

The Policy Frameworks and Legal Challenges in the EEZ Attached Transboundary Areas in Marine Protected Areas of India

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Abstract - Although the Anthropocene is under question, it is generally acknowledged that humans profoundly impact the climate and ecosystems.¹ 90% of the surplus heat produced by growing greenhouse gas concentrations is absorbed by ocean basins, which raises ocean temperatures and causes acidification. Marine biodiversity and the inhabitants of the coastal region and the hinterland are directly and urgently threatened by the overuse of ocean resources and marine pollution.²

"Marine Protected Areas" (MPAs) are used to safeguard and maintain marine ecosystems because of their tremendous significance. Scientists believe that to maintain long-term sustainability, and we must protect an area comparable to 30% of the world's oceans, comprising only 6.4% of MPAs. However, the efficiency of the conservation and monitoring mechanisms used in MPAs is under question.³

The paper offers a thorough examination of MPAs, emphasizing the Indian viewpoint. It summarises the MPA network in India, identifies current issues, and provides policy suggestions for effective MPA formation, administration, and monitoring frameworks that guarantee the long-term preservation and protection of maritime ecosystems.

Indian authorities should ensure the preservation, sustainable use and protection of oceanic biological variability inside its EEZ. In addition to the necessity for more regional collaboration regarding the security of shared regions and to explore the policy and implementation problems associated with creating MPAs in the EEZ.

Keywords: transboundary conservation, biodiversity, Aichi targets, marine protected area

¹ "Encyclopedic Entry: Anthropocene," *National Geographic Website*, <https://www.nationalgeographic.org/encyclopedia/anthropocene/>

² Pushp Bajaj, "On Oceans and Climate Change," *National Maritime Foundation Website*, 23 July 2020, <https://maritimeindia.org/on-oceans-and-climate-change/>

³ "The Marine Protection Atlas," *Marine Conservation Institute*, <https://mpatlas.org/>

Introduction

1.1 Evolution of the Global MPA Discourse

The 1962 World Conference on National Park was the first to create PAs⁴ as part of worldwide conservation efforts.⁵ As a result, the 1993 CBD⁶ and MPAs⁷ were created.⁸ A protected area is what the CBD's Article 2 specifies:⁹

"a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives."

The maritime environment was taken into consideration when the CBD Conference of Parties interpreted the broad meaning as:

"[an] area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and coastal biodiversity enjoys a higher level of protection than its surroundings."

The definition of protected areas in 2008, was updated, which has since become the standard for all governments globally¹⁰

"A protected area is a clearly defined geographical space, recognized and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."

In its published Guidelines, 2013, for Protected Area Management Categories,¹¹ the IUCN classified PAs into six categories based on various laws, with the level of restriction progressively lowering from Category I to Category VI.¹²

According to independent evaluations, the IUCN categorization MPAs are insufficient, which results in poor monitoring and management. A more uniform categorization that defines each zone inside an MPA and evaluates its influence on biodiversity has recently been proposed.¹³

⁴ Protected Areas

⁵ IUCN Protected Areas Programme, 50 Years of Working for Protected Areas: A Brief History of IUCN World Commission on Protected Areas (Gland, Switzerland: IUCN,

2010) https://www.iucn.org/sites/dev/files/import/downloads/history_wcpa_15july_web_version_1.pdf

⁶ Convention on Biological Diversity

⁷ marine protected areas

⁸ Maynard E. Silva et al, A Bibliographic Listing of Coastal and Marine Protected Areas: A Global Survey (Falmouth, Massachusetts: Woods Hole Oceanographic Institution, 1986). <https://doi.org/10.1575/1912/7543>

⁹ Convention on Biological Diversity, Rio De Janeiro, 29 December 1993, <https://www.cbd.int/convention/text/>

¹⁰ Youna Lyons et al, "Moving from MPAs To Area-Based Management Measures in the South China Sea" *The International Journal of Maritime Law* 35, No.2 (October 2019): 201-231, <https://doi.org/10.1163/15718085-23521101>.

¹¹ Nigel Dudley et al, "Guidelines for Applying Protected Area Management Categories including IUCN WCPA Best Practice Guidance on Recognising Protected Areas and Assigning Management Categories and Governance Types," A Monograph by the *International Union for Conservation of Nature*(2013), <https://portals.iucn.org/library/node/30018>.

¹² *Ibid*

¹³ Bárbara Horta e Costa et al, "A Regulation-Based Classification System for Marine Protected Areas (MPAs)," *Marine Policy* 72, (October 2016): 192-198, <https://doi.org/10.1016/j.marpol.2016.06.021>.

1.2 Biodiversity Targets: Then and Now

Area-based conservation is a commitment made in Aichi Biodiversity Target 11 as of 2020; *at least 17 per cent of terrestrial and inland water and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures and integrated into the more expansive landscapes and seascapes."*

SDG 14.5 was endorsed by the UN, which urged states to create PA's networks and apply area-based conservancy techniques as:

"a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-ecosocioeconomic locally relevant values."

Since 2000, there has been a rise in MPAs, and by 2020, it is anticipated that the 10% objective will have been met.¹⁴

As per the World Database on PAs, only 7.65% of the world's waters were reportedly protected.¹⁵ The database shows India's PA coverage is inadequate, yet "Aichi Target 11" has been partly achieved. A coalition of 50 nations called the HAC seeks to preserve 30 per cent of the earth's water and 30 per cent of its lands.¹⁶

2.1 The National Stage: Ecosystem Conservation Perspective of India

Legal Framework

The following categories are required under the legal framework in India controlling Protected Areas via the relevant legislation:

- Forests designated as reserved or established under the IF Act¹⁷ of 1927.
- Areas protected by the WP Act¹⁸ of 1972 that fall into one of the four categories: conservation reserves, community reserves, wildlife sanctuaries, and national parks.
- Sites designated as biological diversity Heritage under the BD Act¹⁹ of 2002.
- Under the 2017 Wetland (Conservation and Management) Rules, wetlands were designated and notified.²⁰

¹⁴ Secretariat of the Convention on Biological Diversity, *Global Biodiversity Outlook 5 – Summary for Policy Makers* (Montreal, Quebec: CBD, 2020), <https://www.cbd.int/gbo/gbo5/publication/gbo-5-spm-en.pdf>

¹⁵ "Discover the World's Protected Areas," Protected Planet, Accessed on 11 May 2021, <https://www.protectedplanet.net/en>

¹⁶ High Ambition Coalition for Nature and People, "50 Countries Announce Bold Commitment to Protect at Least 30% of the World's Land and Ocean by 2030," *Campaign For Nature*, 11 January 2021, <https://www.campaignfornature.org/50-countries-announce-bold-commitment-to-protect-at-least-30-of-the-worlds-land-and-ocean-by-2030>

¹⁷ Indian Forest Act, 1927

¹⁸ Wildlife Protection Act, 1972

¹⁹ Biological Diversity Act, 2002

²⁰ Ramya Rajagopalan, *Marine Protected Areas in India* (Chennai: International Collective in Support of Fishworkers, 2008)

Given that it does not specifically separate MPAs from other Pas, India's primary reference law for marine protected areas is the WP Act²¹ of 1972. The majority of MPAs were created as national parks and wildlife refuges.

The Wildlife Act was amended in 2003 to include "Conservation Reserves" and "Community Reserves" to safeguard both land and seascapes.²² Currently, India's mainland has 25 MPAs, while its islands have 130 MPAs.²³ "Biosphere Reserves" have also been established by the central government.²⁴ The Wildlife Institute of India has suggested upgrading 106 locations to "Sanctuaries" or "Conservation Reserves" after identifying them as "Important Coastal and Marine Biodiversity Areas" (ICMBAs).²⁵

3.1 Biodiversity Targets: Then and Now

To fulfil its obligations under the Aichi goals, the GoI created twelve NBTs as

"Ecologically representative areas on land and in inland waters, as well as coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, based on protected area designation and management and other area-based conservation measures and are integrated into the wider landscapes and seascapes, covering over 20 % of the geographic area of the country, by 2020."

According to the nation's 2018 review of the CBD, the 20% objective for Protected Area and Other ABCM has mostly been met. The aim, however, does not differentiate between PA coverage that is particular to a specific topography and mandates 20% coverage throughout all "geographic areas" of the nation.²⁶

By 2030, modifications to the NBTs must provide enough PA coverage and make a distinction between obligations made on land and at sea.

3.2 Future Outlook

The "National Wildlife Action Plan" (NWAP) offers an entire conservation plan,²⁷ but since no MPAs exist in the EEZ, it cannot provide corrective actions.²⁸

3.3 Management and Effectiveness

The "Management Effectiveness Evaluation" (MEE) methodology, which may enhance the performance of protected areas by reviewing management practises, altering resource distribution, and boosting transparency, was created in 1992 at the World Parks Congress in Venezuela.²⁹

²¹ Wildlife Protection Act

²² Neeraj Khera et al, *Training Resource Material on Coastal and Marine Biodiversity and Protected Area Management for field-level MPA managers* (New Delhi: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) India and the Wildlife Institute of India, 2015)

²³ K Sivakumar et al, *Coastal and Marine Protected Areas in India: Challenges and Way Forward* (Dehradun: Wildlife Institute of India, 2013)

²⁴ Rajagopalan, *Supra Note 14*

²⁵ Sivakumar et al, *Supra Note 16*

²⁶ *India's Sixth National Report to the Convention on Biological Diversity* (2018), <https://chm.cbd.int/database/record?documentID=241351>

²⁷ *National Wildlife Action Plan (2017-2031)*, Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India

²⁸ *Ibid*

²⁹ Fiona Leverington et al, *Evaluating Effectiveness: A Framework for Assessing Management Effectiveness of Protected Areas* (Gatton, Australis: IUCN WCPA, 2008)

MEE is broken down into six steps for assessing protected areas (MEE) by the IUCN's WCPA Framework, a best-practice manual that has received worldwide support.³⁰ Sixty per cent of Wildlife Sanctuaries and National Parks are to be assessed by Member States.

India has institutionalized the MEE process, and the most recent assessment for 146 National Parks and Wildlife Sanctuaries used a "Rapid Expert-Based Scorecard" technique to gauge overall effectiveness. Actionable points and management's strong and weak areas were emphasized to develop an MPA-specific MEE that has been made public by the WII and MoEFCC and is anticipated shortly.³¹ The administration of Indian MPAs still faces several challenges, including risks to water quality, a staffing shortage, and a lack of centralized well-documented data.³² The MWS³³ also has inefficient management, pollution, and the inability to resolve disputes and provide local concessions.³⁴

For a more comprehensive approach to MPA management, the interdepartmental collaboration between the Department of Tourism, Coast Guard and Fisheries Department is required.³⁵

³⁰ Dhananjai Mohan et al, *Management Effectiveness Evaluation (MEE) of National Parks and Wildlife Sanctuaries in India. Process and Outcomes, 2018-19 (Volume IV)* (Dehradun: Wildlife Institute of India, 2020)

³¹ Ministry of Environment, Forests and Climate Change, Government of India, "Best Managed Protected Areas in the Country to be Ranked and Awarded Every Year: Shri Prakash Javadekar. Environment Minister Releases Management Effectiveness Evaluation (MEE) of 146 National Parks and Wildlife Sanctuaries. Framework for Management Effectiveness Evaluation of Indian Zoos (MEE-Zoo) and of Marine Protected Areas also Launched," *PIB Delhi*, 11 January 2021. <https://pib.gov.in/PressReleasePage.aspx?PRID=1687688>

³² Mohan et al, *Supra* Note 23

³³ Marine Wildlife Sanctuary

³⁴ Shimul Bijoor et al, *Management of Marine Protected Areas in the Andaman Islands: Two case studies* (Bangalore: Dakshin Foundation, 2018)

³⁵ *Ibid*

4.1 DECODING MARINE PROTECTED AREAS

The UNCLOS³⁶ 1982 entitles island States or coastal to fluctuating degrees of jurisdiction and access over their offshore seas. These include the Continental Shelf,³⁷ EEZ,³⁸ Contiguous Zone and Territorial Sea. The responsibility for the sustainable utilization, conservation and protection of these resources falls on Indian authorities. MPA coverage is needed to protect regions in the EEZ that remain largely unprotected.

4.2 Biological Diversity in Indian Waters

Five MPA criteria, including EBSA designation, were accepted at COP 9.³⁹

IMMAs in the Indian continental shelf represent the region's diverse subpopulations of cetaceans and are of considerable ecological significance. Micro-biodiversity is present in other areas, such as the Laccadive Sea.⁴⁰

The OMZ and Olive Ridley Turtle Corridor are two EBSAs intersecting with India's EEZ and are both significantly environmentally responsible.

Threats from climate change, overfishing by humans, and marine pollution are present in the Indian EEZ and are changing the dissemination and specific numbers of aquatic ecosystem species. There is a pressing need to create procedures and systems to safeguard and preserve these sites.⁴¹

4.3 Marine Conservation in the EEZ

- Legal Frameworks

The Government of India is authorized to set aside any region inside the EEZ or on the continental shelf for exploratory, protective and exploitation operations under the Maritime Zones Act, 1976.⁴² The state government of Maharashtra has suggested designating the flooded plateau of Angria Bank as a "designated area." This region is significant to the Indian Navy in terms of anti-submarine and submarine drills because of the variety of its coral reefs, the habitats of marine flora and other marine flora, including mammals.⁴³

According to the authors, amending the Wildlife Act and doing away with the "designated area" requirement would be the better choice for building MPAs in the EEZ.⁴⁴

- The Wildlife Act offers a pre-existing structure for creating, administrating, and overseeing MPAs.

³⁶ United Nations Convention on the Law of the Sea

³⁷ Legal Continental Shelf

³⁸ Exclusive Economic Zone

³⁹ Youna Lyons and Denise Cheong, "The International Legal Framework for the Protection and the Sustainable Use of Biodiversity" in Routledge Handbook of Biodiversity and the Law, eds Charles R McManus and Burton Ong, (Routledge, 2017).

⁴⁰ *Identifying Conservation Needs in India's Offshore Waters*, Greenpeace India Society, (Bangalore, 2014).

⁴¹ Pushp Bajaj and Akshay Honmane, "Climate Risks to India's Holistic Maritime Security- Part 3: Collapsing Ocean Biodiversity," *National Maritime Foundation Website*, 04 November 2020, <https://maritimeindia.org/climate-risks-to-indias-holistic-maritime-security-part-3-collapsing-ocean-biodiversity/>. Also see: Sarita Fernandes and Pushp Bajaj, "Implications for India of Noctiluca Scintillans in the Maritime Domain," *National Maritime Foundation Website*, 06 May 2021, <https://maritimeindia.org/implications-for-india-of-noctiluca-scintillans-in-the-maritime-domain/>

⁴² *Maritime Zones Act (1976)*, The Gazette of India, https://legislative.gov.in/sites/default/files/A1976-80_0.pdf

⁴³ Badri Chatterjee, "India inches towards first marine 'designated area' off Maharashtra coast," *Hindustan Times*, 29 November 2020, <https://www.hindustantimes.com/mumbai-news/india-inches-towards-first-marine-designated-area-off-maharashtra-coast/story-P8RPgVUfug8tqtLq9spl1I.html>

⁴⁴ *National Wildlife Action Plan (2017-2031)*, Ministry of Environment, Forest and Climate Change (MoEFCC), https://wii.gov.in/nwap_2017_31.

- However, a lack of systematic categorization adhering to advised criteria has compromised India's PA coverage in the IUCN's Protected Areas World Databases.
- Wildlife Act amendment to allow for MPA designation and management in EEZ.

5.1 Recommendations and the possible solutions

The NWAP (2017-2031) expanded accountability to the government and academic institutions and identified possible MPA locations in the EEZ. The project started in 2017 and is anticipated to last. Based on international best practices, this subsection offers a course of action recommendations.⁴⁵

- Since 2000, there has been an upsurge of LMPAs across the world. However, their efficacy has been questioned because of management challenges and high expenses.⁴⁶ Many scientists and environmentalists, however, think that the advantages exceed the drawbacks, such as significant "biomass spillover" to areas beyond the LMPA.⁴⁷
- India has started a pilot project to swap trawlers with—the 2,000 deep-sea boats in the Bay of Bengal.⁴⁸ India has an estimated standing stock of 3.81 million tonnes of pelagic fish in the EEZ.⁴⁹ It is crucial to create LMPAs to improve ecosystem services and fishery returns.⁵⁰
- Deep sea tuna longlining is vigorously sought inside the EEZ to maximize the potential of Indian fisheries. For large mobile species like tuna, turtles and sharks, research shows that creating a system of smaller MPAs alongside migratory lanes, sea paths, and breeding areas is preferable to the LMPA method.^{51 52} To secure socio-economical advantages, more collaboration and persistent efforts by the island and coastal States of the Indian Ocean are required to safeguard and preserve the shared marine biodiversity.⁵³ It is time to fully involve the Ministry of External Affairs (MEA) in regional marine conservation and food security.⁵⁴

5.2 Challenges and Opportunities in Transboundary Conservation

Transboundary conservation, also known as transboundary protected areas, conservation landscapes, and migration conservation areas, is the safeguarding and preservation of biologically vital areas and species beyond maritime borders.⁵⁵

⁴⁵ Ibid

⁴⁶ Bethan C O'Leary et al, "Addressing Criticisms of Large-Scale Marine Protected Areas", *BioScience* 68, No 5 (2018): 359–370. <https://doi.org/10.1093/biosci/biy021>

⁴⁷ Smyth and Hanich, *Supra* Note 8

⁴⁸ V N Sanjeevan, "Deep-Sea Fishery Resources of the Indian Exclusive Economic Zone," *Geography and You*, 27 September 2018, <https://geographyandyou.com/deep-sea-fishery-resources-of-the-indian-exclusive-economic-zone-eez/>

⁴⁹ Shaju Philip, "Explained: Why is Kerala Govt Caught in a net Over a Deep Sea Fishing Deal," *The Indian Express*, 24 February 2021, <https://indianexpress.com/article/explained/why-is-the-kerala-government-caught-in-a-net-over-a-deep-sea-fishing-deal-7199381/>

⁵⁰ Ajit Menon and Johny Stephen, "Is Deep Sea Fishing the Silver Bullet?" *The Hindu*, 11 October 2017, <https://www.thehindu.com/opinion/op-ed/is-deep-sea-fishing-the-silver-bullet/article19834939.ece>

⁵¹ Smyth and Hanich, *Supra* Note 8

⁵² E M Abdussamad et al, "Indian Tuna Fishery – Production Years During Yesteryears and Scope for the Future," *Indian Journal of Fisheries* 59, No 3 (2012): 1-13.

⁵³ Katy Askew, "Yellowfin Tuna 'heading for collapse' by 2026: A 20% Reduction in Catch Would Turn the Tide," *FoodNavigator.com*, 18 March 2021, <https://www.foodnavigator.com/Article/2021/03/18/Yellowfin-tuna-heading-for-collapse-by-2026-A-20-reduction-in-catch-would-turn-the-tide>.

⁵⁴ "Four Tuna Longliner Vessels Expected Soon," *The Hindu*, 13 May 2019, <https://www.thehindu.com/news/national/tamil-nadu/four-tuna-longliner-vessels-expected-soon-first-batch-built-by-the-cochin-shipyard-limited-was-released-in-february/article27111137.ece>

⁵⁵ Maja Vasilijevic et al, *Transboundary Conservation: a Systematic and Integrated Approach* (Gland: IUCN, 2015) <https://doi.org/10.2305/IUCN.CH.2015.PAG.23.en>

Global recognition of the need for transboundary conservation for marine ecosystems, particularly in light of climate change, is growing. The "Pelagos Sanctuary for Cetaceans in the Mediterranean", "Wadden Sea MPA Network", "Ombai Strait Transboundary Corridor", and "Rese Sea Marine Peace Park" are a few examples.

A transboundary conservation model is chosen based on the requirements, priorities, and political and socio-economic of the protected area and the participating nations⁵⁶

The IMBL India shares with Pakistan, the Maldives, Sri Lanka, Bangladesh, and Myanmar and lacks any kind of transboundary marine protection. Beyond the Territorial Sea, a legislative framework for MPA designation is being developed. Creating across-boundary MPAs with Sri Lanka and Bangladesh must be examined.⁵⁷

5.3 Potential for Transboundary Conservation with Bangladesh

The Sundarbans, home to mangroves, fish, crustaceans, crabs, prawns and IMMA,⁵⁸ are where India and Bangladesh have their international border.⁵⁹ Bangladesh is home to 185 crustacean species, 50 crab species, 50 crab species, 475 bony fish, and 50 cartilaginous species.⁶⁰ To track fish populations between the two nations, further analyses are required.⁶¹

Bangladesh has developed many coastal and offshore MPAs. However, upstream sewage flows, overexploitation, and IUU fishing endanger conservation efforts.⁶² To rebuild fish populations, Hilsa sanctuaries have a 65-day prohibition on fishing. However, some fishermen disregard it and use illegal gear, which causes social injustice and insufficient compensation.⁶³

The IUCN supports collaboration to conduct evaluations and create cooperative MPA networks because transboundary conservation between India and Bangladesh⁶⁴ may keep replenishing fish supplies and preserving biodiversity.⁶⁵ Successful shared MPAs need both top-down and effective community-level management techniques.⁶⁶

5.4 Potential for Transboundary Conservation with Sri Lanka

With 17 species of mangroves, 130 types of corals, 79 species of crustaceans, 147 species of seaweed, 108 species of sponges, 1182 species of fish and 260 species of molluscs, the IMBL with Sri Lanka is renowned for its biodiversity.⁶⁷

⁵⁶ Ibid Also see: Christopher Costello and Renato Molina, "Transboundary Marine Protected Areas," *Resource and Energy Economics* 65 (August 2021), <https://doi.org/10.1016/j.reseneeco.2021.101239>

⁵⁷ The Bay of Bengal Large Marine Ecosystem Project, <https://www.boblme.org/>.

⁵⁸ Subrata Sarker et al, "Zoning of Marine Protected Areas for Biodiversity Conservation in Bangladesh," *Ocean and Coastal Management* 173, (May 2019):114-122, <https://doi.org/10.1016/j.ocemoaman.2019.03.002>.

⁵⁹ "Coastal Northern Bay of Bengal IMMA," Marine Mammal Protected Areas Task Force, <https://www.marinemammalhabitat.org/portfolio-item/coastal-northern-bay-bengal/>.

⁶⁰ Joydeep Gupta, "Eight Countries Come Together to Protect Bay of Bengal," *Down to Earth*, 4 July 2018, <https://www.downtoearth.org.in/news/environment/eight-countries-come-together-to-protect-bay-of-bengal-61018>

⁶¹ Mohammad Arju, "Lines on Water Cannot Save Bay of Bengal Fisheries," *The Third Pole*, 15 May 2020, <https://www.thethirdpole.net/en/regional-cooperation/going-beyond-bay-of-bengal/>

⁶² Ibid

⁶³ Ibid

⁶⁴ *Framework for the Establishment and Management of Marine Protected Areas in Bangladesh*, (Dhaka: IUCN, 2014), <https://www.boblme.org/documentRepository/BOBLME-2015-Book-02.pdf>

⁶⁵ Sarker et al, *Supra* Note 21

⁶⁶ M A Aathichoodi, "Conservation and Sustainable Use of Gulf of Mannar Biosphere Reserve," *International Journal of Science and Research* 8, No 12 (December 2019), <https://www.ijsr.net/archive/v8i12/ART20203564.pdf> Also see: Ramya Rajagopalan, *Marine Protected Areas in India* (Chennai: International Collective in Support of Fishworkers, 2008)

The "Gulf of Mannar Marine National Park" in India, the "Gulf of Mannar Biosphere Reserve" in Sri Lanka, and coastal MPAs such as the "Vankalai Sanctuary" and the "Adam's Bridge Marine National Park" are used to carry out conservation.

IUU fishing and the contentious Katchatheevu Island have posed problems for maritime administration in the Palk Bay and Gulf of Mannar.⁶⁷

The problem of illegal fishing has been addressed bilaterally between India and Sri Lanka. However, Sri Lanka has been undecided about releasing motorized boats out of fear of damage.⁶⁸

There are plans to swap mechanized trawlers with deep-sea fishing boats in Palk Bay,⁶⁹ but this will take time and need capacity-building and training.⁷⁰ Despite the infrequent inclusion of local populations in decision-making,⁷¹ some projects have tried to include livelihood development initiatives.⁷²

The best long-term solution to the fishing issue is joint management and governance among the two regional nations.⁷³ The "Gulf of Mannar Biosphere Reserve" does not provide appropriate protection, and the present MPAs off each shoreline provide a divided move to preservation.⁷⁴ A transboundary MPA should be established in these seas, and the fishing populations on the two sides should be unified to develop monitoring systems and community-level management. However, there is still a lack of confidence between local fishermen and the government. Therefore, educating the neighbourhood residents more about the advantages of MPAs is crucial.⁷⁵

Although there has been improvement in the conservation of marine ecosystems and biodiversity, more effort is still required to reach the target of preserving 30% of the world's oceans.

⁶⁷ K K Joshi et al, "Checklist of Fish of the Gulf of Mannar Ecosystem – Tamil Nadu – India," *Journal of the Marine Biological Association of India* 58, No 1 (July 2016), 34-54.

⁶⁸ R S Vasan, "Illegal, Unreported and Unregulated (IUU) Fishing in Palk Bay," *National Maritime Foundation Website*, 20 February 2017, <https://maritimeindia.org/illegal-unreported-and-unregulatediuyu-fishing-in-palk-bay-issues-and-challenges/>

⁶⁹ T Ramakrishnan, "Deep Sea Fishing Scheme Makes Slow Progress," *The Hindu*, 19 December 2020, <https://www.thehindu.com/news/national/tamil-nadu/deep-sea-fishing-scheme-makes-slow-progress/article33369040.ece>

⁷⁰ Vasan, *Supra* Note 32

⁷¹ Rahul Muralidharan, "Open Letter: Why is Tamil Nadu neglecting Its Artisanal Fishers," *The Wire*, 30 July 2017, <https://thewire.in/environment/artisanal-fishers-tamil-nadu-sri-lanka-trawling>

⁷² Rahul Muralidharan and Nitin D Rai, "Violent Maritime Spaces: Conservation and Security in Gulf of Mannar Marine National Park, India," *Political Geography* 80, (June 2020): 102160, <https://doi.org/10.1016/j.polgeo.2020.102160>

⁷³ S Vincent, "Palk Bay Fishing Problem Requires Indo-Sri Lankan Joint-Governance," *Maritime Affairs* 16, No 2 (Winter 2020), 71-88.

⁷⁴ Muralidharan and Rai, *Supra* Note 36

⁷⁵ "Project LK4," *Dugong and Seagrass Conservation*

Project, <https://www.dugongconservation.org/project/establishing-dugong-seagrass-conservation-areas-palk-bay-gulf-mannar-lk4/>