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**P Sahadevan**

Kerala State Co-operative  
Federation for Fisheries  
Development Ltd (Matsafed)  
Kamaleswaram, Manacaud S.O,  
Thiruvananthapuram, Kerala,  
India

## Regulatory vacuum in the management of fisheries in the exclusive economic zone of India: Challenges and the way forward

**P Sahadevan**

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### Abstract

The management of fisheries in India's Exclusive Economic Zone (EEZ) faces significant challenges due to a fragmented and outdated regulatory framework. While India has established strong governance over its territorial waters up to 12 nautical miles, the legal mechanisms governing fisheries beyond this limit remain inadequate. The absence of a dedicated national law for EEZ fisheries management has resulted in weak monitoring, control, and surveillance (MCS) measures, making India's EEZ highly vulnerable to illegal, unreported, and unregulated (IUU) fishing by both domestic and foreign vessels. This regulatory vacuum has also contributed to the overexploitation of fish stocks, degradation of marine habitats, and growing conflicts between different fishing sectors, including small-scale fishers, deep-sea fishing operators, and foreign fleets.

The lack of a comprehensive legal framework also hinders India's ability to effectively enforce international commitments, including obligations under the United Nations Convention on the Law of the Sea (UNCLOS) and the Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries. Although various national legislations address aspects of fisheries governance, they fail to provide a cohesive mechanism for sustainable resource management in the EEZ. This has led to a situation where enforcement remains weak, scientific stock assessments are infrequent, and regulatory overlaps create ambiguities in jurisdiction. This paper critically examines these deficiencies and explores potential solutions to strengthen EEZ fisheries governance in India.

**Keywords:** Exclusive economic zone, fisheries governance, fisheries management, fishing regulation, sustainable fisheries

### 1. Introduction

India's Exclusive Economic Zone (EEZ), covering approximately 2.02 million square kilometres, is a critical resource for the country's marine fisheries sector, providing livelihoods to millions and contributing significantly to national food security and export earnings (Srinath *et al.*, 2005) <sup>[10]</sup>. However, the governance of fisheries within this vast maritime zone remains inadequate due to the absence of a comprehensive legal framework. While fisheries management within territorial waters (up to 12 nautical miles) falls under state jurisdiction, the EEZ is primarily governed by Government of India, creating jurisdictional ambiguities and enforcement challenges (Sathyapalan & George, 2021) <sup>[5]</sup>.

A key challenge in managing fisheries within India's Exclusive Economic Zone (EEZ) is the prevalence of illegal, unreported, and unregulated (IUU) fishing, which is exacerbated by weak monitoring, control, and surveillance (MCS) mechanisms (Kumar *et al.*, 2018) <sup>[3]</sup>. Studies indicate that India's EEZ is increasingly exploited by foreign vessels, particularly those operating in the high seas, leading to resource depletion and economic losses for domestic fishing industries (Prמוד, 2010) <sup>[7]</sup>. Mathew (2003) <sup>[9]</sup> discusses policy inconsistencies in India's deep-sea fishing regulations, highlighting concerns about the participation of foreign vessels and its impact on small-scale fishers. However, the lack of a dedicated national law for EEZ fisheries governance has resulted in a fragmented regulatory framework. Multiple legislations, including the Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976, and the Deep-Sea Fishing Policy, 1991, address different aspects of fisheries management but fail to provide an integrated approach (Mathew, 2003) <sup>[9]</sup>.

**Corresponding Author:**

**P Sahadevan**

Kerala State Co-operative  
Federation for Fisheries  
Development Ltd (Matsafed)  
Kamaleswaram, Manacaud S.O,  
Thiruvananthapuram, Kerala,  
India

From an international perspective, India has ratified key agreements such as the United Nations Convention on the Law of the Sea (UNCLOS) and the FAO Code of Conduct for Responsible Fisheries, yet enforcement remains weak due to inadequate legal backing at the national level (Ghosh *et al.*, 2019) [4]. The absence of structured stock assessment mechanisms further hampers sustainability, as scientific data on fishery resources in the EEZ remains outdated and insufficient to guide policy decisions (Vivekanandan *et al.*, 2013) [11].

This paper critically examines the regulatory vacuum in India's EEZ fisheries management and its implications for sustainability, economic stability, and international compliance. A dedicated EEZ fisheries law is essential to strengthen MCS infrastructure, implement an ecosystem-based fisheries management (EBFM) approach, and enhance regional cooperation to combat IUU fishing. By addressing these gaps, India can ensure the long-term sustainability of its EEZ fisheries while aligning with global conservation norms and securing the livelihoods of its coastal communities.

## 2. Materials and Methods

This study employs a qualitative research approach to analyse the regulatory challenges in managing fisheries within India's Exclusive Economic Zone (EEZ) and to explore potential policy solutions. The methodology involves a systematic review of legal frameworks, policy documents, international agreements, and academic literature, supplemented by an analysis of secondary data sources.

### 2.1 Data Collection

This study relies on multiple sources of data to evaluate the regulatory framework governing fisheries in India's Exclusive Economic Zone (EEZ). A legislative and policy review examines key national laws, including the Maritime Zones of India Act, 1976; the Deep-Sea Fishing Policy, 1991; and the Indian Fisheries Act, 1897, to identify legal gaps affecting EEZ fisheries governance. Additionally, India's obligations under international agreements such as the United Nations Convention on the Law of the Sea (UNCLOS), the FAO Code of Conduct for Responsible Fisheries, and the Port State Measures Agreement (PSMA) are analysed to assess compliance with global fisheries governance norms.

Scientific and government reports from organizations such as the Food and Agriculture Organization (FAO), the Central Marine Fisheries Research Institute (CMFRI), and the Ministry of Fisheries, Animal Husbandry and Dairying provide insights into fish stock assessments, monitoring, control, and surveillance (MCS) mechanisms, as well as the prevalence of illegal, unreported, and unregulated (IUU) fishing. Furthermore, a systematic review of academic literature, including peer-reviewed journal articles and research papers, explores key aspects of EEZ fisheries governance, ecosystem-based fisheries management (EBFM), and regional fisheries cooperation.

### 2.2 Data Analysis

The study employs a legal and policy analysis to compare national fisheries laws with international best practices, identifying regulatory gaps and inconsistencies. A thematic analysis is conducted to highlight major challenges such as weak enforcement mechanisms, jurisdictional ambiguities, and the absence of a unified EEZ fisheries law.

## 2.3 Limitations

As this study primarily relies on secondary data sources and legal analysis, it provides a comprehensive understanding of regulatory challenges in India's EEZ. However, the absence of primary field data limits the assessment of real-time enforcement effectiveness and stakeholder perspectives. Future research incorporating stakeholder interviews and field observations could offer deeper insights into ground-level challenges in EEZ fisheries management.

By adopting this methodological framework, the study aims to present an evidence-based evaluation of regulatory gaps in EEZ fisheries governance and propose actionable policy reforms.

## 3. Results and Discussion

### 3.1. Challenges in the Management of EEZ Fisheries

Despite the significance of India's EEZ, there is no dedicated national law exclusively governing fisheries beyond territorial waters (Meenakumari *et al.*, 2018) [8]. The legal framework remains fragmented, with multiple legislations such as the *Territorial Waters, Continental Shelf, Exclusive Economic Zone and Other Maritime Zones Act, 1976*, addressing different aspects of fisheries management. While past policies, including the deep-sea fishing guidelines of 1991 (revised in 1997), attempted to regulate offshore fisheries, they are no longer in effect. The National Policy on Marine Fisheries (NPMF), 2017, now serves as the primary guiding document, but challenges remain in its implementation and enforcement. Governance complexities, overlapping jurisdictions, and enforcement gaps continue to hinder effective EEZ fisheries management. Additionally, the absence of a unified regulatory body has contributed to inefficiencies in policy execution and inter-agency coordination.

#### 3.1.1. Prevalence of IUU Fishing

IUU fishing is one of the most critical challenges in India's EEZ, leading to overexploitation of marine resources and economic losses (Kumar *et al.*, 2018) [3]. Foreign vessels, particularly those operating in the high seas, exploit regulatory loopholes to conduct unauthorized fishing operations (Pramod, 2010) [7]. Domestic fishers also engage in unreported fishing activities due to inadequate licensing and monitoring frameworks. Studies indicate that the lack of an effective MCS infrastructure has allowed IUU fishing to proliferate, with limited capacity to track, report, and deter violations (FAO, 2022) [14]. Furthermore, the absence of stringent penalties and legal deterrents for IUU fishing has emboldened violators, creating an environment where illicit fishing practices continue unchecked.

#### 3.1.2. Weak Monitoring, Control, and Surveillance (MCS)

India's MCS mechanisms remain underdeveloped, lacking technological advancements such as satellite-based vessel monitoring systems and electronic reporting tools (Sathyapalan & George, 2021) [5]. Countries with robust fisheries governance frameworks, such as Australia and the United States, have successfully implemented satellite tracking and electronic monitoring to curb IUU fishing (Grafton *et al.*, 2008) [12]. In contrast, India still relies on conventional patrol vessels and manual reporting, which are inefficient in covering its vast EEZ. The limited deployment of patrol vessels, coupled with resource constraints and bureaucratic inadequacies, hampers

enforcement efforts. Additionally, poor inter-agency coordination between the Indian Coast Guard, the Department of Fisheries, and other stakeholders further weakens MCS efforts, making it difficult to ensure compliance with regulations.

### 3.1.3. Lack of Scientific Stock

Assessments Scientific stock assessments are essential for sustainable fisheries management, yet India lacks comprehensive data on fishery resources within its EEZ (Vivekanandan *et al.*, 2013) <sup>[11]</sup>. Outdated and infrequent stock assessments hinder the development of evidence-based policies for resource conservation and allocation (Pauly & Zeller, 2016) <sup>[13]</sup>. Without accurate data, policymakers struggle to implement effective measures to prevent overfishing and ecosystem degradation. The absence of a centralized database for fisheries stock assessments further complicates efforts to monitor trends and establish sustainable catch limits. Investment in advanced research methodologies, such as acoustic surveys, satellite-based biomass estimation, and collaborative research initiatives, is necessary to address this critical gap.

### 3.1.4. Regional and International Compliance Issues

India has ratified key international agreements, including UNCLOS and the FAO Code of Conduct for Responsible Fisheries, yet its enforcement capacity remains inadequate (Ghosh *et al.*, 2019) <sup>[4]</sup>. Non-compliance with international conservation norms not only impacts India's global reputation but also restricts its access to international markets that impose stringent sustainability requirements (FAO, 2022) <sup>[14]</sup>. Additionally, the lack of active participation in regional fisheries management organizations (RFMOs) limits India's ability to collaborate on transboundary fisheries issues and benefit from shared resources. Strengthening legal frameworks to align with global best practices and enhancing diplomatic engagements with neighbouring countries are crucial steps toward improving regional fisheries governance and ensuring compliance with international obligations.

## 3.2. The Way Forward: Recommendations for Strengthening EEZ Fisheries Governance

### 3.2.1. Enactment of a Dedicated EEZ Fisheries Law

A national law specifically governing fisheries in the EEZ is crucial for addressing regulatory gaps and strengthening enforcement mechanisms (Meenakumari *et al.*, 2018) <sup>[8]</sup>. The new legislation should clearly define the rights and responsibilities of stakeholders, establish an independent regulatory authority for EEZ fisheries management, and integrate provisions for sustainable resource allocation. Additionally, it should align with international legal frameworks such as the United Nations Fish Stocks Agreement (UNFSA), the FAO Port State Measures Agreement (PSMA), and the Indian Ocean Tuna Commission (IOTC) resolutions to ensure compliance with global fisheries governance and conservation standards. It must provide a legal mandate for the adoption of modern Monitoring, Control, and Surveillance (MCS) techniques, including vessel tracking, satellite surveillance, and electronic logbooks. It must also specify stringent penalties for illegal, unreported, and unregulated (IUU) fishing, ensuring effective deterrence and develop a conflict resolution mechanism to address disputes among artisanal, small-scale, and industrial fishers operating within the EEZ.

### 3.2.2. Strengthening Monitoring, Control, and Surveillance (MCS) Infrastructure

Robust MCS systems are critical for enforcing fisheries regulations, curbing IUU fishing, and ensuring the sustainable use of marine resources (Grafton *et al.*, 2008) <sup>[12]</sup>. This can be achieved through the mandatory installation of Vessel Monitoring Systems and Automatic Identification Systems on all commercial and mechanized fishing vessels operating within the EEZ, thereby enabling real-time tracking and increased transparency. Enhancements in technology, such as AI-driven data analytics and satellite imagery, should be harnessed to detect unauthorized fishing activities proactively. The adoption of unmanned aerial vehicles and drones will expand surveillance capabilities, particularly in remote or high-risk areas where conventional patrolling proves challenging. Additionally, establishing a centralized command and control centre would significantly improve coordination among various enforcement agencies, including the Indian Coast Guard, the Ministry of Fisheries, and the Navy. Investing in capacity building and specialized training for enforcement personnel in advanced data analytics, vessel tracking, and maritime law enforcement is also paramount.

### 3.2.3. Adoption of an Ecosystem-Based Fisheries Management (EBFM) Approach

Shifting from a sector-based strategy to an Ecosystem-Based Fisheries Management approach is vital for balancing ecological, economic, and social objectives while ensuring the long-term sustainability of marine resources (Bavinck, 2005) <sup>[1]</sup>. This approach involves instituting a well-defined fisheries zoning system within India's EEZ that regulates fishing intensity based on ecosystem health, habitat sensitivity, and stock assessments. It also calls for the implementation of bycatch reduction strategies, such as selective fishing gear and temporal fishing closures, to minimize the unintended capture of non-target species. The expansion of Marine Protected Areas and no-take zones in ecologically critical regions will further safeguard vulnerable marine habitats, including breeding grounds and coral reefs. Recognizing the increasing impact of climate change, adaptive management strategies should incorporate real-time environmental monitoring, habitat restoration, and disaster preparedness measures. Furthermore, integrating traditional ecological knowledge from indigenous and local communities can enhance conservation efforts and promote more inclusive governance.

### 3.2.4. Enhancing Regional Cooperation

The transboundary nature of marine resources necessitates stronger regional cooperation to effectively combat IUU fishing and promote sustainable fisheries governance (Bose & Kanungo, 2020) <sup>[2]</sup>. India should actively pursue multilateral agreements with nations within the Indian Ocean Rim Association to facilitate joint enforcement operations, data-sharing initiatives, and harmonized fisheries policies. Enhancing participation in Regional Fisheries Management Organizations such as the Indian Ocean Tuna Commission (IOTC) and Southern Indian Ocean Fisheries Agreement (SIOFA) will allow India to play a more influential role in collective decision-making and responsible resource management. Furthermore, expanding bilateral cooperation with neighbouring countries like Sri Lanka, Bangladesh, Myanmar, and Indonesia is crucial for resolving conflicts over shared fish stocks, coordinating patrols, and establishing



mechanisms for the repatriation of apprehended fishers. Joint patrols and maritime security initiatives, particularly through collaboration between the Indian Coast Guard and regional counterparts, can improve surveillance and enforcement across international maritime boundaries.

### 3.2.5. Improving Scientific Stock Assessments

Reliable and comprehensive stock assessments underpin evidence-based policy decisions and are fundamental to sustainable fisheries management (Vivekanandan *et al.*, 2013)<sup>[11]</sup>. Achieving this requires an expansion of research infrastructure through increased government investment in fisheries research institutions and oceanographic studies, alongside technology-driven data collection initiatives. The deployment of fishery-independent surveys—utilizing acoustic survey technologies, underwater drones, and remotely operated vehicles—will enhance the accuracy of biomass estimates. Implementing mandatory electronic reporting systems for real-time catch data collection can help close existing data gaps, while the integration of climate impact variables into stock assessment models will enable the formulation of adaptive management strategies. Finally, fostering public-private partnerships in fisheries research can drive innovation, improve research capabilities, and facilitate the broader adoption of advanced stock assessment methodologies.

### 4. Conclusion

The regulatory vacuum in India's EEZ fisheries management poses significant challenges to sustainability, economic stability, and international compliance. The absence of a dedicated legal framework, weak MCS mechanisms, and outdated stock assessments have exacerbated the problem. Strengthening EEZ fisheries governance requires a multi-pronged approach integrating robust legal frameworks, advanced enforcement mechanisms, regional collaborations, and science-based management strategies. The enactment of a dedicated EEZ fisheries law, investments in MCS infrastructure, adoption of EBFM principles, enhanced regional cooperation, and improved scientific stock assessments are critical steps toward ensuring the sustainability, security, and economic viability of India's offshore fisheries. Through these initiatives, India can enhance its capacity to manage marine resources effectively, combat IUU fishing, and uphold its commitments to international fisheries governance.

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