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Blue crimes and ocean harmscapes: strategies for tackling Transnational Maritime Environmental Crimes in the Global South

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Transnational Maritime Environmental Crimes (TMEC) pose a significant threat to marine ecosystems, biodiversity, and the socio-economic sustainability of coastal communities, particularly in the Global South. These crimes, including illegal, unreported, and unregulated (IUU) fishing and the trafficking of marine species, demand innovative and inclusive governance strategies. This paper employs a multi-method approach, incorporating a comprehensive literature review and two case studies: IUU fishing in the Philippines and sea cucumber trafficking in the Seychelles. The carrot-and-stick approach, alongside whole-of-society perspectives and principles of southern blue criminology, is used to analyze the effectiveness of regulatory frameworks and incentives aimed at reducing TMEC. Findings from the case studies indicate that regulatory frameworks alone are insufficient to combat TMEC. The integration of community-based strategies, incentives for compliance, and penalties for violations fosters behavioral change among states and individuals. The whole-of-society approach, involving governments, corporations, civil society, and local communities, proves critical in designing effective regulatory measures. By leveraging the carrot-and-stick methodology and emphasizing the inclusion of all stakeholders, this paper highlights the potential for gender-sensitive, socio-ecologically informed solutions that align with Sustainable Development Goal 14. The integration of southern blue criminology principles ensures that governance frameworks are tailored to the unique socio-economic contexts of the Global South, promoting global cooperation to combat TMEC and protect marine environments.

KEYWORDS

transnational organized crime, illegal, unreported, and unregulated (IUU) fishing, sea cucumber, Global South, southern blue criminology, carrot and stick, Sustainable Development Goal 14, harmscape

1 Introduction

As criminals yearn for profits in un(der)policed and high profit spaces, the exploration for new opportunity expands. Looking outward to the seascape for opportunity, particularly the high seas, is therefore increasingly at risk. Maritime-based or enabled crimes must intersect with land, whether as the source, transit or destination of the criminals, or their market to distribute their goods and services. Indeed, transnational organized crime requires a sophisticated network of actors to stealthily conduct illegitimate business while averting law enforcement.

A growing nexus between environmental crimes and organized crime networks within the maritime space has emerged. For instance, a study on IUU fishing highlighted the involvement of sophisticated networks employing advanced technologies to evade detection (Agnew et al., 2009). Additionally, analysis of sea cucumber harvesting revealed the exploitation of regulatory gaps by local and international actors (Purcell et al., 2016). While the shipping industry and maritime trade routes have long been implicated with transnational organized crime, the specific category of transnational maritime environmental crime (TMEC) is particularly concerning. This concern is heightened in our current era of rapid environmental crisis due to climate change and extreme weather events (Seneviratne, 2021, Chapter 11). Although not all TMEC results from climate change, evidence suggests a likely positive correlation between climate change and maritime crime, driven by declining legitimate employment opportunities (Jiang and LaFree, 2023).

The high seas, being beyond any one nation's jurisdiction, naturally lack oversight (NOAA Ocean Exploration, 2023; United Nations, 1982: Article 57). The vast nature of the maritime environment allows for activities to be conducted with minimal fear of interception and offers significant resources for exploitation. However, these resources are increasingly recognized as finite and under threat from over-exploitation and environmental degradation (Bueger and Edmunds, 2020). Understanding the sophisticated networks behind these crimes is critical, along with developing practical approaches to disrupt and dismantle these networks. The emerging concepts of blue, and southern blue criminology apply a lens from which these crimes can be understood, and domestic, regional and international responses can be developed to encourage harmonized and cooperative transboundary policy and regulatory frameworks.

Global challenges, including the COVID-19 pandemic, maritime boundary disputes, and climate change, exacerbate the potential harm of TMEC. These challenges pose greater risks to emerging economies, particularly small island developing states in the Global South, defined as being the developing states, regardless of geographical location (United Nations Development Programme, 2004). Within this seascape, crime flourishes. Meaningful and feasible crime prevention responses that are gender-sensitive and community-led can be established through a broader understanding of how TMEC is structured and its impact on life underwater and on land.

This article aims to: (1) provide an overview of the emergent threat of TMEC, building on transnational organized crime,

sociological, and southern blue and blue criminology literatures; (2) drawing on literature, discuss how TMEC threatens ocean environments and local communities globally, with a particular focus on the Global South; and (3) leveraging examples harnessing 'carrot and stick' and whole-of-society regulatory approaches from the literature, discuss strategies to navigate towards a sustainable future.

2 Methods

To examine the impacts of transnational maritime environmental crimes (TMEC) and the effectiveness of regulatory and incentivization strategies, a comprehensive multi-method approach was employed. First, a thorough literature review was conducted to gather existing data and identify gaps in the current understanding of TMEC. This involved sourcing academic articles, government reports, and NGO publications. Second, case studies of illegal, unreported, and unregulated (IUU) fishing in the Philippines and sea cucumber trafficking in the Seychelles were selected for in-depth analysis. These case studies were chosen due to their representation of TMEC in the Global South and the availability of detailed reports and studies. Additionally, the first author travelled to the Seychelles for an international conference dealing with money laundering in southern and eastern Africa. She engaged with local stakeholders and collected first-hand data on TMEC. Furthermore, the second author engaged in an international conference in the Philippines on maritime security where she specifically discussed TMEC with local and international government and academic stakeholders, with IUU fishing in the Philippines a central issue of concern. This multi-method approach ensured a robust and comprehensive understanding of TMEC and informed the development of proposed strategies.

3 Overview of TMEC

Transnational maritime environmental crimes (TMEC) are gaining international attention due to the nature and extent of their potential harm. We define TMEC here as illegal activities that occur within the maritime environment, often crossing national boundaries, and causing significant harm to marine ecosystems, biodiversity, and coastal communities. These harms encompass a wide range of activities, including illegal fishing, marine pollution, the trafficking of marine species, and the destruction of underwater cultural heritage.

Given the many and varied crime types, developing a rigorous, multidisciplinary knowledge base is essential for enabling the international community, states, and non-state actors, such as the private sector, to respond appropriately to these unwavering threats and new harmscape. It is important to acknowledge that organized crime syndicates often circumvent regulatory measures through bribery and corruption. For example, investigations in Southeast Asia have shown that syndicates involved in illegal fishing frequently pay bribes to local officials to avoid enforcement (Liddick, 2014). Effective strategies must therefore include

mechanisms to combat corruption alongside regulatory measures. The concept of “harmscapes,” as described by Berg and Shearing (2018), highlights the oceans as dynamic zones where multiple environmental harms converge, transcending national boundaries and legal jurisdictions. Here, we explore the nature of TMEC to assist in responding to and quantifying the extent of these crimes within this harm landscape (harmscape).

3.1 Role of SDG 14 to establish TMEC's relevance

In 2015, the United Nations developed the Sustainable Development Goals (SDGs), building on its Millennium Development Goals launched in 2000 (United Nations, 2015, 2000). The 17 SDGs address a wide range of global issues, with SDG 14 focused on life below water (United Nations, 2015). Specifically, the focus of SDG 14 is to “Conserve and sustainably use the oceans, seas and marine resources for sustainable development” (United Nations, 2015: 14). Among the targets underpinning this Goal include a range environmental, social, economic and criminal activities with the overarching aim of achieving sustainable ocean use. Relevant to TMEC, Goal 14 specifically seeks to address pollution (14.1), illegal fishing (14.4 and 14.6), and sustainable marine tourism (14.7) (United Nations, 2015: 24-5). Reference to these ‘blue crimes’ prioritizes the need to enhance understanding and fast-track approaches to address these issues.

The reference of TMEC blue crimes within the framework of SDG 14 also points to the importance of a multifaceted approach to ocean conservation. Addressing pollution involves not only reducing the input of harmful substances but also implementing stringent regulations and monitoring mechanisms to ensure compliance. Combating illegal, unreported, and unregulated (IUU) fishing requires international cooperation, robust legal frameworks, and the use of advanced technologies for surveillance and enforcement (Agnew et al., 2009). IUU fishing is defined by the United Nations Food and Agriculture Organization's (FAO) International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU) (Food and Agricultural Organization of the United Nations, 2001). Specifically, *illegal* fishing extends to offences that contravene domestic and regional fishery management organization (RFMO) laws; *unreported* fishing is the ‘non-reporting, misreporting or under-reporting’ inconsistent with laws; while *unregulated* fishing activities includes fishing activities that are beyond state or RFMO regulation, or activities of stateless vessels (Food and Agricultural Organization of the United Nations, 2001: paragraphs 3.1, 3.2 and 3.3).

3.2 Defining the scope of the harmscape

According to Bueger and Edmunds (2020), blue criminology is an emerging field within criminology that groups crimes that are maritime-based or enabled. Blue crimes are categorized into three main types: ‘crimes against mobility’, ‘criminal flows’, and

‘environmental crimes’ (Bueger and Edmunds, 2020). It is the final of the three categories that we focus within this paper. These environmental crimes are subcategorized as including fisheries crimes (including the use of banned practices, gear and equipment); pollution (such as intentional (toxic) waste dumping); illegal mining/resource extraction; crimes against critical infrastructure (such as vandalism to underwater fiber and pipelines); and crimes against cultural heritage (including trafficking of underwater cultural heritage articles) (Bueger and Edmunds, 2020).

The list of environmental crimes is non-exhaustive and must remain fluid, allowing for the inclusion of emerging crimes, risks and harms. For instance, we could add sea flora and fauna trafficking; and unsustainable marine tourism, to that already extensive list. Some of these crimes are traditional maritime crimes presenting in modern ways, such as illegal fishing, marine pollution and flora and fauna trafficking. However, emerging harms and risks in response to opportunities, such as ecocide, vandalism of underwater fiber and pipelines, underwater cultural heritage trafficking, and unsustainable marine tourism are those that responses may yet to be defined and unified globally.

These crimes and harms present in many forms and while international and domestic regulatory frameworks often exist to disrupt or prevent them, these crimes continue stealthily, often backed by powerful commercial or organized crime interests (Liddick, 2014). A common feature among these maritime-based environmental crimes is their transnational nature, frequently involving actors from both legal and illegal spheres who exploit legal, regulatory, and other loopholes. Freedom of navigation limits enforcement on the high seas, though limited politically, may lead to lax enforcement spilling over into exclusive economic zones as well. As such, whichever way the categories are defined, what remains the challenge is the international agreement through the application of relevant international instruments. For example, lacking codification of these categories limits their potential for wide acceptance as a crime, rendering them merely a harm, and further, its ability to be meaningfully pursued by law enforcement operating within capable criminal justice systems. This is administrable through the United Nations Convention Against Transnational Organized Crime framework, by unpacking and mainstreaming these currently complex definitional issues (United Nations, 2000a: Article 2).

Hübschle and Berg (2024) introduce in this special issue southern blue crime criminology, an approach which emphasizes the importance of integrating perspectives from the Global South to address oceanic harms effectively. Often bearing the brunt of environmental degradation, Global South geographies provide unique insights that can lead to more resilient and sustainable outcomes. Traditional law enforcement and regulations are designed for well-capacitated and resourced agencies in the Global North. Such approaches focus on regulation and punishment, failing to consider the transnational and complex nature of maritime environmental crimes or the socio-economic factors driving them. A southern blue criminology approach, as proposed by Hübschle and Berg (2024), encourages a holistic understanding of TMECs which takes on board legal, socio-

economic and cultural dimensions. Governance frameworks associated with this approach are tailored to varied and complex realities of different regions of the world, contributing to more effective, equitable and sustainable solutions.

3.3 Contested illegality and irregular regulation

TMEC often operate within a realm of contested illegality and irregular regulation, phenomena mirrored in land-based environmental crimes. Actors involved in TMEC tend to challenge the notion of their activities being illegal, capitalizing on ambiguities and gaps in regulatory frameworks (Hübschle, 2016; 2017; Yates et al., 2024). This contested space is further complicated by the transboundary nature of maritime environments, where jurisdictional overlaps and differing national laws create a patchwork of regulations that can be manipulated. In this contested ocean harmscape, the line between legality and illegality becomes blurred and fluid (Hübschle, 2019), allowing actors to navigate within the interstices of law.

For instance, certain fishing practices may be legal in one jurisdiction but considered illegal or illegitimate in another, enabling perpetrators to exploit these discrepancies (Hübschle and Margulies, 2024). Similarly, the practice of reflagging vessels to different countries, a legal procedure, is often abused to evade stringent environmental regulations or to obscure the true ownership of vessels involved in illicit activities. Also dubbed “flags of convenience”, shipping vessels engaging in IUU fishing often reflag to countries with less stringent enforcement to avoid detection and prosecution. This practice, known as “flag hopping,” undermines efforts to regulate and control fishing activities, contributing to overfishing and depletion of marine resources (Food and Agricultural Organization of the United Nations, 2001: Art 39).

The concept of the “flag state” is fundamental in international maritime law as established by the United Nations Convention on the Law of the Sea (UNCLOS) (United Nations, 1982: Article 94). This legal framework grants flag states the authority to register ships (United Nations, 1982: Article 94(2)(a)), assign them nationality (United Nations, 1982: Article 94(2)(b)), and set conditions for their operation on the high seas [United Nations, 1982: Article 94 (3)(a-c)]. A controversial aspect of this framework is the requirement for a “genuine link” between the flag state and the vessel, intended to ensure that the state can exercise effective jurisdiction over its ships (United Nations, 1982: Article 19). However, this requirement is vaguely defined, leading to inconsistent interpretations and enforcement, and consequently, significant regulatory gaps persist (Environmental Justice Foundation (EJF), 2020).

The irregularity of maritime regulation is further exacerbated by the limited capacity for enforcement on the high seas. The vastness of maritime spaces, coupled with limited resources for monitoring and enforcement, provides a fertile ground for TMEC activities to flourish. The lack of a unified, global legal framework for maritime environmental protection allows these actors to operate in a

regulatory grey area, often with impunity (Brisman et al 2020; Bueger and Edmunds, 2020).

Yates et al. (2024) discuss how irregular regulation contributes to criminal activities in markets dealing with antiquities, fossils, and wildlife. Looram and Lindley (2024) also explore this concept in preventing and protecting against underwater cultural heritage crime, in this special issue. Yates et al. (2024) identify five ways in which such markets can be irregular: socially, jurisdictionally, practically, culturally, and discursively. These factors create a grey area where legality is subjective, influenced by cultural, economic, and political contexts. Similarly, TMEC actors exploit these irregularities, navigating through legal loopholes and differing regulations across jurisdictions. This manipulation of regulatory frameworks is evident in practices such as illegal fishing and marine pollution, where the boundaries between legal and illegal activities are easily crossed.

The concept of “irregular regulation” is also pertinent to TMEC. The complexity and inconsistencies in legal frameworks allow actors to operate in a quasi-legal space, undermining or sidestepping enforcement efforts. This irregularity is compounded by the high value and demand for marine resources, which incentivizes illegal activities despite regulatory measures. As with criminogenic collectables, the allure of high profits and the perception of low risk drive the illegal exploitation of marine resources.

By understanding the irregular regulatory landscapes and the socio-economic drivers behind TMEC, policymakers can develop more effective strategies to combat these crimes. This includes harmonizing international laws, improving enforcement mechanisms, and addressing the root causes of illegal activities. Adopting a holistic approach that incorporates southern blue criminology principles can provide a comprehensive framework for addressing the complexities of TMEC and protecting marine environments.

4 TMEC impact upon the Global South

The Global South is vulnerable to TMEC due to its heavy reliance on marine resources for livelihoods, subsistence, and tourism. This region, especially Small Island Developing States (SIDS), faces significant threats from TMEC, which disrupt not only the natural environment but also the socio-economic sustainability of local communities. Understanding the specific impacts of TMEC on the Global South and developing tailored, effective responses is critical.

In many regions of the Global South, particularly surrounding the SIDS, the ocean and the associated blue economy are integral to community life. The fishing industry is a cornerstone, providing both food security and employment, while marine-based tourism significantly contributes to the economy.

Nations such as the Philippines (Satizábal et al., 2020) and the Seychelles (Benoit, 2021) depend heavily on their marine ecosystems to generate tourism revenue, which is vital for

national economies and supports local livelihoods. Given the massive levels of poverty and under-employment in the Philippines, any incentive to not fish illegally must be carefully designed to ensure it provides sufficient economic benefit. For example, community-based sustainable fisheries projects in the region have shown some success in reducing illegal activities when combined with alternative livelihood programs (Cinner et al., 2009). However, TMEC, including illegal fishing, coral reef destruction, and marine pollution, pose substantial threats to these economic activities. Such environmental crimes result in economic losses, exacerbate poverty, and compromise food security. The following case studies on the Seychelles, located in the Indian Ocean off the East African coastline, and the Philippines, bounded by the South China Sea and the Pacific Ocean explore the complex relationship between TMEC and the Global South underscore the urgency of addressing these crimes with innovative and inclusive strategies.

4.1 Illegal, unreported and unregulated fishing in the Philippines

Illegal, unreported, and unregulated (IUU) fishing is a pervasive issue in waters off the Philippines, posing significant threats to marine biodiversity, local fisheries, and the socio-economic sustainability of coastal communities (Petrossian, 2015; Song et al., 2020). As an archipelagic nation with one of the longest coastlines in the world, the Philippines heavily relies on its marine resources. The high demand for fish, both domestically and internationally, drives illegal fishing activities affecting both the environment and local communities, facilitated by gaps in enforcement and regulatory frameworks (Agnew et al., 2009). Palawan, often referred to as the last frontier of the Philippines, exemplifies the complexities of these challenges.

In Palawan, local and migrant fishers alike navigate a landscape where access to marine resources is influenced by class, ethnicity, and historical migration patterns. Migrant fishers from the Visayas and Indigenous Tagbanua people engage in small-scale and commercial fishing, with the latter often marginalized and facing greater obstacles to resource access. The rapid expansion of commercial fishing since the 1950s has intensified these dynamics, as investments from East Asia drive the lucrative trade in live reef food fish and other marine commodities (Fabinyi et al., 2019). Increased pressure due to under-employment may reduce incentives to fish sustainably.

Illegal fishing practices, including environmentally destructive fishing methods, have severe ecological impacts, depleting fish stocks and damaging coral reefs (Tahiluddin and Sarri, 2022). These activities not only undermine conservation efforts but also exacerbate socio-economic inequalities, as poorer fishers are often forced into unsustainable practices to compete with better-equipped commercial operations (Fabinyi et al., 2019). IUU fishing in the Philippines is driven by various factors, including the lucrative nature of the fishing industry, weak enforcement of regulations, and the extensive involvement of organized crime networks that

facilitate and profit from these illegal activities (Tahiluddin and Sarri, 2022). The vast and fragmented maritime territory of the Philippines complicates monitoring and surveillance efforts. The country's limited resources and capacity to patrol its extensive maritime borders allow illegal activities to thrive. Moreover, corruption within regulatory agencies can hinder effective enforcement and accountability.

Efforts to regulate and manage fisheries in the Philippines have included the establishment of marine protected areas (MPAs) and the implementation of licensing systems for fishing vessels (Fabinyi et al., 2019). However, these measures often have unintended consequences, disproportionately affecting the most vulnerable communities. For instance, MPAs can restrict access to traditional fishing grounds for subsistence fishers, while licensing fees can be prohibitive for those with limited financial resources (Fabinyi et al., 2019). Meanwhile, organized crime networks often find ways to circumvent these regulations, using corrupt practices and sophisticated smuggling operations to continue their illegal activities unabated (Liddick, 2014). Measures put in place to fight IUU fishing are hampered by several governance and enforcement challenges. Inconsistent and inadequate regulations make it difficult to effectively manage and control fishing activities. Corruption within regulatory and enforcement agencies undermines efforts to combat IUU fishing, as officials may turn a blind eye to illegal activities or be complicit in them. Additionally, the extensive maritime territory requires significant resources for effective monitoring and enforcement, which are currently lacking.

The environmental impacts of IUU fishing are severe, significantly depleting fish stocks and undermining the sustainability of marine ecosystems. It disrupts the balance of marine life, leading to the decline of both targeted and non-targeted species. The use of destructive fishing practices, such as blast fishing and cyanide fishing, exacerbates habitat destruction, particularly in coral reefs, which are critical to marine biodiversity (Cinner et al., 2009).

The socio-economic repercussions are equally profound. Coastal communities, many of which rely on fishing as their primary source of income, face declining fish stocks and reduced catches, leading to economic instability, increased poverty, and food insecurity. Small-scale fishers, who lack the resources to compete with illegal operators and corporate fishing vessels, are particularly affected. The economic losses from IUU fishing extend to the broader national economy, affecting revenue from fisheries and related industries (Fabinyi et al., 2019).

As global demand for seafood continues to rise, the pressures on the Philippines' marine resources are likely to intensify. Addressing the challenges of TMEC in this context requires a nuanced understanding of local conditions and the implementation of inclusive, community-led management strategies rooted in sustainable fisheries education. Enhancing local capacities for sustainable fishing, promoting alternative livelihoods, and strengthening enforcement mechanisms are critical steps towards mitigating the impacts of TMEC and ensuring the resilience of coastal communities in the Philippines in the face of depleting fish stocks.

4.2 Sea cucumber trafficking in the Seychelles

The Seychelles, an archipelago in the Indian Ocean, faces significant challenges from both legal and illegal trade in marine species, including sea cucumbers (Conand, 2008). Sea cucumbers are *echinoderms* related to sea urchins and starfish and play a crucial role in marine ecosystems by recycling nutrients and maintaining the health of coral reefs (Purcell et al., 2016). The socio-economic contribution to local livelihoods was significant and involved the harvesting, processing and selling of sea cucumbers to various markets (Aumeeruddy and Conand, 2008). However, the escalating demand for sea cucumbers, especially in Asian markets where they are highly valued for their culinary and medicinal properties, has led to widespread legal and illegal harvesting in the Seychelles (Louw and Bürgener, 2020).

Illegal harvesting often involves both local and foreign fishers, coordinated by organized crime networks, who exploit the resource to meet the lucrative market demand in Asia. Sea cucumbers were primarily harvested by divers using SCUBA gear, targeting depths between 10 and 40 meters, with the Mahé Plateau serving as a principal fishing ground at an average depth of around 50 meters. When Aumeeruddy and Conand (2008) conducted an initial study, the sea cucumber fishery in Seychelles consisted of two main categories of fishers. The first category included those who use small outboard-powered boats and operate primarily in the coastal areas around the main populated islands of Mahé, Praslin, and La Digue, typically conducting day trips. The second category involved fishers who use larger, decked boats equipped with diesel inboard engines, capable of staying at sea for up to two weeks (Aumeeruddy and Conand, 2008). These larger boats, which can employ up to four divers as authorized under licensing conditions, often carry out pre-processing of sea cucumbers onboard. Due to overfishing, divers on motorized boats have to venture further out, dive deeper and stay out longer at sea, to find sea cucumbers, often putting their life at risk (World Bank, 2018).

Before 1999, the sea cucumber fishery in Seychelles was essentially open-access, and there were no catch and effort data collected, nor any quotas or size limits in place (Aumeeruddy and Conand, 2008). With the rapid development of the fishery, the Fisheries (Aquaculture) Regulations 2020 (Republic of Seychelles), 2020 introduced several management measures applying the precautionary principle until a thorough resource assessment could be conducted (Food and Agricultural Organization of the United Nations, 2005). These included the requirement for specific licenses for fishing and processing sea cucumbers, the limitation of fishing licenses to 25, and the implementation of a Total Allowable Catch (TAC) based on maximum sustainable yield (MSY) estimates (Food and Agricultural Organization of the United Nations, 2005; Skewes and Long, 2022). Recent assessments, such as the 2021/2022 survey conducted for the Seychelles Fishing Authority (SFA) (Skewes and Long, 2022), highlighted both the resilience and vulnerabilities of different sea cucumber species. For instance, the white teatfish (*Holothuria fuscogilva*) population is now heavily depleted, at about 10% of its 2004 level, leading to a complete ban on its fishing to allow for recovery (Skewes and Long, 2022).

Conversely, species like the prickly redfish (*Thekenota ananas*) have shown signs of population increase (Skewes and Long, 2022).

The Seychellois government implemented stricter regulations to manage the collection of three commercially important sea cucumber species: the flower teatfish (*Holothuria* spp. (type "Pentard")), white teatfish, and prickly red fish (Skewes and Long, 2022). Additionally, the fishing season has been shortened to eight months, from October to May, to help ensure the sustainability of sea cucumber stocks (Seychelles Nation, 2018). However, when the number of boats is restricted, conflicts can emerge among fishers who have been excluded from obtaining a license. There is a waiting list of fishers seeking licenses, and they often argue that licenses should be revoked from those who are not actively fishing for several months (Aumeeruddy and Conand, 2008). Moreover, many fishers in small-scale fisheries harvest other marine resources alongside sea cucumbers. This makes it impractical to limit fishing to certain times for sea cucumbers, as fishers could continue collecting other resources (Lovatelli et al., 2004). This situation complicates the enforcement of effort limitations and often renders them ineffective as a management measure.

High market demand and significant profitability provide strong incentives for non-compliance with local regulations. The illegal sea cucumber trade falls under TEMC and has far-reaching ecological and socio-economic impacts. Ecologically, the overharvesting of sea cucumbers disrupts the marine ecosystem. These organisms are essential for nutrient cycling and the health of seabed environments. Their depletion can lead to a decline in water quality and the degradation of coral reefs, which are vital habitats for numerous marine species. This environmental degradation not only threatens biodiversity but also undermines the resilience of marine ecosystems to other stressors, including climate change (Conand, 2018).

Socio-economically, the dual legal and illegal sea cucumber trade has severe repercussions for local communities in Seychelles. Many local fishers depend on sea cucumbers for their livelihoods (World Bank, 2018). Overharvesting and the subsequent depletion of sea cucumber stocks threaten their income, pushing them (further) into poverty and may create vulnerabilities making them susceptible to engaging in illegal activities. The illegal trade undermines legal and sustainable fisheries, creating an uneven playing field and promoting further illicit activities while benefiting private and commercial entities. Diving accidents are frequent and in extreme cases include drowning, shark attacks, and decompression accidents (Maillaud, 1999; World Bank, 2018).

The enforcement of regulations is complicated by the vast maritime territory of Seychelles and the sophisticated methods employed by organized crime networks, which makes monitoring and regulation difficult. Limited resources and the high profitability of the illegal trade further hinder effective enforcement. Strengthening local enforcement capabilities, promoting sustainable fishing practices, and reducing global demand for illegally sourced marine products are critical steps in addressing these issues. International and regional cooperation is also essential, as the illegal trade in sea cucumbers is a transnational issue that requires coordinated efforts to monitor and regulate.

The complexity of combating both legal and illegal sea cucumber trade in Seychelles highlights the need for a

comprehensive and multifaceted approach. It is recommended that the Seychelles Fishing Authority (SFA) closely monitor quota usage and regularly assess the performance of licensees who fail to utilize their quotas effectively, with increased emphasis on transparency and compliance to ensure sustainable management (Skewes and Long, 2022; FiTI National Multi-Stakeholder Group Seychelles, 2024). This initiative underscores the importance of robust regulatory frameworks and both international and regional collaboration, particularly within the Indian Ocean region to prevent overexploitation and support the socio-economic well-being of local communities (FiTI National Multi-Stakeholder Group Seychelles, 2024).

5 A framework for sustainable change

Addressing the many facets of TMEC is a complex global challenge. Acknowledging the potential harm, addressing its many and varied aspects and the necessary plural whole-of-society response remains an elusive global challenge. Seeking universal, binding buy-in to co-opt a suitable approach is time-consuming – as seen with the High Seas Treaty – and may not result in actionable outcomes. Rather, minor policy adjustments could be a suitable vehicle to realign in pursuit of an optimal outcome. Drawing on the ‘carrot and stick’ approach to motivate better outcomes and regulatory compliance, aligned with SDG 14, might lead to better results and impacts.

In this section, we explore the carrot-and-stick approach alongside a whole-of-society perspective, incorporating insights from southern blue criminology and gender-sensitive applications, to propose comprehensive strategies for tackling TMEC. This approach should be about encouraging change to find enhanced sustainable ways to do business rather than just trying to punish through new laws. The need for innovative strategies that leverage incentives and penalties both at the international level—to incentivize states to act and recognize the benefits of responding to TMEC—and at the national level is crucial. By understanding that some criminals engage in TMEC due to a lack of opportunity, it becomes clear that providing alternatives and support can lead to meaningful disengagement from these illegal activities.

5.1 Overview of the carrot and stick concept

The underlying premise of the carrot and stick approach relies on the incentive (carrot) and the stick (punishment) to comply. This approach has been successfully tested in countless scenarios in response to legal compliance (see for example Su and Cao, 2021; Berenji et al., 2014). Increasingly, adoption of ‘carrot’ initiatives first, particularly for complex crime policies, followed-up with tougher ‘stick’ initiatives (see for example Geest and Dari-Mattiaci, 2013; Garcia, 2022). At its core, the carrot-and-stick approach relies on motivating behavior through rewards for compliance and punishments for non-compliance. This dual

mechanism aims to balance encouragement with deterrence, creating a framework where desired behaviors are reinforced and undesired behaviors are discouraged.

‘t Sas-Rolfes et al. (2019) explored illegal wildlife trade governance from the perspective of carrot and stick given the continued unsustainable levels of exploitation of wildlife trafficked. Despite the regulatory framework outlined by the Convention on International Trade of Endangered Species (CITES), members have autonomy over their regulatory approach. Accordingly, CITES sets out carrots (capacity-building) and sticks (trade sanctions) provisions and regulations (‘t Sas-Rolfes et al., 2019). The use of capacity building alongside trade sanctions for certain species/taxa can prevent illegal trade where suitable substitutions are available. Capacity building efforts, though, as suggested in ‘t Sas-Rolfes et al. (2019), ranching and captive breeding programs, may provide alternatives to wildlife poaching; however, these programs have had varying success across the world. Further, there requires a strong commitment to enforce regulations to ensure that the stick disincentive is effective given that the payoff may be greater than providing substituted alternatives.

In their study relating to the Amazon Forest, Börner et al. (2015) considered how carrot and stick approaches may have played a role in preventing further Amazonian deforestation. Strengthened enforcement (stick) to avoid further deforestation, combined with experimental initiatives that provide economic incentives (carrot) to farmers for conservation actions and environmental services (Börner et al., 2015). The study found that revenue procured through financial penalties offsets the greater investment in enforcement and incentives provided to farmers, collectively achieving an optimal environmental outcome.

Another study found that a carrot-and-stick approach is required to achieve sustainable circular fashion (Manshoven and Opstal, 2022). Manshoven and Opstal (2022) suggest that as fashion has practical challenges that hinder the industry from being environmentally-friendly, finding a balance of policy incentives (carrot) and directives (stick) is necessary. Surveys and focus groups with industry stakeholders determined that enforceable mandatory regulations in combination with optional regulations are best suited, though this varies for certain aspects of circular fashion where an enforceable outcome may be most appropriate.

Meanwhile, Morgera (2012) considered the role of the carrot-and-stick approach linked to incentivizing support for CITES agreements in the United States, as is the case in the European Union. It considered various approaches to either incentivize (carrot) or sanction (stick) compliance on a bi- and multi-lateral scale. Suggested sanctions and incentives may be linked to trade and other initiatives as a means of promoting compliance and incentivizing community interests within the international environmental law space.

The concepts of “irregular regulation” and “contested illegality” further complicate the enforcement of TMEC regulations. Actors involved in TMEC exploit legal ambiguities and gaps, taking advantage of jurisdictional overlaps and differing national laws. This manipulation of regulatory frameworks, coupled with the high value and demand for marine resources, incentivizes illegal

activities despite existing regulatory measures. These complexities underscore the need for adaptive, context-sensitive strategies that account for these challenges.

Drawing on these relevant literatures, two clear carrot-and-stick themes emerge. First, the use of incentives for states to adopt regulatory change; and second, the incentive for criminals and actors that ride on the edge of legality/illegality to desist from crime and encourage legitimate alternative livelihoods. Drawing on these themes, we suggest that incentivizing states to adopt non-binding initiatives that prevent TMEC (carrot) will evoke pressure to achieve binding evidence-led outcomes (stick). By adopting such an approach in the TMEC space, there is the potential to adopt suitable prevention tools and develop training and technical assistance against the framework provided. Similarly, incentivizing sustainable fishing practices and providing alternative livelihoods can reduce illegal activities.

5.2 Whole-of-society and southern blue criminology: an overview

As highlighted by [Holley and Shearing \(2018\)](#), the *Anthropocene epoch* necessitates a rethinking of criminology's foundational assumptions. The interconnectedness of human and natural systems calls for a duty of care that extends beyond traditional boundaries. They underscore the importance of a duty of care in their work, arguing that the Anthropocene, characterized by significant human impact on Earth's geology and ecosystems, requires a shift in criminological approaches. The authors highlight the need for a comprehensive framework that integrates environmental stewardship into the core of crime prevention and regulation ([Holley and Shearing, 2018](#)). This duty of care extends to all aspects of governance, emphasizing the need for policies that protect the environment while addressing socio-economic inequalities that drive environmental crimes. This principle aligns with the whole-of-society approach, emphasizing the need for proactive measures to prevent environmental harm and promote sustainable practices. It calls for a comprehensive understanding of the interconnectedness of human and environmental well-being, advocating for policies that reflect this interdependence.

A whole-of-society approach to crime prevention emphasizes the need for collective action, involving all stakeholders, including governments, the private sector, civil society, and local communities ([Berg and Shearing, 2011](#)). This inclusive strategy is gaining currency in terrestrial conservation and anti-poaching initiatives ([Hübschle and Shearing, 2018](#); [Cooney et al., 2017](#)) and would be well suited to addressing TMEC requiring coordinated efforts across various sectors and jurisdictions to dismantle organized crime networks and their operations. Leveraging society seeks to balance out any limitations of law enforcement.

The whole-of-society approach advocates for the participation of all societal sectors in addressing complex social, crime and environmental issues. This method acknowledges that effective environmental conservation cannot rely solely on governmental regulations but must also incorporate self-regulation by corporations, community-led initiatives, and hybrid governance

systems. According to [Berg and Shearing \(2011\)](#), involving directly affected communities in the regulatory process ensures that the measures are practical, culturally appropriate, and widely supported. This approach fosters a sense of ownership and responsibility among stakeholders, leading to more sustainable and effective conservation and crime prevention outcomes.

Southern blue criminology integrates perspectives from the Global South, highlighting the unique challenges and insights that these regions offer in addressing oceanic harms. [Hübschle and Berg \(2024\)](#) propose that traditional law enforcement and regulatory frameworks, designed for the Global North, may not be as effective in the Global South due to different socio-economic contexts and resource constraints. They advocate for a holistic understanding of TMEC, considering legal, socio-economic, and cultural dimensions ([Hübschle and Berg, 2024](#)). It encourages the development of governance frameworks tailored to the varied and complex realities of different regions, promoting more equitable and sustainable solutions. This approach emphasizes the importance of community involvement that is gender-sensitive and the integration of local knowledge in designing and implementing environmental conservation strategies.

5.3 Discussion: integrating carrot and stick with whole-of-society responses and southern blue criminology

Combining the carrot-and-stick approach with the whole-of-society perspective and southern blue criminology offers a comprehensive framework for addressing TMEC, particularly by targeting the organized crime networks that facilitate these environmental crimes. By leveraging incentives and penalties, engaging all stakeholders, and prioritizing ethical and socio-ecological considerations, it is possible to create a more resilient and sustainable approach to combating transnational maritime environmental crimes.

Drawing on the principles of whole-of-society, initiatives can be designed to encourage self-regulation among corporations and community-led conservation efforts. This can be complemented by state regulation and hybrid governance systems that integrate local, regional, and international policies. The duty of care principle further reinforces the need for these measures, highlighting the ethical imperative to protect marine environments for future generations. Incorporating insights from southern blue criminology ensures that these strategies are inclusive and context-sensitive ([Hübschle and Berg, 2024](#)). By acknowledging the unique challenges faced by the Global South, policies can be tailored to address specific needs and leverage local strengths. This holistic approach can lead to more effective and sustainable solutions, fostering global cooperation in the fight against TMEC.

5.3.1 Incentivizing states

States, particularly SIDS, should be incentivized to adopt non-binding initiatives that prevent TMEC. Drawing on the CTC framework, states can access training and technical assistance provided by United Nations Office on Drugs and Crime (UNODC)

and bi- and multi-lateral agreements, increasing their capacity to combat TMEC.

5.3.2 Incentivizing local communities

Providing funding and access to legitimate alternatives can deter individuals from engaging in TMEC. This approach aligns with national crime prevention projects like those supported by the [United Nations Office on Drugs and Crime \(2023a, 2023b\)](#). For instance, alternative livelihoods programs and technical assistance can effectively reduce economic reliance on illegal activities.

To address illegal fishing in the Philippines, economic incentives such as subsidies for sustainable fishing gear, financial support for alternative livelihoods, and market access for sustainably caught fish can encourage compliance with regulations. Conversely, strict enforcement of penalties for illegal activities, including fines and the confiscation of illegal fishing equipment, serves as a deterrent. [Börner et al. \(2015\)](#) demonstrated that such a balanced approach in the Amazon forest led to significant conservation successes by offsetting enforcement costs with penalty revenues.

Engaging local communities in the governance and enforcement of fishing regulations is crucial. According to [Berg and Shearing \(2011\)](#), involving directly affected communities ensures that regulatory measures are culturally appropriate and widely supported. Community-led monitoring programs, where locals are trained and employed to oversee fishing activities, can enhance compliance and reduce illegal fishing. Southern blue criminology emphasizes integrating local knowledge and socio-economic contexts into environmental governance. In the Philippines, this means recognizing the unique challenges faced by small-scale fishers and addressing the socio-economic drivers of illegal fishing. Initiatives such as co-management of marine protected areas, where local communities participate in decision-making processes, can lead to more equitable and effective conservation outcomes.

The sea cucumber fishery in the Seychelles could also benefit from a carrot-and-stick approach by providing incentives for sustainable harvesting practices and imposing penalties for illegal activities which should include consideration of environmental restorative justice principles in cases where transgressions are minor. Provision of starting capital and measures to overcome barriers-to-entry to legal supply chains and markets, such as training for sustainable sea cucumber farming and processing, can offer fishers alternative livelihoods. Meanwhile, enforcement of quotas and licensing regulations, combined with environmental restorative justice approaches to offending, can deter illegal harvesting ([Dore et al., 2022](#)).

A whole-of-society approach involves the participation of all stakeholders, including fishers, processors, government agencies, and civil society organizations, in the management of the sea cucumber fishery. This method can enhance transparency and accountability, ensuring that regulations are enforced fairly and effectively. Community-based monitoring programs, where local fishers are empowered to report illegal activities, can improve compliance and protect sea cucumber populations. [Berg and](#)

[Shearing \(2011\)](#) emphasize the importance of involving directly affected communities in the regulatory process to ensure that measures are practical and culturally appropriate. Recognizing that many fishers engage in illegal activities due to economic necessity, policies should address underlying socio-economic issues. Providing access to alternative livelihoods and ensuring fair market prices for sustainably harvested sea cucumbers can reduce the incentive for illegal activities. [Hübschle and Berg \(2024\)](#) highlight the need for governance frameworks that consider the complex realities of different regions, promoting solutions that are both equitable and sustainable.

Integrating gender-sensitive strategies is essential for a comprehensive approach to combating TMEC. By incorporating gender-disaggregated data collection and participatory methods, we can ensure that diverse voices, including those of women, are considered in policy development and implementation. Policies and regulations must integrate gender perspectives to ensure both men and women benefit equitably. Community engagement programs should actively involve women, particularly in local monitoring and enforcement roles, to enhance the effectiveness of conservation and crime fighting efforts ([International Union for Conservation of Nature, 2024](#)). Economic support and livelihood diversification initiatives, such as sustainable aquaculture and eco-tourism, should target all genders, with specific microfinance and training programs for women to reduce economic dependence on illegal activities. Extensive literature reviewed by the [International Union for Conservation of Nature \(2024\)](#), suggests that women involved in environmental decision-making leads to enhanced green policies. Education and awareness campaigns should be inclusive and challenge cultural norms that limit women's participation in maritime and environmental sectors ([International Union for Conservation of Nature, 2024](#)). Legal frameworks must address gender-based violence and exploitation linked to TMEC, promoting gender equality within law enforcement agencies. Reflecting on the examples, in the Philippines, community-led monitoring and alternative livelihoods for women may reduce the propensity for illegal fishing, while capacity-building and gender inclusive decision-making in fisheries management in the Seychelles can ensure sustainable sea cucumber harvesting. These gender-sensitive approaches not only address specific needs and vulnerabilities but also leverage women's strengths in the fight against maritime environmental crimes, fostering more inclusive, effective, and sustainable solutions, as encouraged by the [International Union for Conservation of Nature \(2024\)](#).

Integrating the carrot-and-stick approach with whole-of-society perspectives and blue and southern blue criminology offers a robust framework for addressing TMEC. By combining incentives and penalties, engaging all stakeholders, and considering local socio-economic contexts, these strategies can foster sustainable and equitable solutions. The case studies of illegal fishing in the Philippines and sea cucumber trafficking in the Seychelles demonstrate the practical application of these concepts, highlighting their potential to promote compliance, protect marine environments, and support the livelihoods of local communities.

6 Conclusion

Transnational Maritime Environmental Crimes present a multifaceted harmscape to global marine ecosystems and the socio-economic stability of coastal communities, particularly in the Global South. The convergence of environmental degradation, weak regulatory frameworks, and the high profitability of illegal activities creates a complex landscape that requires nuanced and collaborative solutions. The effectiveness of the carrot-and-stick approach is supported by numerous case studies. For example, in Brazil, a combination of incentives for sustainable farming and strict penalties for deforestation has led to significant reductions in illegal logging activities (Börner et al., 2015). This paper has highlighted the critical need for a comprehensive approach that integrates the carrot-and-stick approach with whole-of-society and blue and southern blue criminology perspectives.

The carrot-and-stick approach emphasizes the importance of balancing incentives and penalties to encourage compliance and deter illegal activities. By leveraging incentives for sustainable practices and providing alternative livelihoods, while also enforcing penalties for non-compliance, it is possible to create a more balanced and effective regulatory environment. The case studies of illegal fishing in the Philippines and sea cucumber trafficking in the Seychelles underscore the practical application and potential success of this approach.

Furthermore, the whole-of-society approach calls for the involvement of all stakeholders, including governments, the private sector, civil society, and local communities including women. By fostering a sense of ownership and responsibility among all actors, this method promotes more sustainable and effective conservation and crime prevention outcomes. Blue and southern blue criminology enriches this framework by incorporating perspectives from the Global South, ensuring that policies are context-sensitive and equitable.

We recommend addressing TMEC through a multifaceted and collaborative approach that goes beyond traditional regulatory frameworks. By integrating the carrot-and-stick approach with whole-of-society, and blue and southern blue criminology perspectives, we can develop more resilient and sustainable solutions to protect marine environments and support the livelihoods of vulnerable communities. Future research and policy efforts should continue to explore and refine these strategies, ensuring that they are adaptable to the dynamic challenges posed by TMEC, ensuring that responses are adaptable to the dynamic and complex challenges posed by these crimes.

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Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding authors.

Author contributions

JL: Conceptualization, Project administration, Writing – original draft, Writing – review & editing. AH: Conceptualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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