, 2023.
- American Academic and Scholarly Research Center. Blue economy and sustainable development. American Academic and Scholarly Research Center, 2012.
- BusinessWorld Online. 95% of India's trade volume, 68% by value move via coastal routes: Govt official. BW Businessworld, 2025. <https://www.businessworld.in/article/95-Of-India-s-Trade-Volume-68-By-Value-Move-Via-Coastal-Routes-Govt-Official/545734>
- CommonLII Legal Database. India's Exclusive Economic Zone – legal overview. CommonLII Legal Database, n.d.
- Aranca Research. India's ports: New engines of global trade. Aranca Research, n.d.
- The Prayas India Initiative. India's maritime borders and exclusive economic zones. The Prayas India Initiative, 2025. <https://theprayasindia.com/indias-maritime-borders-and-exclusive-economic-zones/>
- Kumar NL, Greely J. Mapping the Indian Ocean region. Carnegie Endowment for International Peace, 2023. <https://carnegieendowment.org/research/2023/06/mapping-the-indian-ocean-region?lang=en>
- Geospatial World. The high tide: Harnessing India's blue economy. Geospatial World, 2023.
- The Diplomat. India's nascent blue economy: Structural constraints and climate challenges. The Diplomat, 2025.
- Indian National Centre for Ocean Information Services. Draft Blue Economy Policy of India. Indian National Centre for Ocean Information Services, 2021.
- Ministry of Earth Sciences. Deep Ocean Mission: Overview and objectives. Government of India, 2021.
- Indian Academy of Sciences. Deep-sea exploration and ocean science challenges. Journal of Biosciences, 2023.
- Central Marine Fisheries Research Institute. Indian fisheries outlook. Central Marine Fisheries Research Institute, 2022.
- ASCELA Advisors. Opportunities and challenges for inland waterways in India. ASCELA Advisors, 2020.
- India Foundation. The blue economy in the Indian Ocean: Policy challenges and choices. India Foundation Journal, 2021.
- Ministry of Earth Sciences. Draft National Policy on India's Blue Economy. Government of India, 2022. <https://www.moes.gov.in/sites/default/files/1677English.pdf>
- KPMG India. Navigating India's blue economy landscape. KPMG Insights Report, 2025.
- Press Information Bureau. Press Release: Challenges in developing India's Blue Economy. Government of India, 2025.
- The Energy and Resources Institute. Blue Economy Publication. The Energy and Resources Institute, 2022.
- International Journal for Multidisciplinary Research. Sustainable fisheries and aquaculture in India. International Journal for Multidisciplinary Research, 2023.
- The Times of India. Why India must shift from quantity to quality in fisheries and aquaculture. The Times of India, 2023.