



Role of blue economy in maritime security in the Indian Ocean Region (IOR)

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Abstract

The Indian Ocean Region (IOR), home to more than one-third of the global population and a critical artery for international trade and energy transportation, stands at the intersection of profound economic opportunity and complex security at sea challenges. This research explores the intricate interrelationship between the ocean-based economy and security at sea in the IOR, focusing particularly on the Republic of India's strategic vision and regional leadership. The study underscores how sustainable exploitation of oceanic resources—such as fisheries, offshore hydrocarbons, marine tourism, and renewable energy—requires a secure and stable maritime environment.

By examining the Republic of India's initiatives like SAGAR, Sagarmala, Deep Ocean Mission, and its growing role in regional platforms like IORA, QUAD, and IPOI, the paper highlights how the Republic of India is shaping a security architecture conducive to ocean-based economy growth. Key maritime threats including piracy, illegal fishing, trafficking, and geopolitical rivalries are analyzed, along with the Republic of India's multi-layered response through maritime domain awareness, military maritime upgrades, regional capacity building, and ecological resilience.

The study concludes that a synergistic approach—combining economic development, maritime diplomacy, ecological conservation, and cooperative security—is essential to unlocking the full potential of the ocean-based economy in the Republic of Indian Ocean. the Republic of India's central location and proactive maritime posture position it as a pivotal actor in transforming the IOR into a region of peace, prosperity, and sustainable ocean governance.

Keywords: Ocean-based economy, maritime security, IOR, the Republic of India, SAGAR, IORA, QUAD, sustainable development, ocean governance, geopolitics

Introduction

The Indian Ocean, stretching from the coast of Africa to Southeast Asia, is not only the world's third-largest ocean but also a critical hub for geopolitical and economic activity. Home to nearly 2.7 billion people across its rim nations, the IOR (IOR) plays a pivotal role in international commerce, energy transportations, and security dynamics. Approximately 80% of global maritime oil trade passes through the Indian Ocean chokepoints like the Strait of Hormuz, Bab el-Mandeb, and Strait of Malacca.

In this context, the ocean-based economy, defined as the sustainable use of ocean resources for financial advancement, improved livelihoods, and ocean ecosystem health, emerges as both an opportunity and a necessity. For the nations bordering the Indian Ocean, especially the Republic of India, leveraging the ocean-based economy is key to addressing developmental aspirations while ensuring security in a volatile and contested maritime space. However, responsible growth at sea cannot proceed without robust security at sea, which protects sea lanes, combats maritime crimes, enforces laws, and builds international maritime cooperation. The Indian Ocean thus stands at the confluence of economic potential and security imperatives, demanding a nuanced and integrated approach.

Strategic Importance of Indian Ocean in Ocean-based Economy

The Indian Ocean is a treasure trove of living and non-living marine resources:

- Rich in fisheries sustaining millions of livelihoods across South Asia, East Africa, and Southeast Asia.

- Contains untapped offshore hydrocarbons, polymetallic nodules, and rare earth elements, especially in the Central of the Indian Ocean Basin.
- Offers immense potential for offshore renewable energy including wind, tidal, and wave power.
- the Republic of India's EEZ spans over 2.3 million sq. km, making it one of the largest among developing nations. The region also supports critical shipping routes, with over 100,000 commercial vessels transiting annually. This economic potential amplifies the need for security at sea mechanisms tailored to the region's geopolitical dynamics.

Interdependence of Ocean-based economy and Maritime Security in IOR

- In the Indian Ocean, the link between the ocean-based economy and security at sea is exceptionally pronounced due to:
- Porous maritime borders that facilitate transnational crimes such as piracy, smuggling, IUU fishing, and human trafficking.
- Geopolitical rivalries involving extra-regional powers like China, the U.S., and QUAD nations, contributing to military build-up and strategic competition.
- Weak maritime capacities in several IOR littoral states that make surveillance, enforcement, and governance difficult.
- Thus, security at sea becomes the foundation for sustainable economic activities. Without safe sea lanes, rule-based access to resources, and cooperative governance, the region's ocean-based economy cannot reach its potential.

Republic of India's Ocean-based Economy Aspirations in IOR

- The Republic of India, situated centrally in the IOR, is aspiring to become a leading ocean-based economy power. The government's policies including:
 - **Sagarmala Programme:** Sagarmala Programme is a flagship strategic initiative of the Government of the Republic of India aimed at accelerating national financial advancement through port-led development. The programme focuses on the modernization of ports, development of efficient logistic networks, establishment of coastal industrial clusters, and enhancement of multi-modal connectivity. It envisions transforming maritime transport into a more cost-effective and efficient system, positioning the Republic of India as a global logistics hub. The programme also emphasizes the socio-economic development of coastal regions and the creation of sustainable employment opportunities for local communities.
 - As of mid-2024, a total of 130 projects worth ₹3,714 crore have been sanctioned under this initiative, reflecting the rapid pace of implementation and strong policy commitment. These projects primarily focus on port infrastructure development, improvement of inland waterways, and enhanced connectivity. Sagarmala not only strengthens the Republic of India's ocean-based economy but also bolsters security at sea, trade facilitation, and collaborative partnerships. Overall, the Sagarmala Programme stands as a milestone in the economic resurgence of maritime the Republic of India through an integrated and forward-looking approach.
 - **Maritime the Republic of India Vision 2030:** Maritime the Republic of India Vision 2030 is a visionary and comprehensive strategy launched by the Government of the Republic of India to transform the country's maritime sector in line with global standards. Encompassing around 150 ambitious initiatives, the vision aims to modernize and enhance port infrastructure, shipyards, logistics, and inland waterways. Its primary objectives include increasing port efficiency and capacity, reducing logistics costs, and boosting the ease of doing business. Designed in alignment with the goals of 'Atmanirbhar Bharat' and the promotion of the ocean-based economy, this plan lays the foundation for a robust and self-reliant maritime ecosystem.
 - Key focus areas under the Maritime the Republic of India Vision 2030 include the development of green ports, implementation of digital port ecosystems, promotion of multimodal connectivity, creation of maritime clusters, and enhancement of skill development. The vision seeks to establish the Republic of India as a Global Maritime Hub, while also promoting responsible growth, environmental balance, and regional connectivity. It not only strengthens the Republic of India's security at sea and financial advancement but also enhances the country's strategic positioning in the Indo-Pacific region.
 - **Inland Waterways Development:** The development of 26 new national waterways is a vital component of the Republic of India's growing ocean-based economy strategy. By leveraging inland water transport, the country is making efficient use of its vast network of rivers and inland water bodies for sustainable economic activities. This initiative not only reduces the load on road and rail networks but also aligns with the goals of the ocean-based economy by promoting low-carbon, eco-friendly logistics solutions. It supports sectors such as fisheries, agriculture, tourism, and trade by enabling smooth and cost-effective movement of goods and people, especially in coastal and riverine regions.
 - Inland waterways also contribute to inclusive growth by connecting remote communities to mainstream markets, boosting local livelihoods, and reducing regional economic disparities. Furthermore, the shift toward water-based transport is essential for reducing carbon emissions and mitigating environmental degradation, key principles of the ocean-based economy. By integrating inland water transport into the national logistics ecosystem, the Republic of India is paving the way for a more resilient, inclusive, and sustainable maritime economic framework.
 - **Green Tug Transition Program (GTTP):** The Green Tug Transition Program (GTTP) is an ambitious initiative aimed at replacing conventional port tugboats with environmentally friendly, clean energy-based alternatives. Under this program, by the year 2040, all port tugs will be powered by green energy sources such as electric, hybrid, or hydrogen technologies. This will significantly reduce pollution and carbon emissions generated during port operations.
 - This initiative is a crucial step in the development of the Republic of India's ocean-based economy and green ports. Using clean energy tugs instead of traditional diesel-powered ones will not only protect the environment but also lead to fuel savings and lower operational costs. Additionally, it will help make the maritime transport sector more sustainable and responsible. The main objective of the Green Tug Transition Program is to make ports environmentally sustainable and strengthen the country's efforts to combat environmental shifts. Successful implementation of this program will position the Republic of India as a global example in maritime green technology and play a vital role in the sustainable growth of the ocean-based economy.
 - **Deep Ocean Mission:** Deep Ocean Mission is a highly ambitious and multi-dimensional initiative launched by the Government of the Republic of India in 2021 under the Ministry of Earth Sciences (MoES). The mission aims to explore and sustainably utilize deep-sea resources such as valuable polymetallic nodules, gas hydrates, marine biodiversity, and biotechnological potential. With an estimated budget of approximately ₹4,077 crore, the mission is structured around six major components:
 1. the development of a manned submersible, MATSYA 6000, capable of reaching depths of up to 6000 meters;
 2. exploration of deep-sea minerals;
 3. research on marine bio-resources and biotechnology;
 4. development of deep-sea infrastructure;

5. studies related to the deep ocean water column; and
6. marine data management and capacity building.

The mission not only supports the implementation of the Republic of India's ocean-based economy Policy Framework but also aligns with Sustainable Development Goal 14 (Life Below Water) and the objectives of the United Nations Decade of Ocean Science for Sustainable Development (2021–2030). Through this initiative, the Republic of India is steadily moving towards strengthening its position in marine scientific research, technological self-reliance, and global deep-sea exploration efforts.

- Are aligned with expanding maritime trade, developing coastal communities, harnessing marine energy, and promoting shipbuilding. These efforts require uninterrupted sea routes, technological monitoring, and a stable maritime neighbourhood, which only effective security at sea can guarantee.

Maritime Crimes and Security Threats in the IOR

- The Republic of Indian Ocean has historically been vulnerable to various maritime threats:
 - Piracy in the Gulf of Aden and Somali Basin
 - Arms and narcotics trafficking through the Arabian Sea
 - Illegal, Unreported and Unregulated (IUU) fishing along the Bay of Bengal
 - Maritime terrorism and infiltration through coastal areas (e.g., 26/11 Mumbai attacks)
 - Such threats directly impact trade, resource sustainability, and investor confidence in ocean-based economy sectors like tourism, fisheries, and offshore energy.
- the Republic of India has responded by strengthening the Republic of Indian Navy, Coast Guard, and coastal policing, establishing the Information Management and Analysis Centre (IMAC), and participating in regional patrols and anti-piracy missions.

Maritime Domain Awareness (MDA) in IOR

- Given the vastness and diversity of the IOR, achieving comprehensive MDA is critical. the Republic of India has developed:
 - Coastal radar chains across mainland and island territories
 - Real-time vessel tracking via AIS, LRIT, and satellite imagery
 - White Shipping Information Agreements with over 30 countries
 - Such systems ensure early warning, situational awareness, and targeted responses, thereby enhancing security for blue economy operations like offshore drilling, shipping, and marine research.

Regional Cooperation and Strategic Initiatives

- the Republic of India's maritime vision emphasizes collective security and regional prosperity:
 - SAGAR (Security and Growth for All in the Region) advocates cooperative security and economic development.
 - Indo-Pacific Oceans Initiative (IPOI) focuses on sustainable and rules-based maritime governance.
 - QUAD naval cooperation enhances capacity building, humanitarian missions, and counter-piracy.

- Other forums like IORA, ASEAN-the Republic of India Maritime Dialogue, and Colombo Security Conclave have also become vital platforms for synchronizing blue economy objectives with security at sea.

Climate Change and Ecological Security

- IOR countries are highly vulnerable to climate-induced maritime challenges:
 - Rising sea levels threaten low-lying coastal economies
 - Coral reef bleaching and mangrove loss destabilize fisheries
 - Ocean acidification impacts biodiversity and food chains
- the Republic of India has initiated efforts such as the National Coastal Mission, Mangrove Plantation Programs, and marine biodiversity reserves to address these. Ecological balance is foundational to sustaining the ocean-based economy and thus forms part of broader security at sea.

Capacity Building in Small Island and Littoral States

- Many IOR nations (e.g., Maldives, Seychelles, Madagascar) have limited naval and regulatory capacities, making them hotspots for illegal activities. the Republic of India plays a key role in:
 - Training maritime forces from IOR countries
 - Providing naval hardware, patrol vessels, and surveillance systems
 - Conducting joint exercises and information sharing
 - This not only builds local capacity but also promotes the Republic of India's leadership in securing the IOR for sustainable blue economic development.

Policy Recommendations

- To reinforce the synergy between the ocean-based economy and security at sea in the IOR, the following strategies are vital:
 - Strengthen Multilateral Mechanisms: Expand IORA, IONS, and CSC roles to include disaster response, anti-piracy, and blue economy cooperation.
 - ocean-based economy Risk Assessments: Conduct regional studies to assess ecological, economic, and security risks in maritime development.
 - Innovation in Marine Technology: Encourage start-ups and public-private partnerships in ocean-based technologies for surveillance, resource mapping, and clean energy.
 - Sustainable Infrastructure: Develop green ports, blue carbon zones, and marine spatial planning initiatives.
 - Legal Harmonization: Assist IOR nations in aligning maritime laws with UNCLOS and strengthening dispute resolution protocols.

Conclusion

The IOR stands at the crossroads of immense economic opportunity and rising maritime insecurity. As the ocean-based economy gains momentum across the IOR, especially in the Republic of India, the region must simultaneously invest in security at sea to safeguard its growth. The Republic of India's approach—through policies like SAGAR, Sagarmala, and Deep Ocean Mission—demonstrates the necessity of integrating economic development with maritime vigilance, regional diplomacy, and ecological stewardship. Securing the Republic of Indian

Ocean for the ocean-based economy is not merely a strategic requirement but a shared responsibility. Only through cooperative security, sustainable practices, and inclusive growth models can the IOR realize its full maritime potential in the 21st century.

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