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MANAGEMENT OF OCEAN SPACE AROUND INDIA AND THE HIGH SEAS TREATY

DR BHASKAR BALAKRISHNAN

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SAPRU HOUSE, NEW DELHI
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ABSTRACT

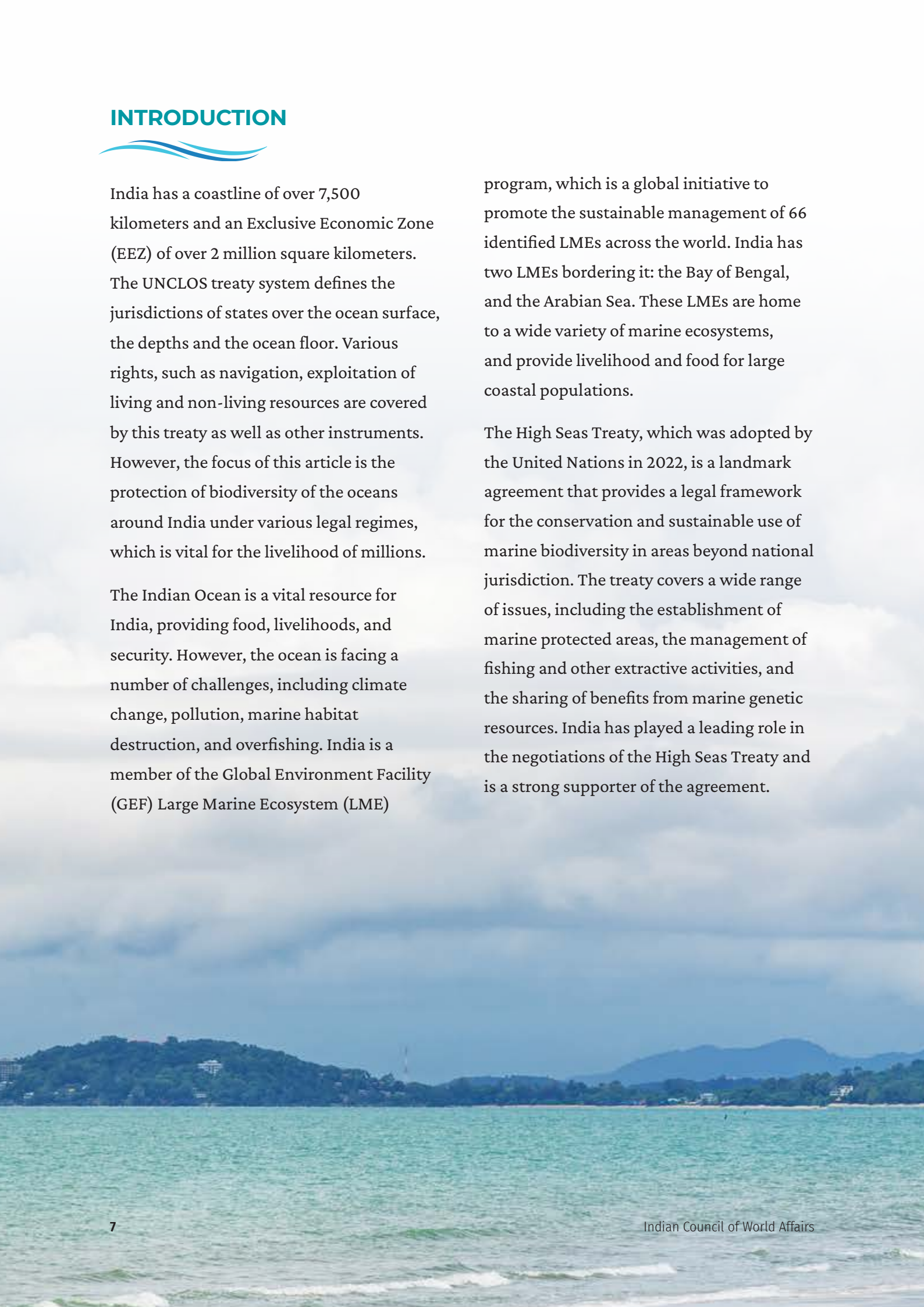
This article covers the management of ocean space around India, including the high seas. It deals with the issues of protecting the ocean environment and biodiversity which affects the livelihood of millions. The issues relating to rights of navigation are briefly touched upon. The challenges and opportunities for India are discussed, including initiatives in the Arabian Sea and Bay of Bengal.

INTRODUCTION

India has a coastline of over 7,500 kilometers and an Exclusive Economic Zone (EEZ) of over 2 million square kilometers. The UNCLOS treaty system defines the jurisdictions of states over the ocean surface, the depths and the ocean floor. Various rights, such as navigation, exploitation of living and non-living resources are covered by this treaty as well as other instruments. However, the focus of this article is the protection of biodiversity of the oceans around India under various legal regimes, which is vital for the livelihood of millions.

The Indian Ocean is a vital resource for India, providing food, livelihoods, and security. However, the ocean is facing a number of challenges, including climate change, pollution, marine habitat destruction, and overfishing. India is a member of the Global Environment Facility (GEF) Large Marine Ecosystem (LME) program, which is a global initiative to promote the sustainable management of 66 identified LMEs across the world. India has two LMEs bordering it: the Bay of Bengal, and the Arabian Sea. These LMEs are home to a wide variety of marine ecosystems, and provide livelihood and food for large coastal populations.

The High Seas Treaty, which was adopted by the United Nations in 2022, is a landmark agreement that provides a legal framework for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. The treaty covers a wide range of issues, including the establishment of marine protected areas, the management of fishing and other extractive activities, and the sharing of benefits from marine genetic resources. India has played a leading role in the negotiations of the High Seas Treaty and is a strong supporter of the agreement.



OCEAN SPACE AND JURISDICTIONS- UNCLOS 1982

The United Nations Convention of the Law of the Sea, (1) started with the UN Seabed Committee in 1968. It was finally signed in 1982 and entered into force in 1994. It took a long time, in view of the very complex nature of the seas with a diversity of conditions. A separate agreement on Article XI (deep sea mining) entered into force in 1996. Another Agreement on Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks on conservation management of fish stocks entered into force in 2001. These are the three main implementing agreements of the UNCLOS.

The ocean covers about two thirds of the surface of our planet and houses 50-80% of all life on Earth. 64% of the ocean is considered the "high seas". The high seas are some of the most biologically productive in the world – teeming with plankton and home to ocean giants like predatory fish, whales, and sharks. The seabed sequesters tremendous amounts of carbon and the ocean volume traps heat and carbon dioxide, slowing considerably the effects of climate change on land and in the atmosphere.

Coastal countries generally control the 200 nautical miles of ocean – that is, the water column and seafloor – extending out from their coasts. These 200 nautical miles are known as a country's "Exclusive Economic Zone (EEZ)," where the exploration and use of marine resources is a sovereign

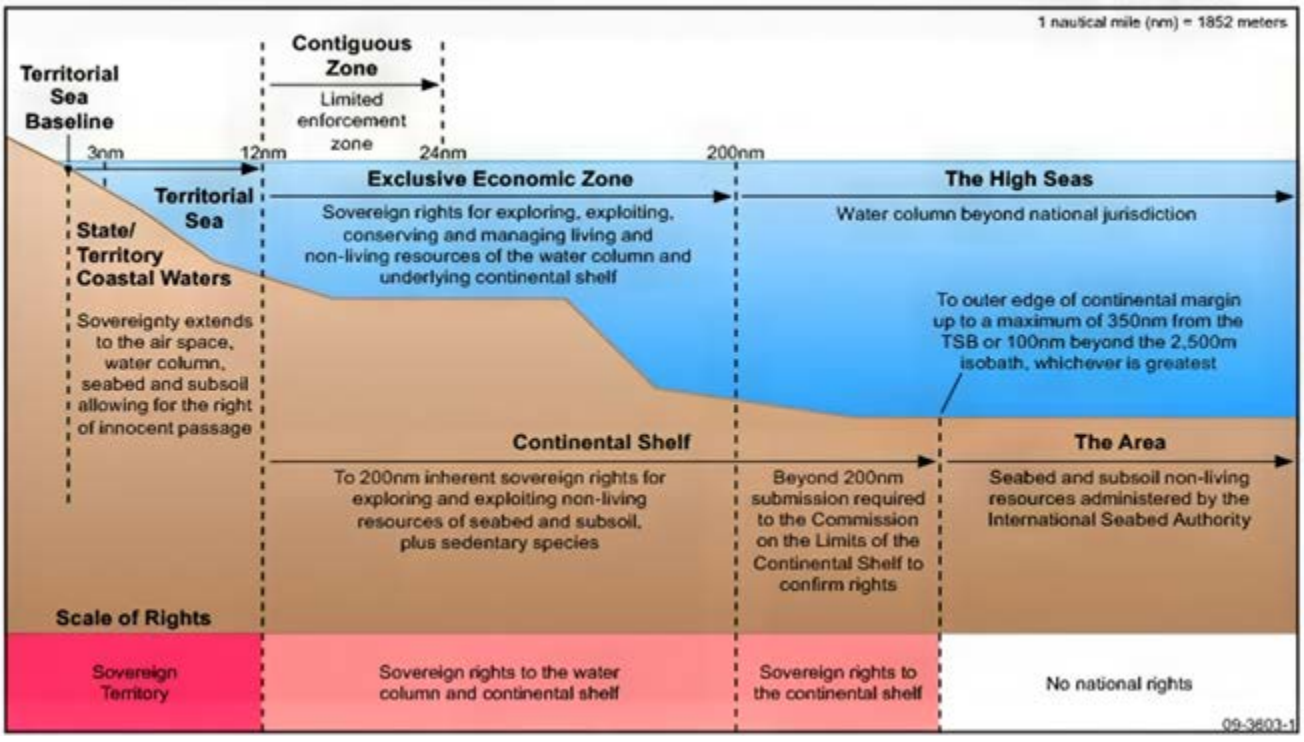


Fig 1. Boundaries of the Ocean, UNCLOS 1982

right. The term high seas refers to the ocean water column that lies beyond the boundaries of any one country, also known as areas beyond national jurisdiction (ABNJ). The seafloor beyond the limits of the coastal continental shelf is what is termed "the Area" by the 1982 United Nations Convention on the Law of the Sea (UNCLOS). The International Seabed Authority (ISA) is mandated to regulate the exploration for, and exploitation of, seabed mineral resources in the Area for the benefit of humankind. The various maritime zones specified under the UNCLOS (1) are briefly described below, starting with the innermost zone.

TERRITORIAL SEA

Everything from the baseline to a limit not exceeding twelve miles is considered the coastal State's territorial sea. Coastal States have sovereignty and jurisdiction over the territorial sea on the surface but also to the seabed and subsoil, as well as vertically over airspace. However, other States have passage rights, including innocent passage through the territorial sea and transit passage through international straits. There is no right of innocent passage for aircraft flying through the airspace above the coastal state's territorial sea.

CONTIGUOUS ZONE

Coastal States may also establish a contiguous zone from the outer edge of the territorial seas to a maximum of 24 nautical miles from the baseline. This zone exists to bolster a State's law enforcement capacity and prevent criminals from fleeing the territorial sea. Within the contiguous zone, a State has the right to both prevent and punish infringement of fiscal, immigration, sanitary, and customs laws within its territory and territorial sea. Unlike the territorial sea, the contiguous zone only gives jurisdiction to a State on the ocean's surface and floor. It does not provide airspace rights.

THE EXCLUSIVE ECONOMIC ZONE (EEZ)

The Exclusive Economic Zone (EEZ), a maritime zone established under the United Nations Convention on the Law of the Sea (UNCLOS) (1), extends 200 nautical miles (370 km) beyond a coastal state's territorial sea, which generally extends 12 nautical miles (22 km) from the baseline of the coast. Within the EEZ, the coastal state has exclusive rights to explore, exploit, conserve, and manage the living and non-living resources of the waters, seabed, and subsoil. This includes fish, oil, gas, minerals, and other resources found on the seabed or in the water column.

The coastal state has jurisdiction over certain activities within its EEZ, such

as marine scientific research, pollution control, and the construction of artificial islands. However, other states still have the right of innocent passage through the EEZ, which means they can navigate freely for non-harmful purposes. The coastal state has the responsibility to protect the marine environment within its EEZ. This includes preventing pollution from land-based sources and from maritime activities. Coastal states are encouraged to cooperate with other states in the conservation and management of shared resources within their EEZs.

THE CONTINENTAL SHELF

The continental shelf is a natural seaward extension of a land boundary. This seaward extension is geologically formed as the seabed slopes away from the coast, typically consisting of a gradual slope (the continental shelf proper), followed by a steep slope (the continental slope), and then a more gradual slope leading to the deep seabed floor. These areas are rich in natural resources, including oil, natural gas and certain minerals.

The UNCLOS allows a State to conduct economic activities for a distance of 200 nautical miles from the baseline, or the continental margin where it extends beyond 200 nautical miles. There are two methods to determine the extent of a continental margin - by measuring the thickness of sedimentary rocks, or by drawing its boundary 60 miles from the foot of the shelf's slope. But this expanded continental shelf cannot, however, exceed (i) 350 miles from the baseline or (ii) 100 miles from the 2,500-meter isobath. To prevent abuse of the continental shelf provisions, the UNCLOS has established the Commission on the Limits of the Continental Shelf (CLCS). The CLCS evaluates States' claims about the extent of their continental shelves and whether they conform to the Convention's standards.

The economic rights within the continental shelf extend only to non-living resources and sedentary living resources, such as shellfish. It also allows the coastal State to build artificial islands, installations, and structures. Other States can harvest non- sedentary living resources, such as finfish; lay submarine cables and pipelines; and conduct marine research as if it were

international waters. Continental shelf rights do not grant a State the right to restrict navigation.

HIGH SEAS AND DEEP OCEAN FLOOR

The ocean surface and the water column beyond the EEZ are referred to as the high seas under UNCLOS. The seabed beyond a coastal State's EEZs and Continental Shelf claims is known under the UNCLOS as the Area which is considered "the common heritage of all mankind" and is beyond any national jurisdiction. States can conduct activities in the Area so long as they are for peaceful purposes, such as transit, marine science, and undersea exploration. Living resources, such as fish, are available for exploitation by any vessel from any State. Although the UNCLOS does not impose any limitations on fishing in the high seas, it encourages regional cooperation to conserve those resources and ensure their sustainability for future generations.

Non-living resources from the Area, referred to under UNCLOS as minerals, are handled by the International Seabed Authority, referred to as the Authority. This international body, headquartered in Jamaica, is responsible for administering these resource projects through a business unit called the Enterprise. The Enterprise was organized to be governed by a Council and a Secretariat. As an international body, the Authority also includes an Assembly of representatives from each nation which is the supreme body for setting policy in the Authority. So far the Authority has granted only exploration licenses. The first case of exploitation or deep sea mining submitted by Nauru is under consideration by the ISA, amidst concerns over environmental impact and damage to biodiversity.

MARINE BIODIVERSITY AND ITS IMPORTANCE

Life on earth actually began in the oceans and migrated onto land and the air. The oceans provided a stable temperature for life to develop. About 2 billion years ago, there was a great oxygenation event, and probably caused by a bacterium known as cyanobacteria in the oceans, and that raised the atmospheric oxygen levels from 2% to over 20% and reduced Carbon Dioxide levels from 20% to 0.04%. This enabled the present form of aerobic life to emerge. Today, the number of known marine species is about 240,000, as per the latest estimates in 2021. But there are estimates that this is only a small fraction of the 1.5 million marine species on Earth. The extreme diversity in the microorganisms, which live in the oceans, such as bacteria and phytoplankton, and the various marine habitats which give rise to diverse life forms, and many are still unknown. From the deep ocean, which is around 4000

meters plus to the continental shelf and the sea shores, there is a wide range of ocean habitats. Marine biodiversity is a valuable asset. The oceans already provide the world with goods and services worth at least $ 2 trillion every year. This is the blue economy, which is still in early stage. Some 3 billion people depend on fish for livelihood and as a source of protein. More than half the world's marine species could be on the brink of extinction by 2100. Many useful chemicals used in the health industry, the health sector, as well as industrial compounds can be derived from marine organisms, but if they get extinct, then we would not be able to produce those useful products. This underlines the need to protect marine biodiversity and restore marine habitats.

There are several instruments which deal with biodiversity The Convention on Biological Diversity, which entered into force in 1993 actually deals with biodiversity as a core subject. It does not distinguish between the land as well as the oceans. One of its aims is to promote the conservation of biodiversity. This was intended to apply to national territories, but for areas which are beyond national territories, which are open to everyone, the convention can be applied to processes and activities carried out by state parties, even if they carry out the activities in the open ocean. Because of concern over biodiversity, and especially in the oceans, the international community embarked on developing a new instrument - the High Seas treaty.

HIGH SEAS TREATY – MAIN FEATURES

Since 2017, an Inter-Governmental Conference established by the United Nations General Assembly has been negotiating an agreement under UNCLOS that would allow for more effective management and protection of the high seas (2). This internationally legally binding instrument is often referred to as the Biodiversity in Areas Beyond National Jurisdiction treaty, or "BBNJ treaty." This treaty focuses on four main areas:

- Conservation and sustainable use of marine biological diversity in ABNJ, including marine genetic resources.
- Area-based management tools, including marine protected areas.
- Environmental impact assessments.
- Capacity building and the transfer of marine technology.

On 19 June 2023, the UN General Assembly adopted the BBNJ Treaty by consensus. The Treaty consists of the Preamble, 12 Parts, 76 Articles, and 2 Annexes. The Treaty is the result of over two decades of international collaboration and negotiations among a wide range of stakeholders, not just countries: scientists, Indigenous Peoples and local communities, civil society, academic, research institutions, and the private sector. It was opened for signature on June 19th and will enter into force 120

days after at least 60 states ratify it. As on October 2023, 82 countries have signed it.

The Treaty addresses biological diversity loss and degradation of ecosystems of the ocean, in particular, due to climate change impacts on marine ecosystems, as well as ocean acidification, pollution, including plastic pollution, and unsustainable use. It also has the goal to advance scientific research. The Treaty seeks to address existing inequalities in sharing the benefits (including access) accrued from the organisms of ABNJ and the associated digital sequence information. Such benefits could include a wide range of resources, including collection activity information, samples, information about publication, patents and commercialization. Also, the Treaty includes certain monetary benefit sharing requirements associated with commercialization from utilizing marine genetic resources of ABNJ and the associated digital sequence information. The main features of the BBNJ Treaty are described below.

MARINE GENETIC RESOURCES

One of the key aspects of the High Seas Treaty (2) is marine genetic resources (MGRs), which are the genetic material found in marine organisms. MGRs have immense potential for various applications, such as Biomedical research. MGRs can be used to develop new drugs, vaccines, and other medical treatments. Enzymes from deep-sea bacteria have been used to develop heat-resistant DNA polymerases, which are crucial for certain molecular biology techniques. MGRs can be used to produce enzymes, pigments, and other bioproducts with industrial applications. Cold-adapted enzymes from deep-sea organisms are used in laundry detergents because they remain active at low temperatures. MGRs can be used to develop new crops and improve the yields of existing ones. Algae with high nutritional content are being investigated as potential food sources for a growing global population. The High Seas Treaty establishes a legal framework for the access to and utilization of MGRs in ABNJ. This includes provisions for prior informed consent, benefit-sharing, and environmental impact assessments.

One of the key provisions of the Treaty is the creation of a framework for the fair and equitable sharing of benefits (FEBS) arising from the use of marine genetic resources (MGRs) found in ABNJ. The Treaty recognizes that MGRs found in ABNJ are a shared resource of all humankind, and that the benefits derived from their use should be shared equitably. This is particularly important for developing countries, which often lack the resources to access and utilize MGRs on their own. The Treaty establishes a number of principles and mechanisms for FEBS, including: (a) Transparency: States and entities that access and utilize

MGRs in ABNJ must be transparent about their activities. (b) Prior informed consent: States and entities must obtain the prior informed consent of the relevant authorities before accessing and utilizing MGRs in ABNJ. (c) Benefit-sharing plans: States and entities must develop and implement benefit-sharing plans that outline how the benefits derived from the use of MGRs will be shared with all stakeholders, including developing countries. (d) The Monetary Fund: The Treaty establishes a Monetary Fund to support the implementation of FEBS. The Fund will be financed through a variety of sources, including contributions from states, private sector entities, and philanthropic organizations.

The FEBS provisions of the High Seas Treaty are still under development, and there are a number of challenges that need to be addressed in order to ensure their effective implementation. These include: (1) Defining what constitutes an MGR: The Treaty does not provide a clear definition of what constitutes an MGR, which could make it difficult to determine when FEBS applies. (2) Identifying the relevant authorities: The Treaty does not specify who the relevant authorities are for the purposes of obtaining prior informed consent, which could lead to confusion and delays. (3) Sharing benefits equitably: There is no consensus on how to share benefits equitably, and different stakeholders have different interests. Despite these challenges, the FEBS provisions of the High Seas Treaty represent a significant step forward in ensuring that the benefits derived from the use of marine genetic resources are shared equitably.

The High Seas Treaty (BBNJ) also delves into the realm of digital sequence information (DSI) alongside marine genetic resources (MGRs). DSI refers to the digital representation of genetic information, like DNA sequences stored in databases. The Treaty acknowledges DSI as a critical component of MGRs, recognizing its potential for scientific research and development of pharmaceuticals, food production, and environmental monitoring.

Similar to MGRs, the Treaty emphasizes the fair and equitable sharing of benefits arising from the utilization of DSI obtained from ABNJ. This seeks to ensure that developing countries, often lacking resources to access and utilize DSI, have a rightful stake in the potential economic and scientific advancements. The Treaty promotes transparency throughout the DSI research and development process. This includes obligations for researchers and companies to disclose the origin of the DSI, how it was obtained, and how benefits are being shared. This aims to prevent biopiracy and ensure responsible use of genetic resources.

Implementing DSI provisions poses challenges, including: (1) Defining DSI: Establishing a clear and internationally recognized definition of DSI is crucial for consistent application of the Treaty's provisions. (2) Tracking and Monitoring DSI: Tracing the origin and utilization of DSI across databases and research institutions can be complex, requiring robust tracking and monitoring systems. (3) Sharing Benefits from DSI: Determining how to equitably share benefits derived from DSI, particularly when multiple parties contribute to research and development, needs careful consideration. Despite challenges, the Treaty lays a crucial foundation for regulating and sharing benefits from DSI in ABNJ. As scientific understanding and technological advancements progress, the Treaty can be adapted and refined to ensure responsible and equitable utilization of this valuable resource for the benefit of all humankind.

THE RACE FOR PATENTS AND IPRS

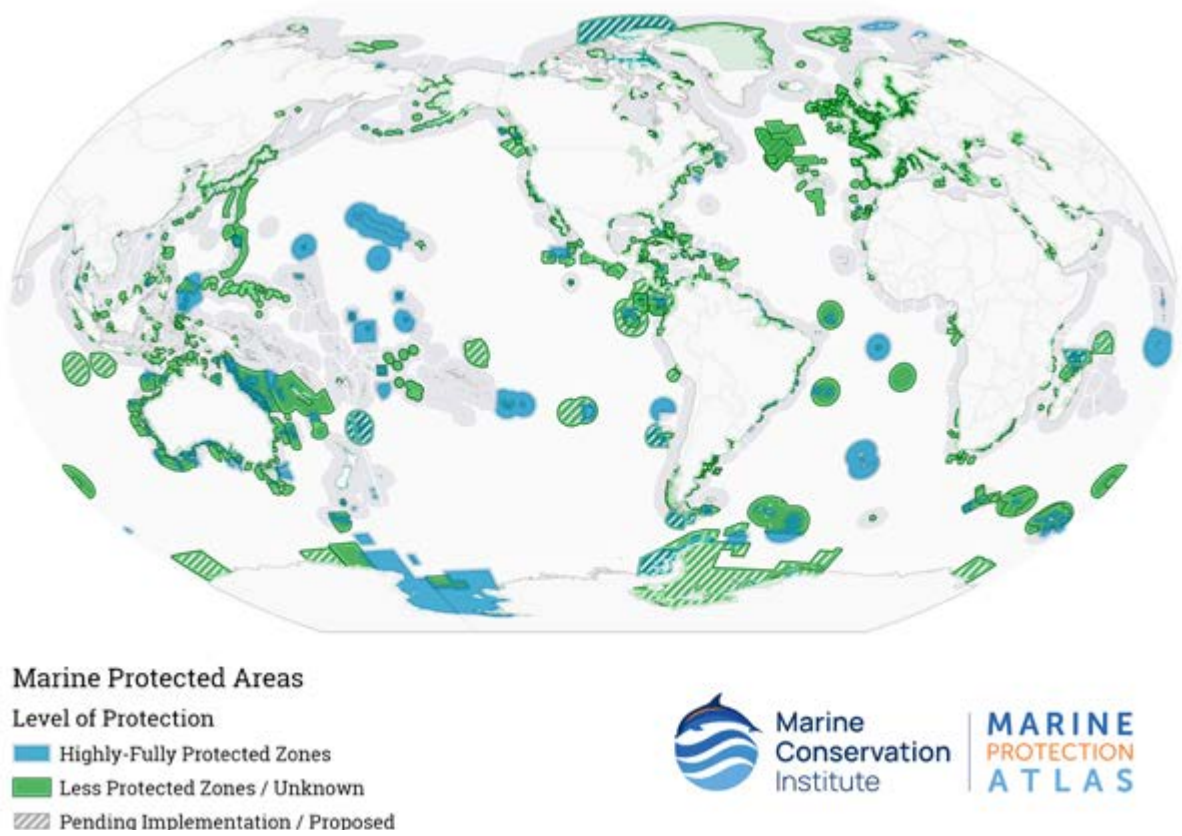
The vast potential of marine organisms has led to a race for patenting their unique genetic resources. A few major players have emerged as holders of a big portion of patents associated with MGRs. BASF, a German chemical giant, is the world leader with roughly 47% of all MGR-related patents. Their focus lies in enzymes, pigments, and other bioactive compounds derived from marine organisms, with potential applications in industries like biotechnology, pharmaceuticals, and cosmetics. Academic institutions are also actively involved in MGR research, and their contributions are reflected in patent holdings. The Yeda Research and Development Co. Ltd., the commercial arm of the Weizmann Institute of Science in Israel, stands out with 56% of all university-held MGR patents. Other notable academic players include the University of California system, MIT, and Scripps Institution of Oceanography. Kyowa Hakko Kirin Co. Ltd., a Japanese multinational pharmaceutical company holds a significant share of MGR patents, focusing on enzymes with applications in food processing and industrial applications. Their research is driven by the potential of marine enzymes

to function efficiently under extreme conditions, like high temperatures or acidic environments. Butamax Advanced Biofuels LLC, a US-based biofuel company focuses on extracting biodiesel from marine algae, and their patent portfolio reflects this interest. Their research aims to unlock the potential of algae as a sustainable source of renewable energy.

MGR patent holdings are concentrated to a few players and not geographically balanced. Entities located in just 10 countries account for 98% of all patents, with Germany, the United States, and Japan leading the way. There is a risk of the scope of the patents especially on microorganisms, being unduly wide, which could discourage further research and development. There are concerns about equitable access to and benefit-sharing from MGRs, particularly for developing countries with rich marine biodiversity but limited research resources. As scientific understanding deepens and technological advancements accelerate, the race for marine genetic resources is likely to intensify. Ensuring responsible and equitable utilization of these resources, while addressing concerns about biopiracy and benefit-sharing, remains a crucial challenge for the future of marine biodiversity and its potential to benefit humankind. Numerous other entities, including smaller companies, startups, and research groups from diverse countries, are actively involved in MGR research and patenting. The future of this field holds immense promise for scientific breakthroughs and economic development, but also has the risks of concentration of ownership of IPRs and potential abuse of market power.

AREA BASED MANAGEMENT TOOLS

The High Seas Treaty seeks to preserve marine biodiversity through the use of area-based management tools (ABMTs) analogous to reserved forests on land. These are tools that regulate human activities by scope, area and duration, to conserve marine biodiversity and ensure the sustainable use of marine resources. Some of the most common ABMTs include Marine protected areas (MPAs). These are designated areas where all or certain activities are restricted or prohibited to protect marine ecosystems and biodiversity. MPAs can be fully protected, allowing no extractive activities like fishing or mining, or they can be managed in areas where certain activities are allowed under specific regulations. Marine reserves are similar to MPAs, and are strictly protected areas where no extractive activities are allowed. They are often established to protect spawning grounds, vulnerable species, or unique ecosystems. Fishery management areas are designated to manage specific fishing activities, such as limiting the types of gear used, catch quotas, or fishing seasons. This



helps to prevent overfishing and ensure the sustainability of fish stocks. Vulnerable marine ecosystems (VMEs) are areas with unique and fragile ecosystems that are particularly vulnerable to human activities like bottom trawling. The High Seas Treaty requires states to identify and protect VMEs from activities that would cause them harm.

The High Seas Treaty provides a framework for establishing and managing ABMTs in ABNJ. It requires states and Regional Fisheries Management Organizations (RFMOs) to cooperate in developing and implementing these tools. The Treaty also emphasizes the importance of scientific research and traditional knowledge in informing the design and management of ABMTs. ABMTs can help to conserve vulnerable marine species and ecosystems, preventing overfishing, habitat destruction, and other threats. By managing human activities, ABMTs can help to ensure that fish stocks and other marine resources are used sustainably for the benefit of present and future generations. ABMTs can provide platforms for studying marine ecosystems and understanding the impacts of human activities on the ocean. By safeguarding healthy marine ecosystems, ABMTs can support the livelihoods of people who depend on fishing and other marine industries.

The challenges to overcome in implementing these tools include gaps in capacity building. Many developing countries lack the resources and expertise to participate in the development and management of ABMTs. Ensuring compliance with ABMTs in vast areas of ocean can be difficult. There is a lack of scientific data on many parts of the ocean, making it difficult to identify and manage threats effectively. Nevertheless, the High Seas Treaty and the use of ABMTs offer a promising way to protect the ocean and its resources for the benefit of all. By working together, states, RFMOs, scientists, and other stakeholders can ensure that the vast and vital areas beyond national jurisdiction are managed sustainably and continue to support life on Earth.

ENVIRONMENTAL IMPACT ASSESSMENTS

The High Seas Treaty contains important elements on the implementation of environmental impact assessments (EIAs). EIAs are systematic processes that evaluate the potential environmental consequences of proposed activities before they are authorized. In the context of the High Seas Treaty, EIAs will be applied to activities conducted in ABNJ, such as:(1) Marine scientific research: Research activities can potentially disrupt marine ecosystems, and EIAs ensure responsible research practices that minimize negative impacts. (2) Resource extraction: Activities like deep-sea mining and fishing can have significant environmental consequences. EIAs help assess these impacts and guide the development of sustainable practices. (3) Marine transportation: Increased shipping traffic poses threats like pollution and invasive species introductions.

The High Seas Treaty establishes a framework for conducting EIAs in ABNJ (3). It requires states and regional organizations to: (1) Develop clear EIA standards and procedures: These standards should ensure that EIAs are comprehensive, transparent, and scientifically sound. (2) Conduct EIAs for all activities with the potential to cause significant environmental harm: This includes activities with transboundary impacts, affecting areas beyond the jurisdiction of a single state. (3) Make EIA reports publicly available: This transparency fosters informed decision-making and public participation in protecting the high seas.

The implementation of EIAs under the High Seas Treaty has several potential benefits: (1) Preventing environmental harm: By identifying and mitigating potential negative impacts, EIAs can help protect vulnerable marine ecosystems and species. (2) Promoting sustainable use of resources: EIAs can inform the development of practices that ensure the long-term sustainability of resource extraction and

other activities in ABNJ. (3) Enhancing decision-making: EIAs provide valuable information to decision-makers, enabling them to make informed choices about which activities to authorize and under what conditions. (4) Building public trust: Transparency and public participation in EIAs can build trust among stakeholders and ensure that environmental concerns are addressed effectively.

Challenges in implementing EIAs for activities in ABNJ include lack of capacity of countries in terms of resources and expertise necessary to conduct EIAs effectively. There is a lack of scientific data on many parts of the high seas, making it difficult to assess the potential impacts of activities. Cooperation between states and regional organizations is crucial for consistent and effective application of EIAs across ABNJ. There are also questions arising around which organization (the ISA or the BBNJ Treaty or both) would conduct EIAs relevant to mining projects involving the deep sea bed areas. However, the High Seas Treaty's provisions for EIAs represent a significant step forward in protecting the ocean beyond national borders. By working together, states, regional organizations, scientists, and other stakeholders can ensure that EIAs become a key tool for safeguarding the health and biodiversity of our shared high seas for generations to come. EIAs can play a critical role in ensuring the sustainable use and conservation of our precious ocean resources.

CAPACITY BUILDING AND TECHNOLOGY TRANSFER

The High Seas Treaty recognizes the crucial role of capacity building and technology transfer (CBTT) in ensuring its effective implementation, particularly for developing countries. These provisions aim to bridge the gap between those with the resources and expertise necessary to protect the high seas and those who lack them. The Treaty establishes a dedicated Capacity Building and Technology Transfer Committee (CBTT Committee) responsible for overseeing, monitoring, and providing guidance on CBTT activities. The CBTT Committee will work with governments, intergovernmental organizations, and other stakeholders to identify the specific capacity needs and technology gaps of developing States regarding the implementation of the Treaty. The Treaty encourages the development of regional centers of excellence and collaboration between regional organizations and research institutions to share knowledge and expertise within certain regions. The Treaty promotes the sharing of environmental data, marine scientific research outcomes, and relevant technologies with developing States. This includes facilitating access to databases, research vessels, and equipment. The Treaty establishes a voluntary trust fund specifically for CBTT activities, along with additional funding avenues like assessed

contributions from Parties and partnerships with private sector entities.

Effective implementation of the High Seas Treaty requires a global effort. However, many developing countries with rich marine biodiversity in their ABNJ zones lack the necessary resources and expertise to fully participate in activities like: (1) Marine scientific research: Conducting research to understand the marine environment and inform conservation efforts. Marine research vessels and the related onshore research laboratories can be very expensive. (2) Environmental impact assessments: Evaluating the potential impacts of activities in ABNJ and developing mitigation measures. (3) Establishment and management of area-based management tools (ABMTs): Implementing marine protected areas and other tools to protect marine biodiversity. (4) Enforcement of Treaty provisions: Patrolling vast areas of ABNJ and ensuring compliance with regulations.

Implementing effective CBTT provisions presents some challenges: (1) Ensuring sufficient resources are available for capacity building and technology transfer initiatives. (2) Building trust and transparency: Fostering collaboration and ensuring equitable access to technology and knowledge amongst all stakeholders. (3) Monitoring and evaluation: Regularly assessing the effectiveness of CBTT activities and adapting them as needed.

But the Treaty's CBTT provisions offer significant opportunities:(1) Empowering developing countries to contribute actively to the protection of marine biodiversity in ABNJ. (2) Promoting sustainable ocean governance, collaboration and ensuring a fair and equitable sharing of the benefits derived from the ocean. (3) Advancing scientific research, data and technology sharing, leading to a more comprehensive understanding of the high seas.

NAVIGATION RIGHTS

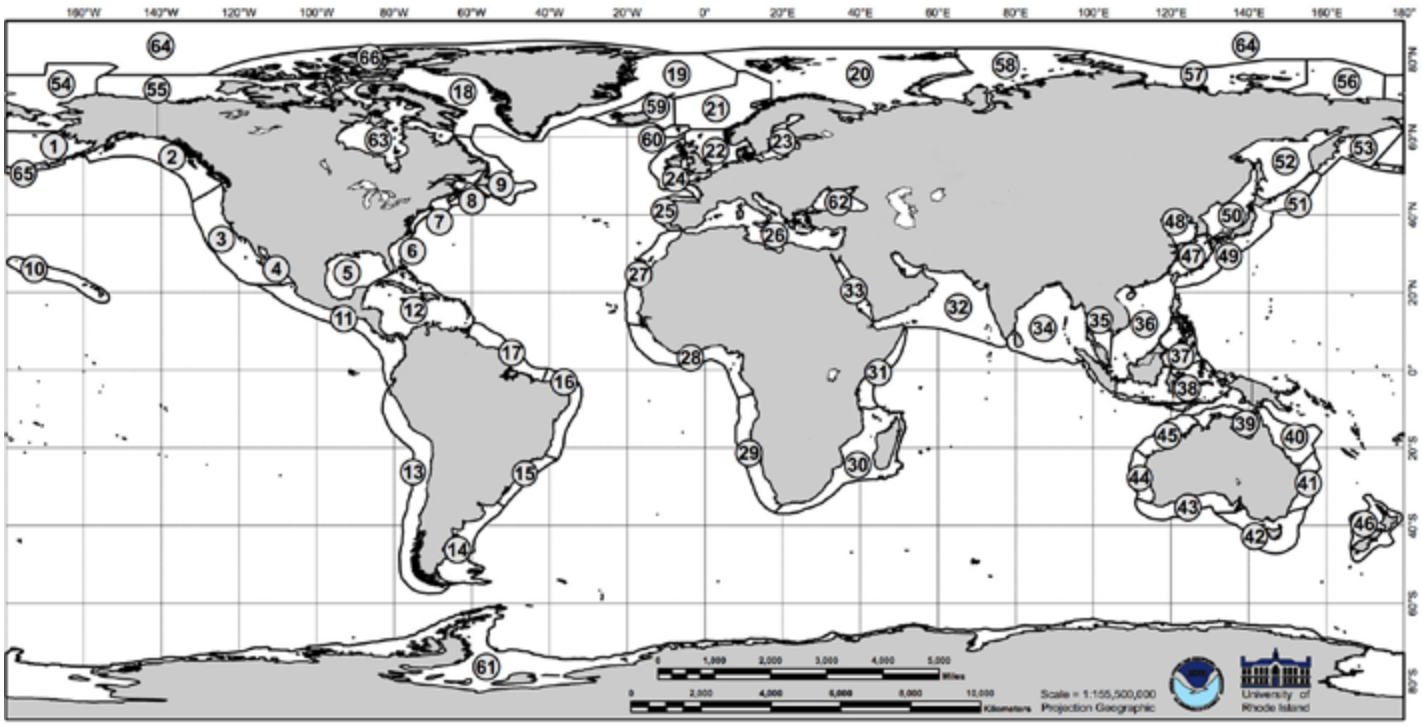
Much attention has been focused on navigation rights across the seas, the so-called Freedom of Navigation. This has been important as much of the world's trade is carried in ships across the seas. The movement of warships on and under the seas is also of military importance. Navigation rights are limited only in the Territorial Seas, except for innocent passage and transit passage through straits. Freedom of navigation exists beyond the territorial seas. In the EEZ a coastal State does not have the right to prohibit or limit freedom of navigation or overflight, subject to very limited exceptions. UNCLOS stipulates that the high seas are open to all States, including freedom of navigation and overflight. It recognizes that all States enjoy within the EEZ freedom of navigation and overflight and of the laying of submarine cables and pipelines, and other

internationally lawful uses of the sea. Hence, both the EEZ (including the contiguous zone) and the high seas beyond the EEZ are often referred to as "international water" or "high seas" for purposes of such navigation and overflight rights. In recent years, non-state actors often based on land (in conflict areas) have engaged in activities that disrupt shipping, such as piracy, attacks using missiles and drones, etc. This poses a growing threat to navigation for all states.

THE LME CONCEPT

While navigation and jurisdiction can be defined sharply in terms of territory, the living creatures of the sea move across various jurisdictions. This has led to the concept of Large Marine Ecosystems (LMEs) which seek to approach the biological resources of the seas in a more integrated manner (3). The LMEs are regions of ocean space encompassing coastal areas

Large Marine Ecosystems of the World



1. East Bering Sea
2. Gulf of Alaska
3. California Current
4. Gulf of California
5. Gulf of Mexico
6. Southeast U.S. Continental Shelf
7. Northeast U.S. Continental Shelf
8. Scotian Shelf
9. Newfoundland-Labrador Shelf
10. Insular Pacific-Hawaiian
11. Pacific Central-American
12. Caribbean Sea
13. Humboldt Current
14. Patagonian Shelf
15. South Brazil Shelf
16. East Brazil Shelf
17. North Brazil Shelf
18. Canadian Eastern Arctic - West Greenland
19. Greenland Sea
20. Barents Sea
21. Norwegian Sea
22. North Sea
23. Baltic Sea
24. Celtic-Biscay Shelf
25. Iberian Coastal
26. Mediterranean
27. Canary Current
28. Guinea Current
29. Benguela Current
30. Agulhas Current
31. Somali Coastal Current
32. Arabian Sea
33. Red Sea
34. Bay of Bengal
35. Gulf of Thailand
36. South China Sea
37. Sulu-Celebes Sea
38. Indonesian Sea
39. North Australian Shelf
40. Northeast Australian Shelf
41. East-Central Australian Shelf
42. Southeast Australian Shelf
43. Southwest Australian Shelf
44. West-Central Australian Shelf
45. Northwest Australian Shelf
46. New Zealand Shelf
47. East China Sea
48. Yellow Sea
49. Kuroshio Current
50. Sea of Japan/East Sea
51. Oyashio Current
52. Sea of Okhotsk
53. West Bering Sea
54. Northern Bering-Chukchi Seas
55. Beaufort Sea
56. East Siberian Sea
57. Laptev Sea
58. Kara Sea
59. Iceland Shelf and Sea
60. Faroe Plateau
61. Antarctic
62. Black Sea
63. Hudson Bay Complex
64. Central Arctic Ocean
65. Aleutian Islands
66. Canadian High Arctic-North Greenland

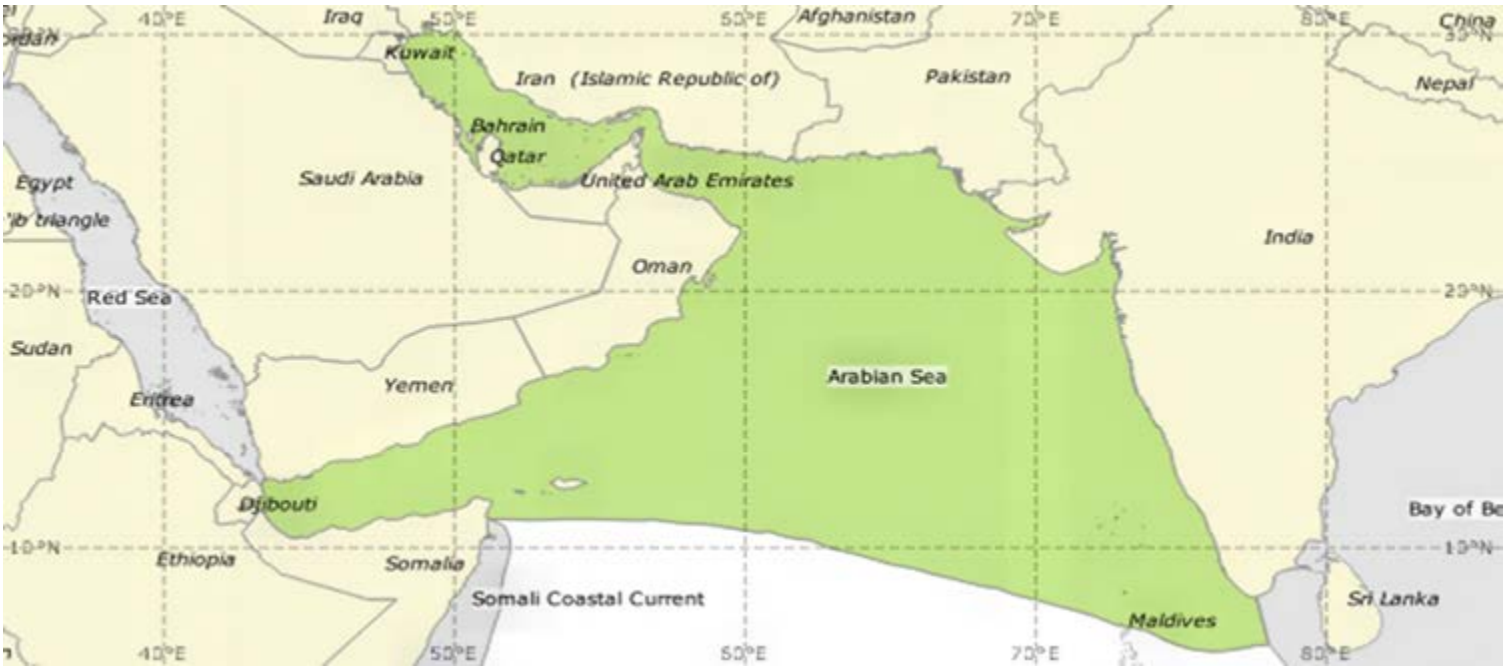
from river basins and estuaries out to the seaward boundary of continental shelves, and the outer margins of coastal currents. LMEs are expansive ocean areas, generally greater than 200,000 km2. They encircle nearly every continent and some large islands and island chains. Each LME has distinct bathymetry (depth), hydrography (tides, currents, and physical conditions of ocean waters), and biological productivity whose plant and animal populations are inextricably linked to one another in the food chain.

Globally, the world's oceans have been divided into 66 Large Marine Ecosystems (LMEs). The LMEs are the most highly productive areas of the oceans. They harbor biodiversity and provide important ecosystem services and tangible benefits, including livelihoods, food security (producing about 80 percent of the world's annual marine wild fisheries catch), shoreline protection, carbon sequestration and storage, and recreational opportunities. LMEs provide direct services approaching US$ 3 trillion annually, with a non-market value estimated at US$ 22 trillion each year. These ecosystems are transboundary in nature by virtue of interconnected currents, pollution, and movement and migration of marine living resources. LMEs represent multi-country, ecosystem-based management units for measuring the changing states of these defined ocean spaces, and for taking remedial actions toward the recovery and sustainability of degraded goods and services.

LME AND GEF EFFORTS

The Global Environment Facility (GEF), an independent financial organization that provides grants to developing countries for projects that benefit the global environment and promote sustainable livelihoods in local communities, has now funded LME projects in 10 LMEs and 75 countries worldwide. These projects are intended to continue over time, with national institutions replacing the support provided by donors. The United Nations Environment Program adopted the LME as the basic unit for its regional seas activities.

The GEF's role is one of catalyzing the development of transboundary Strategic Action Programs (SAPs) signed at the Ministerial level by coastal states bordering an LME. During implementation of the Strategic Action Plans (SAPs), the countries work toward long-term institutional and financial sustainability, potentially securing the coming into force of ground-breaking environmental treaties. To date, the GEF has invested US$ 285 million, leveraging US$ 1.14 billion in financing from other partners in such activities. In the Benguela Current LME, for example, South Africa, Angola and Namibia established the Benguela Current Commission. They subsequently adopted the Benguela Current Convention, a formal



treaty that sets out the countries' intention "to promote a coordinated regional approach to the long-term conservation, protection, rehabilitation, enhancement and sustainable use of their common marine resources." We briefly analyze the situation of two major LMEs bordering India which has the largest coastline in both of them. A more detailed analysis is beyond the scope of this article.

LME 32
THE ARABIAN SEA

The Arabian Sea (LME 32) (5) lies in the northwestern Indian Ocean between the Arabian Peninsula and India, and is bordered by Bahrain, India, Iran, Iraq, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, United Arab Emirates and Yemen. It has a total area of 3,950,421 km2. It is classified as at very high risk. The Coastal area is 513,873 km2 with a population of 28 mn (2010) which is projected to increase to 109 mn (2100). Three subsystems, each with distinct characteristics can be identified within the LME: the Western Arabian Sea along the African coast; the Central Arabian Sea bordering Iran; and the Eastern Arabian Sea bordering the coasts of Sri Lanka, India and Pakistan.

This LME suffers from overexploitation of living resources, with overcapacity of fishing fleets, and diminishing fish catches over the years. Various types of destructive fishing gear, including shrimp trawl nets and explosives, have contributed to localized fish population declines and habitat degradation in the region. The LME suffers from pollution which is severe in some coastal hotspots but moderate overall. The

major issues are oil hydrocarbons and heavy metals, and domestic and industrial sewage outfalls. The massive increase in population and rapid economic growth in coastal areas are leading to the release of vast quantities of untreated sewage and industrial wastes into the sea through sewers and rivers, resulting in highly polluted coastal areas. Marine pollution also arises from sea-based activities, including marine transportation and offshore oil exploration and production activities. The LME has one of the highest oil pollution risks in the world, as a consequence of the concentration of offshore petroleum installations, tanker loading terminals, and the large volume of oil transportation. Physical damage to marine and coastal habitats is a major concern in the region, with increasing pressures arising from human activities, including those related to war. Massive coastal development projects in most of the countries have resulted in changes to vast coastal areas.

Governance in this LME is complicated by the multiple national boundaries and EEZs as well as the large expanse of international open waters. Geopolitical tensions among the coastal states also complicates matters. Several international, regional and bilateral environmental agreements have been adopted by the ROPME (Regional Organisation for the Protection of the Marine Environment) countries established in 1979 with eight member states: Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. The Gulf of Aden comes under the Programme for the Environment of the Red Sea and Gulf of Aden, of which Saudi Arabia, Somalia and Yemen are members (see the Red Sea LME). India and Pakistan, along with Bangladesh, Maldives and Sri Lanka support the South Asian Seas Action Plan (SASAP), established in 1995 under the UNEP Regional Seas Programme and with the South Asia Cooperative Environment Programme acting as secretariat. The overall objective of SASAP is to protect and manage the marine environment and related coastal ecosystems of the region in an environmentally sound and sustainable manner. Although these regional initiatives have made some positive impact towards the protection of the marine environment and coastal areas, the region is still faced with the challenge of forging a holistic ecosystem approach needed for the conservation and sustainable development of the Indian Ocean LMEs, including the Arabian Sea LME.

LME 34
THE BAY OF BENGAL

The Bay of Bengal Large Marine Ecosystem (BOBLME) is one of the largest LMEs globally and covers 6.2 million km2 with depths ranging between 2,000 and over 4,000 m for most of its central area (4). The continental shelf around its perimeter is mostly narrow. About 66 percent of the

BOBLME lies within the EEZs of BOBLME countries - Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, Thailand - the remainder being the high seas area. Thus, a large part of the BOBLME is subject to national jurisdiction. The areas of high primary production are concentrated in the coastal waters. Many large rivers flow into the BOBLME. These include the Ganges, Brahmaputra and Meghna in the north that drain across Bangladesh and India; the Ayeyarwaddy and Thanlwin in the east from Myanmar; and the Mahanadi, Godavari, Krishna and Cauvery in the west from India. These rivers discharge huge quantities of fresh water and large quantities of silt into the coastal environment.

The BOBLME is rich in natural resources, including extensive mineral and energy resources; marine living resources that support major fisheries; and forest and land resources. The marine fisheries production in 2012 (BOBLME, 2015) was approximately six million tons (seven percent of the world's brackish water and marine catch), valued at USD 4 billion (about four percent of the value of the world catch). The LME is the site of three important critical habitats – mangroves (12 percent of world mangrove resources); coral reefs (8 percent of the world's coral reefs) and seagrass. The BOBLME is an area of high biodiversity, with a large number of endangered and vulnerable species. The LME and its natural resources are of considerable social and economic importance to the bordering countries, with activities such as fishing, shrimp farming, tourism and shipping contributing to food security, employment and national economies. The Bay of Bengal

is also one of the hydrocarbon-rich areas of the world, comparable to the Gulf of Mexico, Arabian/Persian Gulf and Bohai Bay in China. Until recently it has been poorly explored due to a lack of financial support for exploration and international boundary disputes. An increasing emphasis on the exploration for, and exploitation of, oil and gas in the BOBLME presents many different opportunities and threats. There is also an increasing risk of pollution.

The Sustainable Management of the Bay of Bengal Large Marine Ecosystem (BOBLME) project, was an initiative of the Food and Agriculture Organization of the United Nations (FAO) and the Global Environment Facility (GEF). It was implemented in the eight countries surrounding the Bay of Bengal from 2009 to the end of 2015. A final evaluation of the project was carried out in July 2015 (4). The countries bordering the Bay of Bengal region have made efforts over many years to conserve their extensive marine and coastal resources and manage fisheries within sustainable limits. The current initiative arose from the earlier Bay of Bengal Programme for sustainable fisheries (BOBP), implemented by FAO in from 1979 to 2003. The BOBLME project was conceived as a programme involving the eight countries with support from FAO, GEF and other donors, and developed under the GEF International Waters Programme. The project's aims were to improve the health of the marine and coastal ecosystems and living resources across the Bay of Bengal, and the lives of coastal populations of the eight countries.

CHALLENGES AND OPPORTUNITIES FOR INDIA

The BOBLME Strategic Action Programme (SAP) was intended to comprise a national SAP for each of the eight countries, but none of the countries progressed much beyond endorsing generic lists of several hundred possible national actions. These are not organized into any form of strategy or programme aligned to any of the SAP's proposed high-level objectives. The lack of national SAP development and strategy in the majority of countries also undermines commitment to and ownership of the whole BOBLME SAP implementation process, and will impede progress of the programme's next phase. India being the leading country in the BOBLME group could take the initiative to promote and shape the next phase of the project.

As regards the Arabian Sea LME 32, the situation is more challenging. Cooperation among the countries has so far been based on a sub-regional basis, with no overarching framework for the LME as a whole. This gap needs to be filled. A start could be made by holding intergovernmental consultations on an integrated approach to the management of the whole LME.

CONCLUSIONS

While considerable attention has been focused on issues related to navigation and maritime security, including the emerging Indo-Pacific strategy, relatively little attention has been given to managing marine biodiversity in the Indian Ocean region. With large growing populations in the coastal areas heavily dependent on fisheries and living marine resources, the sustainable management of the latter is of great importance in ensuring nutrition and livelihoods of the dependent populations on a sustainable basis. India is well placed to play a leading role along with other like-minded countries to launch initiatives to this end with the support from international agencies like FAO, UNEP, GEF, UNESCO, etc.

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