

RESEARCH

Open Access



International legal arrangements for illegal, unreported, and unregulated fishing: legal mechanisms and challenges in Bangladesh

Md Syful Islam^{1*} and A. S. M. Mahmudul Hasan²

Abstract

Illegal, unreported, and unregulated (IUU) fishing is a significant global issue that threatens marine biodiversity, economic stability in coastal communities, and the international law of the sea and maritime law enforcement. This study analyzes the legal mechanisms and roles of international and regional arrangements in combating IUU fishing. It identifies enforcement challenges, resource limitations, and needs for capacity building as key gaps in the management of IUU fishing. This analysis focuses on a comprehensive identification of the current and enforceable laws within the international sphere. Furthermore, it specifically examines the legal framework of Bangladesh for IUU fishing and notes persistent enforcement and resource constraints. Challenges include enforcement gaps, inconsistencies in global coordination, and complexities in maritime jurisdiction. Bangladesh faces significant challenges with IUU fishing due to inadequate regulations, weak enforcement, and poor management. Foreign intrusions, unauthorized trawlers, and local violations exacerbate the depletion of crucial fish species and the loss of biodiversity. In the Bay of Bengal, the activities of Indian and Burmese fishermen within Bangladeshi territorial waters are leading to significant disturbances. These actions not only result in substantial economic losses for Bangladesh but also present major challenges due to their illegality. To effectively combat IUU fishing, Bangladesh requires robust legal frameworks, stringent monitoring, enhanced penalties, and international cooperation. Analysis and the identification of gaps in the case of Bangladesh can function as a pivotal guide for various stakeholders and may be employed as a critical model for academic and policy frameworks.

Keywords Illegal, unreported, and unregulated fishing, Legal mechanisms, United Nations Convention on the Law of the Sea, European union, Bay of Bengal, Bangladesh

1 Introduction

Illegal, unreported, and unregulated (IUU) fishing is a significant global challenge that threatens the sustainability of marine ecosystems, the economic stability of coastal communities, and the enforcement of international maritime laws (Chen et al., 2023). Gaps in enforcement, inconsistencies in global coordination, and

complexities of maritime jurisdictions compound this complex issue (Lestari et al., 2020). Thus, this study aims to provide a comprehensive analysis of international legal mechanisms designed to combat IUU fishing and focuses on their effectiveness in Bangladesh, a country that is profoundly affected by these activities.

Toward this end, the research seeks to address several key questions: How effective are current international legal mechanisms in combating IUU fishing? What are the enforcement challenges faced by Bangladesh in implementing its legal framework against IUU fishing? How do international agreements, such as the United Nations Convention on the Law of the Sea (UNCLOS),

*Correspondence:

Md Syful Islam
syful.au.bd@gmail.com

¹ Sea and Maritime Law, Ankara University, Ankara, Turkey

² International Relations, Karabük University, Karabük, Turkey



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

the United Nations Fish Stocks Agreement (UNFSA), and the Port State Measures Agreement (PSMA), influence Bangladesh's approach to combating IUU fishing? Additionally, the study examines the roles of regional collaboration, such as those under the Bay of Bengal Large Marine Ecosystem (BOBLME) project and the Indian Ocean Tuna Commission (IOTC), in enhancing Bangladesh's efforts. It identifies gaps in enforcement and resource allocation within the legal framework of Bangladesh and explores strategies for improving the national legal and institutional frameworks of the country to address IUU fishing more effectively. The research also investigates the socio-economic impacts of IUU fishing on coastal communities in Bangladesh and considers the potential of technological advancement and capacity building in enhancing the effectiveness of enforcement.

IUU fishing undermines marine biodiversity and jeopardizes the livelihood of millions who are dependent on the fisheries sector (Okafor-Yarwood, 2019). Despite international efforts and the existing legal frameworks, IUU fishing continues, which highlights the need for robust and effective legal measures (Lee, 2019). Chen and Liu (2023) recognized IUU fishing as a significant threat to the sustainability of global fisheries. They contended that IUU fishing poses a major challenge to the effective governance of fisheries by impairing the capacity of decision-makers to base policies on accurate data while jeopardizing the food security and economic well-being of fishing communities. In addition, Schofield (2023) astutely identified IUU fishing as a significant threat and underscored it as a key challenge in ocean governance. The author emphasized that, along with the substantial issues posed by climate change, numerous governance challenges have emerged in relation to the sustainable management of marine resources. These challenges include overfishing and its repercussions, such as IUU fishing, as well as the need to protect marine environments and biodiversity.

The current study first defines the complex nature of IUU fishing and highlights the various dimensions that constitute it a complex problem to tackle. It explores the definitions and scope of IUU fishing as recognized by key international organizations such as the United Nations Food and Agriculture Organization (FAO), the European Union (EU), the Association of Southeast Asian Nations (ASEAN), and Regional Fisheries Management Organizations (RFMOs). Each entity provides a unique perspective on the issue, which reflects the diversity of challenges faced across maritime regions.

In the Bangladeshi context, the country faces severe challenges with IUU fishing and is ranked 85th out of 152 countries on the IUU Fishing Risk Index (Macfadyen et al., 2019). Moreover, in the Bay of Bengal, Indian and

Burmese fishermen operating within Bangladeshi territorial waters are instigating considerable disruption. Their activities lead to significant economic losses for Bangladesh and pose severe challenges due to their illegal nature. Frequent foreign intrusion and numerous unauthorized trawlers in the Bay of Bengal exacerbate the crisis apart from local violations such as banned fishing nets. Organized illegal operations further strain marine ecosystems, which undermines the economic stability of coastal communities and contributes to environmental degradation. The existing laws, such as the Marine Fisheries Ordinance, are weakly enforced, which enables the persistence of illegal activities.

The research method involves a comprehensive literature review and analysis of key international agreements and national legislation related to IUU fishing and mainly focuses on qualitative data from primary and secondary sources to evaluate challenges to enforcement and the effectiveness of legal frameworks (Singh, 2015). Through this comprehensive exploration, the study aims to enhance the current understanding of the effectiveness of international and national legal frameworks in combating IUU fishing. It emphasizes the specific challenges faced by Bangladesh and offers recommendations for the enhancement of enforcement and regional cooperation to ensure the sustainable management of marine resources.

Various entities provide many definitions for IUU fishing. According to the FAO, it encompasses 'illegal fishing, involving violations of national and international laws; unreported fishing, which includes activities not reported or misreported to relevant authorities; and unregulated fishing, occurring where no conservation or management measures exist' (FAO, 2009). Conversely, the definition of the EU focuses on adherence to its Common Fisheries Policy, including 'breaches of EU quotas, failure to report catches, and activities in international waters or areas not covered by EU management' (Groenleer, 2016). In ASEAN, IUU fishing refers to 'unauthorized activities or those in violation of regional agreements, with unreported fishing lacking proper documentation or disclosure, and unregulated fishing occurring outside agreed conservation measures' (Ba, 2017). RFMOs define IUU fishing as activities that violate established conservation and management rules, encompassing fishing without permission, exceeding quotas, misreporting catches, and exploiting areas or species without RFMO regulations (Swan, 2020).

Emphasizing the concept, Agnew (2000) defines IUU fishing as fishing activities that are illegal (conducted in violation of national or international laws), unreported (or misreported to the relevant authorities), and unregulated (conducted in areas or for fish stocks for which

no applicable conservation and management measures exist). IUU fishing is any fishing activity that violates national or international laws, fails to report catches accurately, or operates outside of established conservation and management frameworks, as defined by Riskas et al. (2018). Moreover, Soyer et al. (2018) stress the role of removing profitability to discourage IUU fishing by proposing restrictions on liability insurance coverage for vessels suspected of involvement in these activities. Petrossian (2015) emphasizes the local situational factors that influence IUU fishing, which highlights the importance of effective fisheries management and patrol surveillance. Additionally, the legal framework, particularly UNCLOS, shapes the definitions and regulations of IUU fishing, which empowers states to enforce laws within their exclusive economic zones (EEZs) and necessitates international cooperation. Major legal instruments and agreements include the UNFSA, PSMA, International Plan of Action to Prevent, Deter and Eliminate IUU (IPOA-IUU), Cape Town Agreement (CTA), Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F), and the International Convention for the Prevention of Pollution from Ships (MARPOL). They focus on state rights and responsibilities in combating IUU fishing (Jaleel & Smith, 2023). Thus, the current study further examines the legal frameworks of Bangladesh for combating IUU fishing.

2 International legal mechanisms on IUU fishing

2.1 The United Nations Convention on the Law of the Sea (UNCLOS)

In the scholarly exploration of international marine arrangements that aim to combat IUU fishing, the UNCLOS emerges as a foundational legal framework (Oral, 2020). Although UNCLOS does not explicitly mention IUU fishing, its provisions lay the groundwork for international legal mechanisms that address such practices (Mayer Feitosa Ventura, 2015). A critical examination reveals several key components within UNCLOS that underpin efforts to mitigate IUU fishing. Article 19 of UNCLOS indirectly relates to IUU fishing when vessels illegally fish within the territorial waters of a state, which violates innocent passage conditions and links IUU fishing to territorial enforcement frameworks (Borg, 2013). Additionally, Articles 61 and 62 explicitly mandate states to manage and conserve marine resources in their EEZs, which provides a legal basis for addressing IUU fishing (Long et al., 2020). However, critics argue that these provisions are frequently very generic and lack the specificity required to effectively combat IUU fishing, particularly in complex maritime regions such as the Bay of Bengal (Chen et al., 2023).

In Part XII, which focuses on the protection and preservation of the marine environment, UNCLOS establishes a broad obligation for states to protect the marine environment, which indirectly supports efforts to combat IUU fishing. In particular, Article 191 obliges states to effectively manage the living resources within their EEZs to prevent overexploitation, which directly addresses the unregulated aspect of IUU fishing by advocating for sustainable fishing practices (Fajardo, 2022). However, this general obligation is criticized for its weak enforcement mechanisms, especially in developing countries with limited resources for monitoring and enforcement (Borot, 2021). Additionally, Article 192 underscores the necessity of international cooperation in conserving transboundary and highly migratory fish stocks, which is essential for combating IUU fishing activities beyond national jurisdictions. For instance, Article 194 obligates states to prevent, reduce, and control the pollution of the marine environment by employing the best practicable means at their disposal. While primarily targeting environmental preservation, this provision also contributes to the broad objective of sustainable management of marine resources, which is crucial for addressing IUU fishing (UNCLOS, 1982).

The enforcement provisions under Article 211 empower coastal states to regulate and control activities within their EEZs, including the prosecution of people conducting illegal fishing activities (Maskun et al., 2020). However, inadequate surveillance capabilities and logistical constraints frequently limit the effectiveness of these enforcement powers in developing countries (Febriyanto & Setiaji, 2022; Ogega, 2020). The convention also fortifies the role of flag states through Article 213, which permits flag states to enforce regulations against vessels operating on high seas, which enhances the accountability and responsibility of flag states in mitigating IUU fishing by vessels under their flag (Rosello, 2020). This concept has led a number of scholars to argue that without substantial international support and capacity building, UNCLOS alone cannot sufficiently address the challenges of IUU fishing in less developed coastal states (Tien, 2021).

Part XV of UNCLOS outlines the mechanisms for the peaceful settlement of disputes that emerge from the interpretation or application of the convention. This provision offers pathways to the International Tribunal for the Law of the Sea (ITLOS). Disputes related to IUU fishing can fall under the jurisdiction of ITLOS if framed as breaches of the UNCLOS obligations of a state, such as those related to coastal management within EEZs or flag state responsibilities (Ventura & Zanella, 2024). Additionally, disputes arising from fisheries agreements, which frequently include provisions for ITLOS

arbitration, may lead to adjudications of IUU fishing-related issues. Furthermore, the capacity of ITLOS to issue advisory opinions, as permitted under Article 138 of the Tribunal's Rules, enhances its role in cases of IUU fishing. However, scholars have criticized this reliance on state consent for ITLOS jurisdiction and the non-binding nature of its advisory opinions for limiting its effectiveness in resolving complex IUU fishing disputes (Rajesh Babu, 2015).

Moreover, Article 94 explicitly outlines the duties of flag states, which requires them to ensure that fishing vessels that operate under their registry comply with applicable conservation and management measures and to implement enforcement action against violations (Tai et al., 2020). Despite this article, flag state performance remains a significant weakness because many IUU vessels exploit these regulatory gaps, which leads to continued illegal activities on the high seas (Ford et al., 2022). Tanaka (2011) echoes this criticism and notes that the enforcement of flag state obligations is typically inconsistent as a number of states lack the political will or capacity to fully implement these duties.

2.2 United Nations Fish Stocks Agreement (UNFSA)

Through a detailed articulation of obligations and mechanisms, UNFSA significantly bolstered the legal framework initiated by UNCLOS by meticulously targeting the multifaceted challenges presented by IUU fishing (Telsetsky, 2023).

At the core of UNFSA, Article 5 delineates the general principles for the conservation and management of straddling and highly migratory fish stocks and advocates for sustainable fishing practices and international collaboration (UNFSA, 1995). However, critics argue that although these principles are comprehensive, the actual implementation at the national level frequently falls short, particularly in developing countries with limited resources and enforcement capabilities (Martinho, 2022). Further elaborating on this sustainable ethos, Article 6 introduces the precautionary approach, which compels states to proactively adopt conservation and management measures even in the face of scientific uncertainty (Auld et al., 2023). While this approach is essential for the management of the unregulated aspects of IUU fishing, a number of scholars criticize it for placing a disproportionate burden on developing states, which may lack the capacity to implement these measures effectively (Stefanus & Vervaele, 2021).

Article 7 advances the discourse by addressing the compatibility of conservation and management measures across jurisdictions and urges states to harmonize efforts within their EEZs and on the high seas (UNFSA, 1995). Nevertheless, scholars point out that the lack of

uniformity in enforcement practices and the varying levels of commitment among states are significant barriers to achieving this goal (Davis & Hanich, 2022; Riccardi, 2020). In tandem, Article 8 emphasizes the imperative of cooperation, directly among states or through sub-regional or RFMOs, to effectuate the conservation and management of specified fish stocks (Miller et al., 2016). However, the effectiveness of RFMOs has been questioned, particularly in regions where geopolitical tension hinders collaborative efforts (Sinan et al., 2021).

UNFSA places substantial responsibilities on flag states, as outlined in Articles 11 and 17, which require them to ensure that vessels under their flag comply with conservation and management measures. However, the continued prevalence of *flags of convenience*—in which vessels register under states with lax enforcement—undermines the effectiveness of these provisions, thus leading to ongoing IUU fishing activities (Rosello, 2017). These requirements are fundamental to promoting transparency and accountability in fishing operations.

The enforcement responsibilities highlighted in Article 19, which focus on the investigation and penalization of IUU fishing activities, are critical for deterring illegal practices. Nonetheless, the lack of enforcement capacity, particularly in developing countries, remains a major obstacle because these nations frequently struggle to conduct the necessary investigations and impose sanctions. Lastly, the emphasis of Article 23 on cooperation with non-parties to the Agreement reflects the need for inclusivity; however, the voluntary nature of compliance and the absence of a binding enforcement mechanism are frequently cited as limitations of the UNFSA (Rosello, 2021a; UNFSA, 1995).

Furthermore, Annex I of UNFSA, which outlines measures such as licensing, monitoring, control, and surveillance (MCS), has been instrumental in guiding states' efforts to combat IUU fishing. However, critics argue that without adequate financial and technical support, many states are unable to fully implement these measures, leading to gaps in enforcement and monitoring (Miller et al., 2014). In synthesizing these provisions, UNFSA emerges as a pivotal element of the international legal architecture against IUU fishing, establishing a comprehensive suite of obligations that enhance the collective ability to manage and conserve straddling fish stocks and highly migratory fish stocks effectively (Palma et al., 2010).

2.3 Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated Fishing (PSMA)

As the first binding international treaty that exclusively focuses on IUU fishing, the PSMA empowers states to take decisive actions against foreign fishing vessels that attempt to use their ports, which, thereby, significantly

reduces the avenues through which IUU-caught seafood can enter global markets (Huntington et al., 2015; Ortiz, 2016). This analytical discourse aims to elucidate the key provisions of the PSMA that are germane to the global marine legal arrangement and places a particular emphasis on the significance of these mechanisms for Bangladesh in its endeavors to effectively confront IUU fishing.

At the heart of the PSMA lies Article 5, which mandates that parties implement measures to prevent vessels engaged in or supporting IUU fishing from utilizing their ports. This provision is critical because it directly impedes the operations of vessels involved in IUU fishing by restricting access to essential port services (FAO, 2009). However, a number of critics argue that the effectiveness of these measures is heavily dependent on the capacity of port states to enforce them, which is frequently lacking in developing countries (He, 2022). Complementing this provision, Article 6 introduces a requirement for foreign vessels to provide prior notification prior to port entry and outlines their fishing activities and catch on board. This advance notification is instrumental in enabling port states to plan inspections and deny entry to vessels implicated in IUU fishing, which enhances the efficacy of port control (Sanchez, 2017). Nevertheless, this scenario also places a significant administrative burden on port states, particularly those with limited resources (Saraphaivanich et al., 2024).

Article 2 encapsulates the essence of the PSMA, in which it sets forth its primary objective: to prevent, deter, and eliminate IUU fishing by denying port access and associated services to vessels implicated in such activities (FAO, 2009). Despite this clear mandate, the practical implementation of these measures significantly varies across countries, which leads to uneven enforcement and presents opportunities for IUU vessels to exploit less stringent ports (Bethel et al., 2021). Article 7 further strengthens the PSMA framework by granting port states the authority to deny port use to vessels identified as engaging in IUU fishing.

Articles 9 and 10 of the FAO Agreement mandate port state actions and define inspector qualifications for addressing IUU fishing after vessel inspection, including potential detention and further investigation. Article 12 enhances these efforts by promoting international collaboration through information exchange among port states, flag states, and relevant organizations, which is crucial to preventing IUU-caught fish from entering global markets (FAO, 2009; Onoora, 2018). Critics point out that the success of these provisions is contingent on the availability of trained inspectors and the capacity to conduct thorough inspections, which are frequently limited to smaller or less developed port states (Sanchez, 2017). In summary, the PSMA represents a critical evolution in the

global initiative to prevent, deter, and eliminate IUU fishing by introducing stringent port state measures and fostering international cooperation.

2.4 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU)

Although it is not a binding treaty, the IPOA-IUU meticulously delineates a series of measures that states are encouraged to implement in an effort to enhance the global fight against IUU fishing through a collaborative approach (Kao, 2015). Key among these measures is the emphasis on flag state responsibility (Article 5), in which states are urged to ensure that vessels that fly their flag adhere to international and national fisheries regulations, which is a crucial step in mitigating IUU fishing activities (FAO, 2001).

Furthermore, the IPOA-IUU grants coastal states the authority to board and inspect vessels that are suspected of engaging in IUU activities (Article 6.2), which enhances the capacity to monitor and control fishing within their jurisdiction (Puspoayu & Setyowati, 2018). Equally significant are the port state measures outlined in Article 7.1.d, which empower states to deny port access to vessels implicated in IUU fishing, thereby limiting the ability of these vessels to offload their catch and access port services. Additionally, Article 10.1 underscores the importance of international cooperation in adopting market-related measures that are designed to prevent IUU-caught fish from entering global markets, which addresses the economic incentives that drive IUU fishing (FAO, 2001). However, critics argue that the voluntary nature of the IPOA limits its effectiveness because compliance is mainly dependent on the political will and capacity of individual states (Rosello, 2021b).

The plan also promotes market-related measures, such as the use of catch documentation schemes, to ensure that fish that enter the market have been legally caught. However, the success of these schemes varies, with many regions struggling to implement effective traceability systems due to limited resources and technical expertise.

2.5 2012 Cape Town Agreement (CTA)

The focus of the CTA on safety standards for fishing vessels, particularly those potentially involved in distant-water IUU operations, indirectly addresses IUU fishing by promoting the safety and legality of operations (Cabral et al., 2018). Through mandatory safety inspections and certification (Parts II and III), the CTA ensures that vessels comply with international standards, which deters the use of unsafe vessels that are typically associated with IUU fishing. However, other experts argue that the slow pace of ratification and implementation hamper

the effectiveness of the CTA, particularly in developing countries where the cost of compliance may be prohibitive (Cabral et al., 2018). Moreover, the agreement empowers port states to detain non-compliant fishing vessels (Part IV) and emphasizes flag state responsibilities (Part XI), which creates a disincentive for IUU practices (IMO, 2012).

2.6 International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel (STCW-F, 1995)

Although the STCW-F Convention does not explicitly address IUU fishing, its provisions play a crucial role in mitigating such practices by putting forward comprehensive standards that target the elevation of the competency and professionalism of fishing vessel crews (Setianto et al., 2023). Specifically, the convention mandates minimum competency standards for crew members (Article II, Annex A) and focuses on critical areas such as navigation, safety procedures, and emergency responses (IMO, 1995). This aspect not only aims to reduce the incidence of accidents at sea, which is a scenario that IUU operators could exploit to conceal illegal activities but also to enhance the overall operational standards of fishing vessels.

In addition, the STCW-F Convention outlines mandatory safety standards for vessel operation, as detailed in Annex A, which includes comprehensive requirements for lifesaving equipment, firefighting procedures, and the adoption of safe work practices. These standards ensure that fishing vessels are not only equipped to handle emergencies but also operate within a framework that prioritizes the safety and well-being of the crew (Ramli, 2013). However, the STCW-F faces criticism for its slow rates of adoption and implementation, particularly in regions where IUU fishing is the most prevalent. Thus, the lack of widespread ratification limits its effectiveness in curbing illegal activities (Fekry et al., 2024).

2.7 International Convention for the Prevention of Pollution From Ships (MARPOL)

Although the primary objective of MARPOL is not to directly address IUU fishing, its stringent environmental protection standards, particularly those related to waste management and pollution control, promote conditions that are less conducive to IUU fishing activities (Richardson et al., 2017).

Annex V of MARPOL, which prohibits the discharge of plastics and other waste materials into the ocean, is particularly relevant (MARPOL, 1973). IUU vessels, which typically operate with little regard for environmental regulations, frequently violate these provisions, making them more susceptible to detection and prosecution

(Marteache et al., 2020). This provision is especially relevant because IUU operators, who frequently flout regulations to maximize profits, are more likely to engage in these environmentally harmful practices. The enforcement of these regulations through port state inspections serves as a critical checkpoint. Vessels that do not comply with the waste disposal provisions of MARPOL may raise red flags, which prompts further scrutiny that could reveal signs of IUU fishing (Martini & Allnutt, 2021). Critics point out that the enforcement of MARPOL provisions is inconsistent, particularly in regions with limited maritime enforcement capabilities. This inconsistency enables many IUU vessels to continue operating with impunity, which undermines the effectiveness of the convention (Davey, 2021).

3 Role of international and regional organizations in combating IUU fishing

3.1 Food and Agriculture Organization (FAO)

Notably, the IPOA-IUU of the FAO offers a detailed blueprint that countries can use to strengthen fisheries management and enforcement mechanisms to address IUU fishing. The FAO facilitates the exchange of information and best practices among member states and RFMOs. This includes sharing data on IUU fishing activities, identifying vessels involved in such practices, and disseminating successful strategies and technologies for the detection and prevention of IUU fishing (Zhang, 2021).

The FAO encourages the establishment of and cooperation with RFMOs, which play a vital role in the management of fishery resources in the high seas, which are areas situated beyond the national jurisdiction where IUU fishing is particularly prevalent (Wang et al., 2014). Through RFMOs, member states can collaborate on conservation and management measures, share data and resources, and coordinate efforts to monitor, control, and surveil fishing activities across vast oceanic areas. Despite these efforts, critics argue that the effectiveness of RFMOs is limited by inconsistent participation and enforcement among member states, in addition to the complex geopolitical dynamics that hinder cooperative efforts (Heidrich et al., 2022).

3.2 International Maritime Organization (IMO)

The contributions of the IMO are primarily through the establishment and enforcement of international maritime safety, security standards, and environmental regulations, which significantly impede IUU fishing operations but indirectly address fishing activities. The comprehensive safety and security standards of the IMO, as encapsulated in the International Convention for the Safety of Life at Sea and the International Ship and Port Facility Security Code, indirectly deter IUU fishing activities.

These standards ensure that vessels comply with navigational and safety protocols, which prevents IUU fishing vessels from evading detection under the guise of safety non-compliance (Galani & Evans, 2020). However, critics argue that the indirect approach of the IMO may be insufficient on its own in addressing the complex and multifaceted nature of IUU fishing. The focus of the organization on broader maritime safety and environmental issues occasionally implies that specific challenges related to IUU fishing are only partially addressed, which necessitates a stronger collaboration with other international bodies that directly focus on fisheries management (Skerritt, 2024).

3.3 Regional Fisheries Management Organizations (RFMOs)

By focusing on the unique challenges posed by IUU fishing in their respective regions, RFMOs play an important role in complementing global efforts to ensure sustainable fisheries management. RFMOs have taken proactive steps by developing and implementing Regional Plans of Action to combat IUU fishing (RPOA-IUU), which align these with the broad objectives of the IPOA-IUU of the FAO (Tai et al., 2020). These regional plans are tailored to address the specific nuances and challenges of IUU fishing practices within their jurisdiction, which demonstrates a commitment to the adaptation of global measures to regional contexts.

To increase transparency and accountability, many RFMOs maintain regional vessel-listing schemes that identify authorized fishing vessels that operate within their areas of competence. This measure effectively deters unauthorized or unlicensed fishing activities by making information about legally operating vessels readily available. Building on the foundation laid by the global PSMA, several RFMOs have adopted unique binding port state measures. These regional PSMs commonly include additional, region-specific requirements that are designed to tighten control on IUU fishing vessels that seek to enter ports within the area of the RFMO, which prevents IUU catches from entering the market. They are essential in conserving migratory fish stocks and progress by adopting additional, comprehensive MCS standards, improving IUU vessel-listing mechanisms, and enhancing cooperation and transparency among member states (Bethel et al., 2021).

Despite this progress, RFMOs face criticism for inconsistency in performance. A number of RFMOs do not publicly list authorized vessels, which leads to difficulty in cross-checking against IUU lists. Standardized protocols for sharing IUU vessel lists, incomplete IUU lists, and inadequate tracking of vessel owners are lacking. Furthermore, the use of sanctions is rare, and compliance

reviews of member states are typically incomplete and non-transparent, which hinders the assessment of adherence to the agreed measures (Hutniczak et al., 2019).

To enhance the effectiveness of the RFMOs against IUU fishing, the OECD recommends adopting standardized MCS tools and practices, building comprehensive IUU vessel lists, tightening cooperation between RFMOs, creating transparent sanctioning mechanisms, regularly reviewing the compliance of members, and establishing other efficient decision-making protocols. Additionally, non-member countries with vested interests should join and support RFMO efforts to enforce adopted measures (Hutniczak et al., 2019).

3.4 European Union (EU)

The EU plays an important role in international efforts to combat IUU fishing by deploying a comprehensive legal and operational framework that intends to ensure sustainable fisheries management within its borders and globally. This multifaceted approach combines strict regulatory measures, collaborative international efforts, and rigorous enforcement mechanisms to prevent, deter, and eliminate IUU fishing activities, which promotes the conservation of marine biodiversity and the sustainable use of fishery resources.

At the heart of the strategy of the EU against IUU fishing is Council Regulation (EC) No. 1005/2008, which is known as the IUU Regulation. This pivotal regulation introduces a catch certification scheme that mandates that all fishery products imported into the EU are accompanied by a catch certificate that is validated by the competent authorities of the exporting country (He, 2017). It aims to ensure the legality of fishery products that enter the EU market. Additionally, the regulation establishes an EU list of IUU vessels and strengthens port state measures, including refusal of port access to vessels engaged in IUU activities and those flagged by non-cooperating third countries.

The External Fleet Regulation (EU 2017/2403) mandates that EU vessels that operate outside EU waters and non-EU vessels within them must meet the sustainability criteria and secure the necessary authorization to promote responsible fishing globally (Leroy et al., 2016). Complementarily, Control Regulation (EC No 1224/2009) enforces the Common Fisheries Policy, including IUU fishing rules, by establishing a rigorous monitoring and inspection system to ensure the traceability and sustainability of fishery products within the EU (Eliantonio & Cacciatore, 2022).

Through Sustainable Fisheries Partnership Agreements (SFPAs) with third countries, the EU promotes sustainable fisheries management and the implementation of measures for combating IUU fishing in the EEZs

of partner countries (Johnson et al., 2021). The EU works closely with the FAO, IMO, and other key international bodies to harmonize efforts against IUU fishing, which emphasizes the importance of global cooperation in addressing this challenge. Moreover, the commitment of the EU to international cooperation amplifies its impact; through participation in RFMOs, the establishment of SFPAs, and advocacy for global standards, the EU extends its influence beyond its waters, which promotes a unified global response to IUU fishing.

The efforts of the EU to combat IUU fishing have faced several criticisms. The limited effectiveness of the Environmental Crime Directive has led to the exclusion of IUU fishing from the list of environmental offenses, which has raised concerns about the adequacy of legal measures. The reliance on soft law instruments and administrative sanctions instead of binding criminal penalties is viewed as potentially insufficient for effectively deterring illegal activities. Additionally, the market-based *blue conditionality* approach of the EU has been criticized due to insufficient transparency, limited control over EU fleets that operate in developing countries, and its contribution to resource overexploitation due to excessive fishing capacity (Fajardo, 2022). Furthermore, while the EU has made progress through international cooperation, scholars recognize that broad multilateral efforts are necessary to comprehensively address IUU fishing. The proposed requirement of intent in prosecuting IUU crimes could further weaken enforcement by limiting criminal sanctions to deliberate violations only (Fajardo, 2022).

3.5 Association of Southeast Asian Nations (ASEAN)

The ASEAN has established itself as a key player in the fight against IUU fishing by leveraging a combination of regional frameworks, collaborative mechanisms, and international partnerships to address this pervasive issue (Williams, 2013). Given the rich biodiversity of the region and the critical importance of fisheries for economic and food security, the initiatives of ASEAN are vital for the promotion of sustainable marine resource management in Southeast Asia.

The ASEAN Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020, which was adopted in 2011, marked an early commitment to sustainable practices (Honniball, 2021). Building on this, the ASEAN RPOA-Capacity and the ASEAN RPOA-IUU outline specific strategies for the management of fishing capacity and directly address IUU fishing (Lobach & Vidas, 2010).

ASEAN must establish a regionally funded action plan to address IUU fishing, which presents significant

economic, social, and environmental challenges in Southeast Asia. This plan should be comprehensive, adequately financed, and consistently implemented across member states. Furthermore, it must consider the unique maritime and fishery challenges of each ASEAN to enable tailored enforcement strategies. Strengthened regional cooperation and commitment to existing agreements, such as the 2015 guidelines on IUU fish products, are essential (Malik, 2023). Financial investment from the public and private sectors is crucial, particularly for the development of monitoring technologies. Additionally, improved transparency and data sharing among ASEAN are necessary to promote harmony between enforcement and close loopholes (Malik, 2023). Without a unified and well-funded approach, the efforts of the ASEAN to combat illegal fishing may remain ineffective.

3.6 South Asian Association for Regional Cooperation (SAARC)

The SAARC occupies a unique position in addressing the multifaceted challenges of IUU fishing within the South Asian region. The SAARC Agreement on Rapid Response to Natural Disasters underscores the importance of regional cooperation in mitigating environmental challenges, including those that affect marine ecosystems (Hossain & Shrestha, 2019). Similarly, the SAARC Development Goals, which are aligned with UN SDGs, focus on the sustainable management of natural resources, which indirectly supports the fight against IUU fishing by advocating for the conservation of marine biodiversity and the sustainable use of fishery resources. The proposed initiatives of the SAARC, such as the coastal zone management center, aim to enhance the capacity of the region to manage coastal and marine resources effectively, which addresses the key factors that contribute to IUU fishing.

Regional organizations are key to fishery management because they enhance cooperation and establish standards that align with global conservation goals. They facilitate the sharing of best practices and strengthen monitoring and surveillance using tools such as vessel-monitoring systems and catch documentation schemes, which play critical roles in curbing IUU fishing.

Table 1 illustrates the various approaches taken by various organizations to address the challenges posed by IUU fishing and highlights key initiatives that are instrumental in the global effort to ensure the sustainability of marine resources. Through collaboration and implementation of these initiatives, significant progress can be made in the ongoing battle against IUU fishing.

Table 1 Global and regional efforts to combat IUU fishing: At a glance

Organization	Role in combating IUU fishing	Key initiatives
FAO	Develops international standards, guidelines, and action plans for combating IUU fishing; provides technical assistance and promotes effective monitoring, control, and surveillance systems	Code of Conduct for Responsible Fisheries IPOA-IUU
IMO	Sets global maritime safety and environmental standards, which indirectly contributes to the fight against IUU fishing by enhancing vessel identification and tracking	Safety of Life at Sea International Ship and Port Facility Security Code
RFMOs	Focus on the sustainable management of fishery resources within specific regions and the development and implementation of measures to combat IUU fishing	RPOA-IUU Vessel-monitoring systems and catch documentation schemes
EU	Implements stringent regulatory measures and collaborative international efforts to prevent, deter, and eliminate IUU fishing	EU IUU Regulation (Council Regulation (EC) No 1005/2008) External Fleet Regulation (Regulation (EU) 2017/2403)
ASEAN	Advances regional frameworks and action plans for sustainable fisheries management and the combat against IUU fishing	ASEAN Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 ASEAN RPOA-Capacity
SAARC	Focuses on environmental sustainability and sustainable development, which indirectly support efforts against IUU fishing	SAARC Agreement on Rapid Response to Natural Disasters SAARC Development Goals

Source: Authors' compilation, 2024

4 Principle of state sovereignty and IUU fishing

IUU fishing constitutes a series of activities that contravene international law. Specifically, *illegal fishing* encompasses operations undertaken by national or foreign vessels within the maritime jurisdiction of a state without the authorization of such a state or in violation of its legal statutes (FAO, 2009). If conducted by foreign vessels, then such actions will not only breach the territorial waters of the state but also infringe on the foundational principle of sovereignty, which particularly manifests as violations of the doctrine of non-interference in the internal affairs of a state. Any unauthorized activities within the jurisdiction of a sovereign state unequivocally undermine its sovereign rights.

Moreover, *unreported fishing* involves activities that go unreported or are falsely reported to the relevant national authorities, which contravenes national regulations (Programme, 2008). This form of fishing also infringes on state sovereignty because the absence of reporting or misreporting signifies a lack of consent from the sovereign authority, which constitutes an indirect form of interference, which is prohibited under international norms.

Similarly, *unregulated fishing* typically involves vessels that are devoid of nationality but are operating in the waters of a sovereign state, which further complicates governance and enforcement challenges (FAO, 2009). Such actions are deemed unlawful because they also constitute an intrusion on the sovereign jurisdiction of a state.

In the realm of international law, the principle of sovereignty and the prohibition of interference stand as *jus cogens* or peremptory norms, which are mandatory

principles from which no derogation is permitted. The United Nations Charter and various other international legal instruments and judicial decisions explicitly prohibit violations of the sovereign rights of a state. In the international legal framework, direct and indirect efforts that intend to destabilize or disrupt the social or economic structures of states are viewed as breaches of sovereignty (Hasan, 2021). Therefore, based on these legal principles, IUU fishing evidently represents a direct affront to the doctrine of sovereignty. As discussed, IUU fishing activities contravene the principles of state sovereignty and international law. Nevertheless, violations persist globally. A pertinent example is the Bay of Bengal, where Bangladesh faces significant challenges, particularly from Indian and Myanmar fishermen. Analyzing the case of Bangladesh will elucidate the current gaps and challenges in this domain.

5 IUU fishing in Bangladesh: Legal mechanisms and current challenges

5.1 National legislation and enforcement mechanisms

In addressing the complex challenges related to IUU fishing, the legal and institutional framework of Bangladesh exhibits a complex interplay of strengths, deficiencies, and potential areas for enhancement. The enactment of the Marine Fisheries Act of 2020, which amends the previous Marine Fisheries Act of 1983, signifies a pivotal stride in the legislative efforts of Bangladesh to mitigate IUU fishing (Alam et al., 2021b). Developed through the collaborative efforts of scientists, academics, policy-makers, and government officials, this Act is frequently mentioned in scholarly discussions and in-depth interviews, which underscores its critical role in the legal

armamentarium of the nation against IUU fishing (Popi et al., 2023).

Notably, the National Plan of Action 2020 encompasses several legislative measures that target IUU fishing, albeit its full implementation is pending. The Marine Fisheries Act, 2020, which was formulated by the Department of Fisheries (DOF) under the Ministry of Fisheries and Livestock, introduces specific sections that address IUU fishing along with drafting the Marine Fisheries Policy and Rules. The significant addition brought about by the Act is the mandatory registration of all fishing trawlers, which is intended to improve surveillance and control overfishing activities to curtail illegal practices.

However, the legislative landscape prior to the 2020 Act, including the Protection and Conservation of Fish Act 1950 and the Marine Fisheries Ordinance 1983, was critiqued for lacking comprehensive mechanisms to deter unauthorized fishing without explicit provisions that define or penalize IUU fishing activities. The Marine Fisheries Act 2020 endeavors to bridge this gap by mandating the registration of all fishing trawlers, which thereby facilitates effective monitoring (Singh et al., 2019). Nevertheless, challenges such as inadequate surveys due to IUU fishing and a scarcity of patrol vessels persist, which hampers enforcement efforts.

Furthermore, the Act addresses a few of the gaps identified in previous legislation by incorporating specific sections on IUU fishing, which thereby provides a clear legal framework for identifying, preventing, and penalizing IUU fishing activities. It includes the delineation of prohibited fishing methods and the establishment of penalties for engaging in IUU fishing, which strengthens the legal basis for action against violators (Majumdar et al., 2023). However, the Act also recognizes the challenges inherent to the enforcement of fisheries regulations, including the need for adequate patrol vessels to monitor fishing trawlers and the importance of the conduct of proper surveys to assess the extent of IUU fishing. While the Marine Fisheries Act 2020 marks a commendable step toward addressing IUU fishing, the existing legislative and enforcement challenges moderate its impact (Al Arif & Karim, 2022).

Another notable legal framework against IUU fishing, such as the Bangladesh Fisheries Policy, aims to align national policies with international standards, which reflects its commitment to sustainable fisheries. The Bangladesh Coast Guard Act 2010 complements the Marine Fisheries Act by granting authority to the Coast Guard to patrol maritime borders, apprehend violators, and collaborate with national and international agencies in combating IUU fishing. This Act has been crucial in enabling the active enforcement of IUU fishing regulations. However, it also faces challenges primarily in terms

of resource allocation and operational capacity. These limitations hinder the ability of the Coast Guard to fully enforce the provisions of the Act, which points to the need for further strengthening, especially in terms of technological and surveillance capabilities (Alam et al., 2021a). The evolution of fisheries legislation in Bangladesh reflects its commitment to combat IUU fishing and ensure the sustainability of its marine biodiversity. Table 2 outlines the key acts and frameworks relevant to the efforts of Bangladesh against IUU fishing.

The DOF in Bangladesh is the primary regulatory body that is responsible for the enforcement of fisheries policies, issuance of licenses, and the management of fishery resources. Collaborating with law enforcement, the DOF enforces several seasonal fishing bans to protect biodiversity and promote sustainability. These measures include a 92-day ban on hilsa fishing, a 61-day ban on juvenile hilsa and crab fishing, a similar period for prawn fishing, and a 65-day moratorium on all fishing in the Bay of Bengal to protect breeding periods. Penalties are imposed for non-compliance (Islam et al., 2017; Ritika, 2022). However, challenges such as limited resources, outdated technology, and insufficient staff training hinder the effectiveness of the DOF. Addressing these issues would involve investment in advanced technologies, training personnel, and increased budget (Manik, 2022).

Alongside the DOF, the Bangladesh Navy and Coast Guard are essential in enforcing maritime laws and fisheries regulations, and they are tasked with patrolling waters, deterring IUU fishing, and conducting inspections. However, technological, resource, and coverage limitations hinder their effectiveness. Enhancements could include acquiring advanced surveillance technology, increasing operational funding, and conducting joint exercises with the DOF for better coordination (Alam et al., 2021a). The establishment of an Inter-Ministerial Committee on IUU fishing marks a significant advance toward a coordinated approach to combat IUU fishing in Bangladesh. This committee fosters collaboration across ministries and government agencies, which ensures that a comprehensive understanding of the challenges synergizes and informs efforts to address IUU fishing (Shams et al., 2017). Improving the effectiveness of the committee may involve holding regular meetings, establishing clear protocols for information sharing and decision making, and involving stakeholders from fishing communities to ensure that policies reflect the realities of those most affected by fisheries management decisions.

5.2 Regional collaboration

Bay of Bengal Large Marine Ecosystem: A prime example of regional collaboration in the fight against IUU fishing is the BOBLME Project, which involves Bangladesh,

Table 2 Evolution of the legislative and policy framework of Bangladesh against IUU fishing

Frameworks	Year	Key features	Impact on IUU fishing
Protection and Conservation of Fish Act 1950	1950	Basic regulations for fish protection and conservation that focus on fishing methods and seasons	Lays the groundwork for fishery management but lacked specific provisions for combating IUU fishing
Marine Fisheries Ordinance 1983	1983	Expanded regulatory scope to marine fisheries, introduced vessel licensing, prohibited fishing areas, and gear restrictions	Enhances regulatory frameworks but limited in addressing IUU fishing complexities
Marine Fisheries Act 2020	2020	Comprehensive update, mandatory registration of fishing trawlers, specific sections on IUU fishing, and modernized management principles	Strengthens legal framework against IUU fishing with clear enforcement mechanisms and penalties
National Fisheries Policy	1998	Emphasizes the development of sustainable fisheries, conservation, regulatory guidelines, community involvement, and research support	Provides a foundational framework for managing fishing activities and enhances enforcement mechanisms against IUU fishing
Bangladesh Coast Guard Act 2010	2010	Grants the Coast Guard authority to patrol maritime borders, apprehend violators, and collaborate internationally	Crucial for enforcing IUU fishing regulations, although it is challenged by resource and operational capacity limitations
National Plan of Action 2020	2020	Part of a global initiative, including specific measures for effective monitoring, control, and surveillance systems	Aligns national efforts with international standards for sustainable management of marine resources
BOBLME Project	2009	Regional collaboration with the Bay of Bengal countries to improve marine resource management	Enhances regional cooperation and capacity building for combating IUU fishing
IOTC Membership	N/A	Engagement in regional conservation measures for the sustainable management of tuna and similar species	Aligns national fishing policies with international standards, promoting sustainable fishing practices in the Indian Ocean region

Source: Authors' compilation, 2024

India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand. Launched in 2009, this initiative aims to improve the sustainable management of marine resources in the Bay of Bengal by addressing IUU fishing, among other challenges (Brugere, 2014). Specifically, Bangladesh, alongside India and Myanmar, has engaged in joint patrols and surveillance efforts as part of the BOBLME Project to deter IUU fishing activities within their shared waters (Islam, 2024). These joint patrols, which are focused on the enforcement of fisheries laws and the verification of compliance with regional measures for fisheries management, have led to an increase in the detection and prosecution of vessels engaged in IUU fishing (Vivekanandan et al., 2016).

Indian Ocean Tuna Commission: Another example of regional collaboration in the fight against IUU fishing and the promotion of sustainable fisheries management is the active membership of Bangladesh in the IOTC (Bergin, 2018). By engaging with the IOTC, Bangladesh contributes to the establishment and adherence to regional conservation measures, such as fishing gear regulations, closed seasons, and catch limits, which are crucial for the sustainability of tuna and tuna-like species. This collaboration enables Bangladesh to share and gain insights, which ensures that fishing practices across the Indian Ocean are harmonized and sustainable (Islam, 2024; Sinan et al., 2021).

Table 2 demonstrates the evolution of Bangladesh's legislative and policy framework against IUU fishing, as previously discussed.

5.3 International relevance to the efforts of Bangladesh

As Bangladesh endeavors to align its maritime policies with global standards for combating IUU fishing, several international agreements stand out as cornerstones of this global effort. These agreements not only provide

a legal framework for sustainable marine resource management but also encourage collaboration and shared responsibilities among coastal nations. To better understand the role and relevance of these key agreements to marine conservation efforts in Bangladesh, Table 3 offers a summarized overview.

This overview emphasizes the multidimensional approach taken by Bangladesh through adherence to and active participation in international agreements to safeguard its marine biodiversity, ensure sustainable fisheries management, and uphold its commitment to global marine conservation standards. With its unique focus, each agreement collectively contributes to the broader goal of sustainable oceans and fisheries, which highlights the proactive role of Bangladesh on the international stage.

However, several challenges, including limited resources, outdated technology, and inadequate training of enforcement personnel, frequently undermine the effectiveness of these legal measures. These deficiencies hamper effective monitoring and surveillance, which are critical for enforcing fishing laws at sea, where IUU fishing is the most prevalent. Additionally, although the legislative framework is extensive, it occasionally lacks the specificity required to combat IUU fishing effectively, such as clear definitions and procedures for prosecution and adjudication.

Furthermore, on the international front, the engagement of Bangladesh with global conventions, such as UNCLOS and the UN FSA, illustrates its intent to participate in the global governance of marine resources. Nevertheless, translating these international commitments into practical and effective domestic actions remains a significant hurdle, which is attributed to the gap between policy formulation and operational execution. This gap highlights broader issues in capacity and politics, which

Table 3 Overview of key international agreements and their relevance to marine conservation efforts in Bangladesh, including IUU fishing

International Agreement	Key Focus	Relevance to Bangladesh
UNCLOS	Maritime governance, rights, and responsibilities in managing marine resources	Provides the legal framework for Bangladesh to manage its marine resources and enforce maritime rights
UNFSA	Sustainable management of migratory fish stocks	Supports conservation and sustainable use of migratory fish stocks, crucial for Bangladesh's tuna fisheries
PSMA	Denying port access to vessels involved in IUU fishing	Empowers Bangladesh to prevent IUU fishing by denying port access to offending foreign vessels
IOTC	Regional cooperation for the sustainable management of tuna and tuna-like species	Facilitates collaboration on tuna conservation and sustainable management, significant for Bangladesh's economy
ILO C188	Safety and decent working conditions in the fishing sector	Ensures protection of the rights of fishermen and promotes ethical, sustainable fishing practices in Bangladesh

Source: Authors' compilation, 2024

will be necessary for adequate resource allocation toward the fisheries sector.

In summary, although Bangladesh has established a robust legislative base to address IUU fishing, real-world challenges continue to impede the full realization of the potential of these laws. For more effective combat against IUU fishing, investing in technological advancements, enhancing the capacity and training of its enforcement agencies, and improving inter-agency coordination are crucial actions for Bangladesh. Addressing these points will not only strengthen enforcement but also ensure the sustainable management of marine resources and fulfill the international obligations of Bangladesh more effectively.

5.4 Challenges in Bangladesh and recommendations

IUU fishing poses a significant threat to the marine biodiversity and economy of Bangladesh. The IUU Fishing Risk Index ranks Bangladesh 85th out of 152 countries, which highlights the prevalence of these activities (Macfadyen et al., 2019). A study in *Frontiers in Marine Science* underscores that inadequate regulations, the lack of enforcement, and poor management exacerbate the issue, which leads to the depletion of crucial fish species and biodiversity loss (Mozumder et al., 2023). Incidents, such as the detention of 13 Indian fishermen by the Bangladesh Coast Guard due to illegal fishing, illustrate the severity of the problem (TBS Report, 2021). Moreover, frequent intrusion by foreign vessels and rampant illegal fishing in the Bay of Bengal, in which hundreds of unauthorized trawlers operate, further highlight this crisis (Ritika, 2024). In another instance, the seizure of numerous fishing boats that engage in illegal practices underscores the ongoing challenges faced by enforcement agencies (Khanam, 2024).

Additional incidents emphasize the severity of IUU fishing in Bangladeshi waters. For example, in 2022, the Bangladesh Navy detained 135 Indian fishermen and seized 8 trawlers after catching them red-handed while illegally harvesting marine resources within the EEZ of Bangladesh (Khokon, 2022). This instance not only signifies a breach of territorial integrity but also showcases the extensive scale of illegal operations. Another incident involved the arrest of local fishers that use banned fishing nets, which led to considerable damage to juvenile fish populations in particular and the broad marine ecosystem in general. In 2024, the Coast Guard intercepted a large vessel that carried illegally netted stingray fish, which emphasized the organized nature of IUU activities in the region (Swapan, 2024). Additionally, in 2023, authorities discovered a network of illegal fishing operations that use unauthorized gear in the Sundarbans, the largest mangrove forest worldwide, which severely

impacted its delicate ecosystem (Desk, 2021). Despite a court order, poison fishing continues in the Sundarbans. The Bangladesh High Court issued a ruling in response to a writ petition in September 2021 in an effort to halt this destructive practice. However, it persists (Siddique et al., 2023). These repeated violations reflect the pressing need for enhanced legal frameworks and enforcement mechanisms.

These activities not only undermine the economic stability of coastal communities that are reliant on fisheries but also contribute to environmental degradation by depleting marine resources and reducing biodiversity. Although Bangladesh implements laws, such as the Marine Fisheries Ordinance and Protection and Conservation of Fish Rules, enforcement remains weak, which enables the persistence of illegal activities (Mozumder et al., 2023). In addition, Chen and Liu (2023) underscore the persistent challenge posed by IUU fishing to the sustainability of global fisheries. Given the dynamic nature of fishing fleets and fish stocks, the authors suggest that addressing this challenge requires the collection of spatially referenced data on vessel location, fishing gear, and catch volume. They propose the use of advanced technologies, such as drifting fish aggregation devices, onboard cameras, drones, and satellite vessel-monitoring systems, to enhance surveillance and control. By integrating these spatial dimensions across water, air, and space, new standards for the enforcement of fishing regulations while fostering opportunities for innovative frameworks in ocean governance can be established (Chen & Liu, 2023).

Moreover, Schofield highlights IUU fishing as a significant challenge to effective ocean governance, and emphasizes the necessity of sustainable marine resource management. This issue is particularly critical for Bangladesh, where the sustainable management of marine resources is essential for environmental and economic stability (Schofield, 2023). As previously mentioned, the challenges in addressing IUU fishing in Bangladesh are complex and involve issues in regulation, enforcement, technological capability, and institutional coordination. These challenges hinder the effective management and conservation of marine resources in the country. Table 4 provides details of these specific challenges.

Table 4 outlines the challenges faced by Bangladeshi authorities in combating IUU fishing. It highlights issues such as inadequate regulation, historical deficiency in legislation, foreign intrusion, local illegal activity, and organized illegal operations. Enforcement challenges include insufficient surveys and patrol vessels, resource allocation issues, and technological limitations. Meanwhile, institutional challenges involve limited resources, outdated technology, and poor inter-ministerial coordination. The table

Table 4 Challenges faced by Bangladeshi authorities in the legislation and enforcement of IUU fishing

Category	Specific challenges	Details	Impact	Recommendations
Inadequate Regulations	Weak laws and poor enforcement	Existing laws insufficient for effectively addressing the IUU fishing crisis	Inability to manage and conserve marine resources	Develop and enforce comprehensive legal frameworks to deter IUU fishing
Historical Deficiencies	Inadequate legal mechanisms	The Marine Fisheries Act of 2020 not fully implemented	Delayed management and conservation efforts	Expedite the implementation of legislative measures
	Lack of comprehensive mechanisms in past legislation	Protection and Conservation of Fish Act 1950 and Marine Fisheries Ordinance 1983 lacked effective deterrents	Continued illegal activities due to the lack of explicit definitions or penalties	Strengthen and update existing legal frameworks
Foreign Intrusions	Incursions by foreign vessels	Frequent intrusion by Indian and Burmese fishermen	Significant disturbances and resource depletion in Bangladeshi waters	Improve surveillance and deterrence measures
Local Illegal Activities	Use of banned nets	Local fishers use prohibited equipment	Damage to juvenile fish populations and marine ecosystems	Enforce existing regulations and educate local fishers
	Other illegal practices	Practices that harm the marine ecosystem	Degradation of the marine environment	Strengthen penalties and improve enforcement mechanisms
Organized Illegal Operations	Seizure of large vessels with illegal catches	Organized networks using unauthorized gear, especially in sensitive areas such as Sundarbans	Complicated enforcement efforts	Coordinate enforcement efforts and impose stringent penalties
Enforcement Challenges	Insufficient surveys	Limited data on the extent of IUU fishing	Inaccurate assessment of IUU fishing activities	Enhance operational capacity and provide adequate training and resources
	Limited patrol vessels	Few vessels available for monitoring	Ineffective monitoring and enforcement	Invest in advanced technology and increase patrol vessels
Technological Limitations	Resource allocation issues	Bangladesh Coast Guard faces operational capacity challenges	Reduced ability to enforce regulations	Provide adequate resources and training for enforcement agencies
	Inadequate surveillance capabilities	Lack of advanced technology and comprehensive surveillance systems	Ineffective monitoring and deterrence	Invest in advanced surveillance technology
Institutional Challenges	Limited resources and outdated technology	DOF struggles with resources and technology	Ineffective management and conservation of marine resources	Enhance technological capabilities and provide the necessary training
	Resource constraints and limited coverage	Bangladesh Navy and Coast Guard face technological and resource limitations	Hindered enforcement of fishing regulations	Increase resources and coverage for the Navy and Coast Guard
	Irregular inter-ministerial meetings	Inter-Ministerial Committee on IUU fishing lacks clear protocols for information sharing and decision making	Inefficient coordination and involvement of stakeholders	Foster regular meetings, establish clear protocols, and involve fishing communities in decision making

also provides recommendations that focus on strengthening legal frameworks, improving surveillance and enforcement measures, enhancing operational capacity, investing in advanced technology, and fostering regular inter-ministerial meetings with clear protocols. Addressing these challenges is essential for the effective management and conservation of marine resources in Bangladesh.

6 Conclusions and evaluation

In summary, although significant progress has been achieved in establishing legal frameworks to combat IUU fishing, a considerable gap remains between the establishment of these frameworks and their effective implementation and enforcement. The UNCLOS and UNFSA provide critical legal standards for sustainable marine resource management, while the PSMA and IPOA-IUU of the FAO proffer targeted strategies for port states and flag states, respectively. These measures are instrumental in tightening control of IUU fishing by denying port access to implicated vessels and enhancing the transparency and accountability of fishing operations. However, the effectiveness of these frameworks is dependent on robust enforcement and action.

In the case of Bangladesh, IUU fishing represents a grave threat to its marine biodiversity and economic stability. The ranking of the country on the IUU Fishing Risk Index, combined with numerous documented incidents of illegal activities, underscores the urgency of the need to address this issue. Specifically, the Marine Fisheries Act of 2020 in Bangladesh represents a notable advancement in the legal battle against IUU fishing by introducing mandatory trawler registration and specific anti-IUU measures. Nevertheless, the persistence of enforcement gaps, resource constraints, and inadequate capacity building underscores the need for a comprehensive approach that ensures the effectiveness of these laws. Weak regulation, inadequate enforcement, and poor management have enabled the survival of IUU fishing, which has led to the depletion of essential fish species and significant biodiversity loss. Regional collaboration, such as the BOBLME Project and the IOTC, demonstrate the importance of cooperative efforts in managing shared resources and enhancing efforts against IUU fishing. While beneficial, these initiatives require consistent support and shared responsibility to maintain their impact.

The current situation reveals a discrepancy between policy formulation and practical enforcement in which comprehensive legal frameworks and international agreements are frequently diluted by insufficient enforcement capability and the lack of coordinated action among stakeholders. Additionally, these collaborations necessitate consistent support and shared responsibility to sustain their impact.

To address these challenges, the study recommends enhancing the capacity of local enforcement agencies through increased funding, advanced technology, and training to ensure active and effective law enforcement. Investing in comprehensive capacity-building programs for stakeholders in fisheries management, including training for fishermen, enforcement personnel, and judiciary bodies, is crucial for ensuring a comprehensive understanding of and compliance with IUU regulations.

Moreover, continuing to build on the success of regional initiatives by seeking active participation and commitment from member states is essential. Promoting the sharing of best practices and data can ensure a unified approach to the fight against IUU fishing. Moreover, increasing awareness about the impact of IUU fishing and the importance of sustainable practices among coastal communities and engaging these communities in the monitoring and reporting of IUU activities will create an inclusive and vigilant approach to conservation. Periodically reviewing and updating national legislation to reflect the evolving nature of the challenges related to IUU fishing and to align with international standards and commitments is vital.

For future research, exploring the socio-economic impacts of IUU fishing on local communities, assessing the long-term effectiveness of current legal measures, and investigating innovative technologies for monitoring and enforcement would provide in-depth insights into the optimization of strategies against IUU fishing. These studies could contribute to a comprehensive understanding of the multifaceted nature of IUU fishing and its broader implications on global efforts toward marine conservation.

Acknowledgements

There are no acknowledgments for this research.

Authors' contributions

The corresponding author and co-author are responsible for conception and design, data collection and analysis, interpretation of results, manuscript writing, editing, and finalization.

Funding

This research has received no funding.

Data availability

There are no data and materials available.

Declarations

Competing interests

The author declared no competing interests with respect to the research, authorship, and/or publication of this article.

Received: 11 June 2024 Revised: 8 November 2024 Accepted: 13 November 2024

Published online: 04 December 2024

References

- Agnew, D. J. (2000). The illegal and unregulated fishery for toothfish in the Southern Ocean, and the CCAMLR catch documentation scheme. *Marine Policy*, 24(5), 361–374. [https://doi.org/10.1016/S0308-597X\(00\)00012-9](https://doi.org/10.1016/S0308-597X(00)00012-9)
- Al Arif, A., & Karim, M. S. (2022). Marine Fisheries Act 2020 of Bangladesh: A missed opportunity for sustainability and collaborative governance. *The International Journal of Marine and Coastal Law*, 37(2), 337–349. <https://doi.org/10.1163/15718085-bja10075>
- Alam, M. W., Bhuyan, M. S., & Xiangmin, X. (2021). Protecting the environment from marine pollution in Bangladesh: A brief in legal aspects with response to national and international cooperation's. *Thalassas: An International Journal of Marine Sciences*, 37(2), 871–881. <https://doi.org/10.1007/s41208-021-00347-8>
- Alam, S., Rahman, M., & Al Arif, A. (2021). Challenges and opportunities in artisanal fisheries (Sonadia Island, Bangladesh): The role of legislative, policy and institutional frameworks. *Ocean & Coastal Management*, 201, 105424. <https://doi.org/10.1016/j.ocecoaman.2020.105424>
- Auld, K., Baumler, R., Han, D. P., & Neat, F. (2023). The collective effort of the United Nations Specialised Agencies to tackle the global problem of illegal, unreported and unregulated (IUU) fishing. *Ocean & Coastal Management*, 243, 106720. <https://doi.org/10.1016/j.ocecoaman.2023.106720>
- Ba, A. D. (2017). ASEAN and the changing regional order: The ARF, ADMM, and ADMM-Plus. *ASEAN*, 50, 146–157. https://www.eria.org/ASEAN_at_50_4A8_Alice_Ba_final.pdf
- Bergin, A. (2018). Australia's approach to Indian Ocean fisheries: Towards closer regional engagement. *Journal of the Indian Ocean Region*, 14(1), 100–113. <https://doi.org/10.1080/19480881.2017.1368247>
- Bethel, L., Jessen, H., & Hollander, J. (2021). Implementing the Port State Measures Agreement to combat illegal, unreported and unregulated fishing in the Caribbean. *Marine Policy*, 132, 104643. <https://doi.org/10.1016/j.marpol.2021.104643>
- Borg, S. (2013). The influence of international case law on aspects of international law relating to the conservation of living marine resources beyond national jurisdiction. *Yearbook of International Environmental Law*, 23(1), 44–79. <https://doi.org/10.1093/yiel/yvt061>
- Borot, M. (2021). Illegal, unreported, and unregulated fishing on the high seas: International law gaps and issues. MSc thesis, University of Oslo, Oslo, Norway. <http://urn.nb.no/URN:NBN:no-94824>
- Brugere, C. (2014). Mainstreaming gender in transboundary natural resources projects – the experience of the Bay of Bengal Large Marine Ecosystem (BOBLME) project. *Environmental Development*, 11, 84–97. <https://doi.org/10.1016/j.envdev.2014.05.003>
- Cabral, R. B., Mayorga, J., Clemence, M., Lynham, J., Koeshendrajana, S., Muawanah, U., et al. (2018). Rapid and lasting gains from solving illegal fishing. *Nature Ecology & Evolution*, 2(4), 650–658. <https://doi.org/10.1038/s41559-018-0499-1>
- Chen, Y., & Liu, H. (2023). Critical perspectives on the new situation of global ocean governance. *Sustainability*, 15(14), 10921. <https://www.mdpi.com/2071-1050/15/14/10921>
- Chen, X., Xu, Q., & Li, L. (2023). Illegal, unreported, and unregulated fishing governance in disputed maritime areas: Reflections on the international legal obligations of states. *Fishes*, 8(1), 36. <https://www.mdpi.com/2410-3888/8/1/36>
- Davey, D. (2021). Problems Relating to the Inadequate Enforcement of MARPOL 73/78. MSc thesis, University of Iceland.
- Davis, R. A., & Hanich, Q. (2022). Transparency in fisheries conservation and management measures. *Marine Policy*, 136, 104088. <https://doi.org/10.1016/j.marpol.2020.104088>
- Desk, F. O. (2021). Illegal fishing: 16 fishermen held in Sundarbans. *The Financial Express*. <https://thefinancialexpress.com.bd/national/country/illegal-fishing-16-fishermen-held-in-sundarbans-1631538792>
- Eliantonio, M., & Cacciatore, F. (2022). When the EU takes the field. Innovative forms of regulatory enforcement in the fisheries sector. *Journal of European Integration*, 44(4), 551–568. <https://doi.org/10.1080/07036337.2021.1910253>
- Fajardo, T. (2022). To criminalise or not to criminalise IUU fishing: The EU's choice. *Marine Policy*, 144, 105212. <https://doi.org/10.1016/j.marpol.2022.105212>
- FAO. (2009). Agreement on port state measures to prevent, deter and eliminate illegal, unreported, and unregulated fishing. PAMA. <https://www.fao.org/3/i5469t/i5469t.pdf>
- FAO. (2001). International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU). <https://www.fao.org/3/y1224e/y1224e.pdf>
- Febriyanto, T., & Setiaji, M. L. (2022). Illegal fishing by other countries: Complicated law enforcement in Indonesia. *Indonesian Journal of Environmental Law and Sustainable Development*, 1(2), 189–212. <https://doi.org/10.15294/ijel.v1i2.58123>
- Fekry, A. R., Kaddour, O., & Selmy, A. (2024). The role of standards of training, certification and watch-keeping for fishing vessels (STCW-F 1995) to enhance the personal safety and fishing activities. *Egyptian Journal of Aquatic Biology and Fisheries*, 28(4), 693–713. <https://doi.org/10.21608/ejafb.2024.369448>
- Ford, J. H., Wold, C., Currie, D., & Wilcox, C. (2022). Incentivising change to beneficial ownership and open registers—Holding flag states responsible for their fleets and costs of illegal fishing. *Fish and Fisheries*, 23(5), 1240–1248. <https://doi.org/10.1111/faf.12677>
- Galani, S., & Evans, M. D. (2020). Maritime security and the law of the sea: Help or hindrance? In *The Interplay between Maritime Security and the 1982 United Nations Convention on the Law of the Sea: Help or Hindrance?* (pp. 1–24). Edward Elgar Publishing. <https://doi.org/10.4337/9781788971416.00006>
- Groenleer, M. (2016). The United States, the European Union, and the International Criminal Court: Similar values, different interests? *International Journal of Constitutional Law*, 13(4), 923–944. <https://doi.org/10.1093/icon/mov054>
- Hasan, A. M. (2021). *Principle of Non-interference in the Internal Affairs of States* (p. 117). BD: Print Mission Publication.
- He, J. (2017). The EU illegal, unreported, and unregulated fishing regulation based on trade and market-related measures: Unilateralism or a model law? *Journal of International Wildlife Law & Policy*, 20(2), 168–197. <https://doi.org/10.1080/13880292.2017.1346351>
- He, J. (2022). A jurisdictional assessment of international fisheries subsidies disciplines to combat illegal, unreported and unregulated fishing. *Sustainability*, 14(21), 14128. <https://www.mdpi.com/2071-1050/14/21/14128>
- Heidrich, K. N., Juan-Jordá, M. J., Murua, H., Thompson, C. D. H., Meeuwig, J. J., & Zeller, D. (2022). Assessing progress in data reporting by tuna regional fisheries management organizations. *Fish and Fisheries*, 23(6), 1264–1281. <https://doi.org/10.1111/faf.12687>
- Honniball, A. N. (2021). Engaging Asian states on combating IUU fishing: The curious case of the state of nationality in EU regulation and practice. *Transnational Environmental Law*, 10(3), 543–569. <https://doi.org/10.1017/S2047102520000461>
- Hossain, M. A., & Shrestha, R. B. (2019). Fisheries in South Asia: Trends, challenges and policy implications. *Agricultural Policy and Program Framework: Priority Areas for Research & Development in South Asia*, 332.
- Huntington, T., Nimmo, F., & Macfadyen, G. (2015). Fish landings at the world's commercial fishing ports. *Journal of Ocean and Coastal Economics*, 2(1), 4. <https://doi.org/10.15351/2373-8456.1031>
- Hutniczak, B., Delpeuch, C., & Leroy, A. (2019). Intensifying the fight against IUU fishing at the regional level. <https://doi.org/10.1787/b7b9f17d-en>
- IMO. (2012). 2012 Cape Town Agreement to enhance fishing safety. <https://www.imo.org/en/MediaCentre/HotTopics/Pages/CapeTownAgreementForFishing.aspx>
- Islam, M. M., Shamsuzzaman, M. M., HoqueMozumder, M. M., Xiangmin, X., Ming, Y., & Abu Sayed Jewel, M. (2017). Exploitation and conservation of coastal and marine fisheries in Bangladesh: Do the fishery laws matter? *Marine Policy*, 76, 143–151. <https://doi.org/10.1016/j.marpol.2016.11.026>
- Islam, M. S. (2024). Maritime diplomacy and regional cooperation mechanisms: Insights from the Black Sea and Bay of Bengal. *Millennial Asia*, 1–28. <https://doi.org/10.1177/09763996241256162>
- Jaleel, A., & Smith, H. D. (2023). The plight of the fishers and the management of IUU fishing. *Marine Policy*, 150, 105557. <https://doi.org/10.1016/j.marpol.2023.105557>
- Johnson, A. F., Lidström, S., Kelling, I., Williams, C., Niedermüller, S., Poulsen, K. V., et al. (2021). The European Union's fishing activity outside of European

- waters and the Sustainable Development Goals. *Fish and Fisheries*, 22(3), 532–545. <https://doi.org/10.1111/faf.12533>
- Kao, S. M. (2015). International actions against IUU fishing and the adoption of national plans of action. *Ocean Development & International Law*, 46(1), 2–16. <https://doi.org/10.1080/00908320.2014.957989>
- Khanam, A. (2024). Bangladesh: Illegal fishing must be stopped to save our marine biodiversity. International Collective in Support of Fishworkers (ICSF). <https://www.observerbd.com/news.php?id=476666>.
- Khokon, S. H. (2022). Bangladeshi Navy detains 135 Indian fishermen, seizes 8 trawlers. *India Today*. <https://www.indiatoday.in/india/story/bangladeshi-navy-detains-135-indian-fishermen-seizes-8-trawlers-1968366-2022-06-29>.
- Lee, J. (2019). Subsidies for illegal activities?—Reframing IUU fishing from the law enforcement perspective. *Journal of International Economic Law*, 22(3), 417–438. <https://doi.org/10.1093/jiel/jgz017>
- Lestari, D. I., Putra, A. R., & Larasuci, A. Y. (2020). The main consequences of continued illegal, unreported, and unregulated (IUU) fishing within Indonesian waters for maritime security actors and coastal communities. *Research, Society and Development*, 9(1), e24911566. <https://doi.org/10.33448/rsd-v9i1.1566>
- Leroy, A., Galletti, F., & Chaboud, C. (2016). The EU restrictive trade measures against IUU fishing. *Marine Policy*, 64, 82–90. <https://doi.org/10.1016/j.marpol.2015.10.013>
- Lobach, T., & Vidas, D. (2010). Law, technology and science for oceans in globalisation: IUU fishing, oil pollution, bioprospecting, outer continental shelf. In 6. *Combating IUU Fishing: Interaction Of Global And Regional Initiatives* (pp. 109–129). Brill Nijhoff. <https://doi.org/10.1163/ej.9789004180406.i-610>
- Long, T., Widjaja, S., Wirajuda, H., & Juwana, S. (2020). Approaches to combatting illegal, unreported and unregulated fishing. *Nature Food*, 1(7), 389–391. <https://doi.org/10.1038/s43016-020-0121-y>
- Macfadyen, G., Hosch, G., Kayser, N., & Tagziria, L. (2019). The IUU fishing index 2019. Poseidon aquatic resource management limited and the global initiative against transnational organized crime, Global Initiative. <https://globalinitiative.net/wp-content/uploads/2019/02>.
- Majumdar, S., Bappy, K. M., Moitree, S. M., & Hossain, M. S. (2023). The marine fisheries act 2020: An appraisal. *Bangladesh Maritime Journal*, 7(1).
- Malik, A. (2023). How ASEAN can win its war against illegal and unregulated fishing. *The Diplomat*. <https://thediplomat.com/contact-us/>.
- Manik, M. H. (2022). Current marine fisheries production status and opportunity in Bangladesh. *International Journal of Agriculture and Animal Production*, 2(3), 49–56.
- MARPOL. (1973). International Convention for the Prevention of Pollution from Ships (MARPOL), International Maritime Organization (1973/1978). <https://www.imo.org/en/KnowledgeCentre/ConferencesMeetings/Pages/Marpol.aspx>.
- Marteache, N., Sosnowski, M. C., & Petrossian, G. A. (2020). A review of responses to IUU fishing around the world through the lens of situational crime prevention. In J. Blaustein, K. Fitz-Gibbon, N. W. Pino, & R. White (Eds.), *The Emerald Handbook of Crime, Justice and Sustainable Development* (pp. 485–512). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-78769-355-520201026>
- Martinho, F. (2022). Artisanal fisheries: Management and sustainability. In W. Leal Filho, A. M. Azul, L. Brandli, A. Lange Salvia, & T. Wall (Eds.), *Life Below Water* (pp. 52–62). Springer International Publishing. https://doi.org/10.1007/978-3-319-98536-7_3
- Martini, N., & Allnutt, S. R. (2021). Maritime transport and sustainable fisheries: Breaking the silos. In A. Carpenter, T. M. Johansson, & J. A. Skinner (Eds.), *Sustainability in the Maritime Domain: Towards Ocean Governance and Beyond* (pp. 103–118). Springer International Publishing. https://doi.org/10.1007/978-3-030-69325-1_5
- Maskun, Napang, M., Assidiq, H., & Al Muqni Ali, M. M. (2020). Obligations and responsibilities of flag states related to IUU fishing based on ITLOS case no. advisory opinion 21 and its impacts to Indonesia. *IOP Conference Series: Earth and Environmental Science*, 584(1), 012047. <https://doi.org/10.1088/1755-1315/584/1/012047>
- Mayer Feitosa Ventura, V. A. (2015). Tackling illegal, unregulated and unreported fishing: The ITLOS advisory opinion on flag-state responsibility for IUU fishing and the principle of due diligence. *Brazilian Journal of International Law*, 12(1). <https://doi.org/10.5102/rdi.v12i1.3361>
- Miller, D. G. M., Slicer, N. M., & Sabourenkov, E. (2014). An action framework to address illegal, unreported and unregulated (IUU) fishing. *Australian Journal of Maritime & Ocean Affairs*, 6(2), 70–88. <https://doi.org/10.1080/18366503.2014.912575>
- Miller, D. D., Sumaila, U. R., Copeland, D., Zeller, D., Soyer, B., Nikaki, T., et al. (2016). Cutting a lifeline to maritime crime: Marine insurance and IUU fishing. *Frontiers in Ecology and the Environment*, 14(7), 357–362. <https://doi.org/10.1002/fee.1293>
- Mozumder, M. M. H., Uddin, M. M., Schneider, P., Deb, D., Hasan, M., Saif, S. B., et al. (2023). Governance of illegal, unreported, and unregulated (IUU) fishing in Bangladesh: Status, challenges, and potentials. *Frontiers in Marine Science*, 10, 1150213. <https://www.frontiersin.org/articles/10.3389/fmars.2023.1150213/full>.
- Ogega, P. B. (2020). The use of port state measures as a tool of combating illegal unreported unregulated fishing: Is there a need for expansion of coastal state jurisdiction? OpenUCT. <http://hdl.handle.net/11427/32544>.
- Okafor-Yarwood, I. (2019). Illegal, unreported and unregulated fishing, and the complexities of the sustainable development goals (SDGs) for countries in the Gulf of Guinea. *Marine Policy*, 99, 414–422. <https://doi.org/10.1016/j.marpol.2017.09.016>
- Onoora, P. (2018). Addressing the legislative gaps in the implementation of port state measures: Southeast Asian perspective. *Fish for the People*, 16(1), 5–20.
- Oral, N. (2020). Reflections on the past, present, and future of IUU fishing under international law. *International Community Law Review*, 22(3–4), 368–376. <https://doi.org/10.1163/18719732-12341435>
- Ortiz, A. J. (2016). Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing. *International Legal Materials*, 55(6), 1157–1179. <https://doi.org/10.1017/S002078290030886>
- Palma, M. A., Tsamenyi, M., & Edeson, W. (2010). Promoting sustainable fisheries: The international legal and policy framework to combat illegal, unreported and unregulated fishing. *Brill Nijhoff*. <https://doi.org/10.1163/ej.9789004175754.i-341>
- Petrossian, G. A. (2015). Preventing illegal, unreported and unregulated (IUU) fishing: A situational approach. *Biological Conservation*, 189, 39–48. <https://doi.org/10.1016/j.biocon.2014.09.005>
- Popi, J. N., Rashid, C. M. M., & Al Faruque, A. (2023). How far the Marine Fisheries Act, 2020 ensures sustainable utilization of marine fisheries. *International Journal of Law Management and Humanities*, 6(1), 2005–2021. <https://j.org/10.10000/IJLMH.114270>.
- Programme, F. W. F. (2008). FAO global information and early warning system on food and agriculture - World food programme crop and food supply assessment mission to Bangladesh. <https://www.fao.org/3/ai472e/ai472e00.htm>.
- Puspoyu, E. S., & Setyowati, P. J. (2018). Illegal, unreported, and unregulated fishing as transnational organized crimes. *SHS Web of Conferences*, 54, 05003. <https://doi.org/10.1051/shsconf/20185405003>
- Rajesh Babu, R. (2015). State responsibility for illegal, unreported and unrelated fishing and sustainable fisheries in the EEZ: Some reflections on the ITLOS Advisory Opinion of 2015. *Indian Journal of International Law*, 55(2), 239–264. <https://doi.org/10.1007/s40901-015-0012-1>
- Ramli, M. (2013). STCW-f 1995: Training the Fishermen. *International Journal of Sciences: Basic and Applied Research*, 11. https://www.researchgate.net/publication/302957651_STCW-f_1995_Training_the_Fishermen.
- TBS Report. (2021). Coast guard detains 13 Indian fishermen over illegal intrusion. The Business Standard. Retrieved 3 Apr., 2024, from <https://www.tbsnews.net/bangladesh/coast-guard-detains-13-indian-fishermen-over-illegal-intrusion-285154>.
- Riccardi, L. (2020). The EU and the UN legally-binding instrument on the areas beyond national jurisdiction. In M. C. Ribeiro, F. Loureiro Bastos, & T. Henriksen (Eds.), *Global Challenges and the Law of the Sea*. Cham.
- Richardson, K., Haynes, D., Talouli, A., & Donoghue, M. (2017). Marine pollution originating from purse seine and longline fishing vessel operations in the Western and Central Pacific Ocean, 2003–2015. *Ambio*, 46(2), 190–200. <https://doi.org/10.1007/s13280-016-0811-8>
- Riskas, K. A., Tobin, R. C., Fuentes, M. M. P. B., & Hamann, M. (2018). Evaluating the threat of IUU fishing to sea turtles in the Indian Ocean and Southeast Asia using expert elicitation. *Biological Conservation*, 217, 232–239. <https://doi.org/10.1016/j.biocon.2017.10.011>

- Ritika, A. K. (2022). Critical factors identification to merely study the stagnancy of marine fisheries production in Bangladesh. *BIMRAD Journal*, 3(1), 16–37.
- Ritika, A. K. (2024). IUU fishing: A serious threat to Bangladesh's marine catch. *Daily Sun*. <https://www.daily-sun.com/printversion/details/758962>.
- Rosello, M. (2017). Cooperation and unregulated fishing: Interactions between customary international law, and the European Union IUU fishing regulation. *Marine Policy*, 84, 306–312. <https://doi.org/10.1016/j.marpol.2017.06.030>
- Rosello, M. (2020). Illegal, unreported and unregulated (IUU) fishing as a maritime security concern. In L. Otto (Ed.), *Global Challenges in Maritime Security: An Introduction* (pp. 33–47). Springer International Publishing. https://doi.org/10.1007/978-3-030-34630-0_3
- Rosello, M. (2021a). Chapter 2 rationale for an IUU fishing interpretive lens. In M. Rosello (Eds.), *IUU Fishing as A Flag State Accountability Paradigm: Between Effectiveness and Legitimacy* (pp. 29–72). Brill Nijhoff. https://doi.org/10.1163/9789004463219_004
- Rosello, M. (2021b). Chapter 4 IUU fishing as compliance mechanism. In M. Rosello (Eds.), *IUU Fishing as A Flag State Accountability Paradigm: Between Effectiveness and Legitimacy* (pp. 100–126). Brill Nijhoff. https://doi.org/10.1163/9789004463219_006
- Sanchez, J. B. (2017). Port state measures to combat IUU fishing: The role of the FAO and the EU. MSc thesis, Université catholique de Louvain. <http://hdl.handle.net/2078.1/thesis.8622>.
- Saraphaivanich, K., Suthipol, Y., & Inmsamrarn, N. (2024). Reinforcing the ASEAN member states to combat IUU Fishing in Southeast Asia through monitoring, control, and surveillance. *Fish for the People*, 22(1), 18–25. <http://hdl.handle.net/20.500.12066/7487>.
- Schofield, C. (2023). Geographical dimensions to global oceans governance. *Geographical Review*, 113(1), 20–47. <https://doi.org/10.1080/00167428.2020.1852879>
- Setianto, T., Wisudo, S. H., Imron, M., Wiyono, E. S., & Novita, Y. (2023). Implementation of the Indonesia national policy for crew certification of non-convention fishing vessel after the ratification of STCW-F 1995 (case study in Central Java province of Indonesia). *AACL Bioflux*, 16(2), 1136–1144.
- Shams, S., Sahu, J. N., Rahman, S. M. S., & Ahsan, A. (2017). Sustainable waste management policy in Bangladesh for reduction of greenhouse gases. *Sustainable Cities and Society*, 33, 18–26. <https://doi.org/10.1016/j.scs.2017.05.008>
- Siddique, M. R. H., Hossain, M., & Rashid, A. Z. M. M. (2023). The dilemma of prioritizing conservation over livelihoods: Assessing the impact of fishing restriction to the fishermen of the Sundarbans. *Trees, Forests and People*, 11, 100366. <https://doi.org/10.1016/j.tfp.2022.100366>
- Sinan, H., Bailey, M., & Swartz, W. (2021). Disentangling politics in the Indian Ocean Tuna Commission. *Marine Policy*, 133, 104781. <https://doi.org/10.1016/j.marpol.2021.104781>
- Singh, K. D. (2015). Creating your own qualitative research approach: Selecting, integrating and operationalizing philosophy, methodology and methods. *Vision*, 19(2), 132–146. <https://doi.org/10.1177/0972262915575657>
- Singh, P., Singh, J., Rashid, M. M., Azman, A., & Ali, I. (2019). Fishery policies and acts in present context-experiences from coastal Bangladesh. *Indian Journal of Ecology*, 46(4), 857–861.
- Skerritt, D. J. (2024). Seeking clarity on transparency in fisheries governance and management. *Marine Policy*, 165, 106221. <https://doi.org/10.1016/j.marpol.2024.106221>
- Soyer, B., Leloudas, G., & Miller, D. (2018). Tackling IUU fishing: Developing a holistic legal response. *Transnational Environmental Law*, 7(1), 139–163. <https://doi.org/10.1017/S2047102517000267>
- STCW-F. (1995). International convention on standards of training, certification and watchkeeping for fishing vessel personnel. <https://www.imo.org/en/OurWork/HumanElement/Pages/STCW-F-Convention.aspx>
- Stefanus, A. A., & Vervaele, J. A. E. (2021). Fishy business: Regulatory and enforcement challenges of transnational organised IUU fishing crimes. *Trends in Organized Crime*, 24(4), 581–604. <https://doi.org/10.1007/s12117-021-09425-y>
- Swan, J. (2020). Illegal, unreported, and unregulated fishing: Are RFMOs effectively addressing the problem? *Ocean Yearbook Online*, 34(1), 297–336. https://doi.org/10.1163/9789004426214_013
- Swapna, A. R. (2024). Coast Guard seizes trawler, buries illegally netted stingray fish. *Dhaka Tribune*. <https://www.dhakatribune.com/bangladesh/nation/344997/coast-guard-seizes-trawler-buries-illegally>.
- Tai, T. H., Kao, S. M., & Ho, W. C. (2020). International soft laws against IUU fishing for sustainable marine resources: Adoption of the voluntary guidelines for flag state performance and challenges for Taiwan. *Sustainability*, 12(15), 6013. <https://www.mdpi.com/2071-1050/12/15/6013>.
- Tanaka, Y. (2011). The international law of the sea. *Chinese Journal of International Law*, 10(1), 173–175. <https://doi.org/10.1093/chinesejil/jmr007>
- Telesetsky, A. (2023). Cross regime UNCLOS and UNFCCC cooperation to address loss and damage from climate-shifted transboundary fisheries. *Marine Policy*, 148, 105426. <https://doi.org/10.1016/j.marpol.2022.105426>
- Tien, C.-C. (2021). Rethinking international fisheries law through the lens of IUU fishing: Pathways to sustainable fisheries. PhD thesis, University of Glasgow.
- UNCLOS. (1982). United Nations Convention on the Law of the Sea. https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf.
- UNFSA. (1995). Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. <https://www.un.org/oceancapacity/unfsa>.
- Ventura, V. A. M. F., & Zanella, T. V. (2024). Finding connections between the ITLOS advisory opinion on flag state responsibility for IUU fishing and the advancement of ocean justice. *Revista Digital Constituição e Garantia de Direitos*, 16(2). <https://periodicos.ufrn.br/constituicaoegarantiadedireitos/article/view/35763>.
- Vivekanandan, E., Hermes, R., & O'Brien, C. (2016). Climate change effects in the Bay of Bengal Large Marine Ecosystem. *Environmental Development*, 17, 46–56. <https://doi.org/10.1016/j.envdev.2015.09.005>
- Wang, K. H. (2014). Chapter 19. In combating and deterring IUU fishing: Do RFMOs work? In C. H. Schofield, S. Lee, & M. S. Kwon (Eds.), *The Limits of Maritime Jurisdiction* (pp. 431–447). Brill Nijhoff. <https://doi.org/10.1163/9789004262591>
- Williams, M. J. (2013). Will new multilateral arrangements help Southeast Asian states solve illegal fishing? *Contemporary Southeast Asia*, 35(2), 258–283. <http://www.jstor.org/stable/43281253>.
- Zhang, L. (2021). Global fisheries management and community interest. *Sustainability*, 13(15), 8586. <https://www.mdpi.com/2071-1050/13/15/8586>.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Md Syful Islam The author is currently a PhD candidate at Ankara University, specializing in Sea and Maritime Law. His doctoral research focuses on the complexities of maritime law, particularly the legal frameworks governing international waters and the resolution of maritime disputes. He has published several papers in high-impact journals indexed in Scopus. His research covers areas such as ocean governance, the blue economy, pollution control at sea, maritime law, and human rights in maritime contexts. In addition, his work examines the intersections of climate change, environmental law, pollution control mechanisms, and contradiction studies. His ongoing projects address critical maritime legal issues, including irregular immigration, fisheries management, unmanned ships, technological advancements in shipping, and piracy. His ultimate aim is to integrate environmental sustainability into maritime legal frameworks and enhance climate resilience within the sector.

ASM Mahmudul Hasan Dr. ASM Mahmudul Hasan is an Assistant Professor in the International Relations Department at Karabük University, Turkey. His research focuses on international law, maritime security, and inter-state relations and sovereignty, contributing significantly to the academic and policy discourse on these subjects.