Mainstreaming Marine Spatial Planning In India's Approach To Ocean Governance

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Management of the maritime space presents unique challenges. Activities occurring within the maritime zones of a country or along its coastline, impact activities occurring in the hinterland of the country or even thousands of kilometres away on the shores of a different country — and are likewise impacted by them. The inherent interconnectedness of the ocean and interdependencies of different maritime activities, both amongst themselves and with hinterland activities, necessitates that all maritime exploration, exploitation, development, and conservation activities adopt a holistic approach towards planning, considering their collective environmental, socio-economic, and trans-boundary impacts. While this fact is not lost on academics, practitioners, and policymakers, more often than not the planning and management of maritime activities in India and across the world have taken a sector-specific or target-specific approach. In contrast to this somewhat myopic approach, the relatively novel concept of Marine Spatial Planning (MSP) aims to address the interconnections and interdependencies in an iterative and dynamic planning process. This would ensure greater long-term sustainability by avoiding overexploitation, ensuring a minimal environmental impact through ecosystem-based planning, and future-readiness by building adaptive capacity.

As India continues to expand its maritime sectors in its endeavour to become a major Blue Economy in the world, this article advocates the need to mainstream the idea of MSP in India's approach to ocean governance (encompassing coastal management as well). The article is divided into three main parts. The first provides an overview of the growing threats to the ocean environment, which forms the primary motivation for moving towards more holistic ocean management; the second introduces the concept of Marine Spatial Planning and highlights its benefits; and the third and concluding part outlines how MSP could and should be incorporated in India's coastal and marine development policies and initiatives.

Deteriorating Ocean Health and Ecosystem Services

Since the industrial revolution, the global ocean has absorbed nearly one-third of all carbon dioxide (CO_2) emissions from human activities and around 90 per cent of the excess heat generated by the

increased concentration of greenhouse gases in the atmosphere. The dissolved CO_2 has led to a significant increase in the acidity of ocean waters. According to the UN Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate, published in 2019, the pH value — *a measure of how acidic/basic water is. The range goes from 0 to 14, with 7 being neutral. pH values of less than 7 indicate acidity, whereas a pH of greater than 7 indicates base* — of ocean surface-water has been declining at the rate of 0.017-0.027 units per decade, which is faster than anything experienced during the last 300 million years.[1] The excess heat absorbed by the ocean has contributed to significant ocean warming and led to an increase in the frequency and intensity of marine heatwaves. Ocean warming has also led to a decline in the dissolved oxygen content in the ocean which has led to the expansion of existing *"dead zones"* in the ocean and creation of new ones.

These impacts of contemporary climate change are compounded by other anthropogenic interventions such as marine pollution, overextraction of living and non-living resources, and introduction of invasive species. Recent estimates suggest that around 8-10 million metric tonnes of plastic waste enter the ocean annually, which accounts for around 80 per cent of all marine litter. By 2050, the amount of plastic in the ocean could outweigh all fishes in the ocean.[2] A recent assessment of the UN Food and Agriculture Organisation shows that the percentage of fish stocks with biologically sustainable levels decreased to 64.6 per cent in 2019 as compared to 90 per cent in 1974.[3]

Together, the abovementioned stresses pose severe threats to all marine species, from microscopic phytoplankton and small pelagic fish to multi-tonne whales, as also to the coastal and marine ecosystems that provide critical habitats for these marine species. Coral reefs, for instance, are amongst the most threatened ecosystems on the planet. Already at 1° C of global warming above pre-industrial levels, coral reefs around the world have witnessed widespread bleaching events and mass die-offs. The 2018 UN IPCC Special Report on Global Warming of 1.5° C projected that due to their high sensitivity and low adaptive capacity, coral reefs may decline by 70-90 per cent at 1.5° C of warming and may be completely wiped out at 2° C.[4] Salt marshes, seagrass meadows, and kelp forests are also expected to be at *"high-very high"* risk at 2° C and higher levels of warming.

On the other hand, the ocean and its resources provide unparalleled economic opportunities — a realisation that is increasingly dawning upon coastal and island nations. In addition to the conventional maritime sectors of fisheries, ports and shipping, tourism, etc., countries are beginning to explore new avenues for growth including ocean-based renewable energy, deep-sea mining for minerals, and marine biotechnology. The signs of the fragile state of the ocean environment are

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[1] Nathaniel L Bindoff et al, "Changing Ocean, Marine Ecosystems, and Dependent Communities", in IPCC Special Report on the Ocean and the Cryosphere in a Changing Climate, eds Hans-Otto Pörtner et al, (In Press, 2019). https://www.ipcc.ch/srocc/chapter/chapter-5/

[2] Marta Fava, "Ocean plastic pollution an overview: Data and statistics", Ocean Literacy Portal, UNESCO, 09 May 2022. https://oceanliteracy.unesco.org/plastic-pollution-ocean/

[3] Food and Agriculture Organization, In Brief to The State of World Fisheries and Aquaculture 2022: Towards Blue Transformation, (Rome: FAO, 2022), 32.

[4] Supra Note 1

becoming more and more apparent, which demand that all maritime activities must minimise their environmental impact and that comprehensive efforts must be taken urgently to protect and conserve coastal and marine ecosystems. This is one of the main motivations for introducing ecosystem-based Marine Spatial Planning (MSP) as a guiding tool for the planning and management of current and future Blue Economy initiatives to meet the economic, social, and environmental objectives.

What is Marine Spatial Planning?

While different national and international agencies have varying definitions for MSP, the one provided by the Intergovernmental Oceanographic Commission (IOC) of UNESCO, in 2009, is the most widely cited. It defines MSP as, *"a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that have been specified through a political process"*.[5] The IOC also provided a step-by-step guide for ecosystem-based MSP to help countries develop their maritime activities in harmony with ocean ecosystems and maximise the ecological and socio-economic benefits.[6] Some of the key elements of the 10-step guide include: identifying the specific problems that may be addressed by MSP, obtaining the necessary financial support, creating a work plan through extensive stakeholder participation, analysing the existing spatial conditions (including potential conflicts between different activities, stakeholders, and the environment), making future projections of how the plan might affect the region — particularly maritime activities in the region, and finally, implementing the plan and establishing robust monitoring and evaluation mechanisms. Importantly, this is not meant to be a linear, one-time process but, instead, an iterative, cyclical process allowing flexibility for the plans to be revised as and when needed.

As countries move to expand and diversify their Blue Economy portfolios and engage in newer activities such as offshore wind power generation, tidal and wave energy, deep sea mining, marine biotechnology, etc., there will be a growing need for effective MSP to avoid potential conflicts for ocean space with conventional activities. The fisheries sector would have to evolve to account for declining fish stocks and changing geographical distribution of fish species due to climate change. Offshore oil and gas projects would have to compete with offshore renewable energy projects. Some ecologically sensitive and threatened areas would have to be set aside for nature conservation. Effectively addressing these challenges requires exhaustive mapping of the physical conditions (temperature, wind speeds, currents, etc.) and the living and non-living resources in the marine space, and then carefully allocating the space for the different activities while avoiding conflicts with other activities or with the environment. This forms a key component of the MSP process.

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[5] C Ehler and F Douvere, "Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-based Management", Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, IOC Manual and Guides No 53, ICAM Dossier No 6, (Paris: UNESCO, 2009). https://unesdoc.unesco.org/ark:/48223/pf0000186559

[6] *Ibid*

Arguably, the heart of the MSP approach lies in the first three words in the definition provided above i.e., it is *"a public process"*, which promotes extensive consultations-with and participation-from all stakeholders from the planning to the implementation phases. As highlighted earlier, the maritime space is inherently interconnected, and all maritime activities have a much larger spatial and temporal impact than the location and time of their inception. To illustrate this in further detail, consider the example of building a new seaport in a coastal city. The construction of any marine infrastructure naturally leads to changes in local ocean dynamics. In this example, the construction of breakwaters and jetties for the port would affect the water current patterns in the vicinity of the port. It would also disturb local coastal and marine ecosystems such as mangrove forests, seagrass meadows or saltmarshes, due to dredging and other construction-related activities. It would limit the availability-of and accessibility-to the oceanic space by the local population — space that would have otherwise been available for fishing and other activities. On the other hand, it would create long-term employment in the region and generate economic benefits for the city, state/ province, and the country. It would require the development of support facilities such as power and communication lines and water and waste management facilities. It may also promote long-term industrialisation in the city. Clearly, there are many environmental, social, and economic factors that will come into play. This makes it critical to take a comprehensive science- and information-based approach that accounts for the needs and concerns of all stakeholders from the very start of the planning phase all the way to the implementation phase.

The other critical element of an effective marine spatial plan relates to its flexibility and adaptability. This is an often-overlooked aspect in spatial management plans, which end up getting *stuck* as the socio-economic or environmental conditions change, or when the original plan is unsuccessful in achieving its intended targets. This is particularly relevant for mega-infrastructure projects that involve heavy capital investment and have a lifetime of several decades. The element of adaptability is critical in the contemporary context because of the uncertainty associated with the rate of future climate change and the determination of how exactly and when it would impact the coastal and marine environment. For instance, projections for sea-level rise made by the UN IPCC range from under 0.5 metre to over 1 metre by the end of the century, depending on how much we are able to limit future global greenhouse gas emissions.[7] Recent scientific studies also show that there are several 'tipping points' in the cryosphere (specifically in the context of how the melting of Greenland and Antarctic ice sheets could accelerate due to positive feedback loops) which, when crossed, would commit us to multiple metres of global sea-level rise over a relatively short period of time. There is large uncertainty in where exactly these tipping points lie in terms of the rate and magnitude of the rise in global temperature. Needless to say, every fraction of a metre of additional sea-level rise would have significant impacts of how we manage our coastal and marine space (and how much of it is left to manage!). Consequently, the MSP process must incorporate mechanisms

[7] IPCC, The Sixth Assessment Report, Climate Change 2021: the Physical Science Basis, 2022, https://www.ipcc.ch/assessment-report/ar6/

to revise and adapt the plan to changing conditions and/ or if the original plan does not lead to the intended outcomes.

Incorporating MSP in India's Coastal and Marine Development Projects

In recent years, India has begun to truly acknowledge and take greater responsibility for more sustainable utilisation of its marine living and non-living resources. It has taken several concrete steps to initiate the transition to a sustainable Blue Economy model away from the conventional, exploitative Brown Economy model. Some of the key active endeavours and policies in the maritime sector include the Shipbuilding Financial Assistance Policy 2015 (to promote domestic shipbuilding), Maritime India Vision 2030 (under the Ministry of Ports, Shipping and Waterways), the *Pradhan Mantri Matsya Sampada Yojana* 2020 (for the fisheries sector), and *Sagar Manthan*: the Mercantile Maritime Domain Awareness Centre, to name a few.

Let us take a closer look at one of these initiatives – the Maritime India Vision 2030.[8] Under the aegis of the Ministry of Ports, Shipping, and Waterways, the MIV-2030 aims to expand India's maritime trade sector and significantly enhance the cargo handling capacity of Indian ports. Amongst its priorities are the creation of world-class greenfield 'smart' ports, modernising existing ports, enhancing hinterland connectivity, and promoting public-private partnerships. Even at a quick glance, we can already identify some key challenges that would have to be overcome to successfully implement this ambitious plan, which would have widespread, long-term repercussions. Examples would include the careful selection of the sites for the new ports in order to minimise adverse impacts on coastal ecosystems and biodiversity, the creation of comprehensive spatial management plans for the expansion of hinterland road and railway networks, extensive stakeholder consultations with port operators, private industries, financial institutions, and local communities, and building resilience against the current and projected impacts of climate change. Marine Spatial Planning is precisely the systematic, future-oriented planning process that can and must be utilised to ensure that the projects under this MIV-2030 are carried out in a manner that ensures long-term sustainability and resilience.

Similarly, the *Pradhan Mantri Matsya Sampada Yojana* (PMMSY)[9] attempts to bring about a *"Blue Revolution"* through the sustainable and responsible development of the fisheries sector in India. Some of the objectives of the scheme include enhancing fish production through expansion, intensification, diversification, and productive utilisation of land and water, modernising and strengthening of the value chain, and ensuring social, physical, and economic security for fishers and fish farmers. A key objective is also to promote harnessing of fisheries potential in a sustainable, responsible, inclusive, and equitable manner. This objective focusses primarily on avoiding

[8] Ministry of Ports, Shipping and Waterways of the Government of India, "Maritime India Vision 2030", (New Delhi: MoPSW, 2021).
[9] Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying of the Government of India, "Pradhan Mantri Matsya Sampada Yojana", (New Delhi: MoFAHD, 2020)

overexploitation and maintaining a balance between large fishing companies and artisanal fisherfolk. It does not, however, address the impacts of ocean warming and ecosystem degradation on the distribution of fish populations in the ocean, which would directly affect fishing activities. The scheme does, however, acknowledge the interconnections with other schemes and stakeholders and the need to ensure *'convergence'* with them. It is estimated that the scheme would generate an unprecedented amount of around Rs 20,050 crores in investment over a five-year period. Marine Spatial Planning could, once again, be utilised here to ensure effective management and allocation of the resources, stakeholder participation, and expansion of the supply chain infrastructure to maximise the socio-economic benefits in a sustainable and future-resilient manner.

The foregoing examples constitute just a representative sample of the many that repeatedly illustrate potential opportunities for utilising Marine Spatial Planning as a tool to realise India's ambition of becoming a major Blue Economy in the world. In 2021, the Government of India put out the draft *"National Policy for India's Blue Economy"*, prepared by the Economic Advisory Council to the Prime Minister after deliberations with relevant ministries, think tanks, and experts. While the policy is still in its draft stage, it does highlight the need to *"adopt the Coastal Marine Spatial Planning (CMSP) approach of the Intergovernmental Oceanographic Commission (IOC) – UNESCO (2009) guidelines"* and calls for establishing a national level authority to define the scope and nature of CMSP. The draft policy has also proposed the creation of a National Blue Economy Council to bring together all relevant stakeholders from ministries, think tanks, non-governmental organisations, etc. Indeed, if implemented, these measures would greatly accelerate the transition of India towards becoming a sustainable, resilient, and inclusive Blue Economy.

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