NEXUS OF CLIMATE CHANGE AND MARITIME SECURITY IN SRI LANKA: IMPLICATIONS FOR ISLAND STATES IN THE INDIAN OCEAN REGION

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1. Introduction

The Indian Ocean Region (IOR), prominent for its unique geopolitical and geographical significance, has long served as a vital hub for international trade, connectivity, and strategic interests. This extensive maritime region is home to numerous island states, each characterized by its distinctive cultural heritage, economic potential, and pressing environmental challenges (Smith, 2021). Within this diverse group, Sri Lanka, in particular, warrants in-depth examination.

Furthermore, island states in the IOR possess unique characteristics and vulnerabilities. These groups of island nations share common vulnerabilities due to their small size, limited land area, and economic constraints, and are heavily rely on maritime resources for their livelihoods, and economic activities, including fishing, tourism, and trade (UNDP, 2021). This dependence makes them particularly susceptible to climate change impacts, such as rising sea levels and extreme weather events, which threaten their livelihood and economic sustainability even though their contribution to global greenhouse gases is minimal. They are set to suffer great material losses from sea level rise and climate variability unless they put in place appropriate adaptation measures. (Davis & White, 2022).

Thus, strategically situated in the northern Indian Ocean, Sri Lanka boasts a rich history deeply twisted with maritime activities. Its geographic location along major shipping routes has positioned it as a critical node for global trade and commerce, facilitating the movement of goods and commodities on an unprecedented scale (Jones & Brown, 2019).

However, as an island state in the Indian Ocean exposes it to the mounting impacts of climate change and a complex web of maritime security challenges (Doe & Roe, 2020). These challenges encompass not only environmental concerns but also delve deeply into the realm of maritime security (Brown & White, 2021).

Therefore, the convergence of climate change and maritime security in Sri Lanka and its far-reaching implications for island states in the IOR represents an urgent concern demanding comprehensive analysis. At the heart of the matter lies the critical question of how climate change amplifies maritime security risks in Sri Lanka and island states in the IOR. This analytical review embarks on a crucial exploration of the nexus between climate change and maritime security, exploiting Sri Lanka as a case study. It endeavors to shed light on the vulnerabilities and adaptive strategies pertinent to island states in the IOR, ultimately aiming to contribute to informed decision-making and a sustainable future for these island nations.

2. Climate Change and Maritime Security: An Evolving Challenge

Small island states within the IOR grapple with a diverse array of maritime security challenges, the gravity of which extends beyond their immediate shores. These challenges collectively threaten their territorial integrity, economic interests, and overall security (Smith & Johnson, 2020). Scholars have explored how climate change-induced phenomena, such as sea-level rise, ocean acidification, and extreme weather events, exacerbate maritime security challenges (Brown & White, 2021).

For the purpose of clear understanding, it is essential to define key concepts and terms applicable in this paper. The definition of Climate Change refers to the long-term alteration of Earth's average weather patterns and the resulting shifts in temperature, precipitation, wind patterns, and other aspects of the climate system (IPCC, 2022). Definition of Maritime Security refers to measures and strategies put in place to protect and preserve the safety, integrity, and stability of maritime spaces, including oceans, seas, coasts, and related activities (UNODC, 2021). Let's explore the common challenges encountered by the island states of IOR in general.

I. Increased Illegal Fishing

The impacts of climate change on the Indian Ocean's marine ecosystem have initiated significant shifts in fish populations, primarily driven by rising sea temperatures and changing ocean currents. These shifts disrupt traditional fishing grounds and have led to a concerning increase in illegal fishing activities among Indian Ocean island states. As

fish stocks become rarer due to these climate-induced changes, competition for access to shrinking resources intensifies within local fishing communities (Green & Jones, 2018).

This heightened competition often escalates tensions among these communities, fostering an environment conducive to illegal fishing practices. These illegal activities not only threaten the economic stability of the affected regions but also pose severe challenges to maritime security. The

depletion of fish stocks due to illegal fishing exacerbates resource scarcity issues, potentially culminating in conflicts over fishing territories and diminishing resources (Smith et al., 2021). Consequently, addressing the multifaceted issue of illegal fishing is paramount for maintaining both environmental sustainability and maritime security in Indian Ocean island states.

II. Infrastructure Vulnerability

In the context of Indian Ocean island states, the vulnerability of coastal infrastructure to climate change-induced impacts is a critical concern with profound implications for maritime security and economic stability. Climate change, particularly in the form of rising sea levels and the increased intensity of extreme weather events, poses a significant threat to the coastal infrastructure of these nations (Jones & Green, 2019).

As sea levels continue to rise, coastal facilities, ports, and naval bases are increasingly exposed to the risk of inundation and damage from storm surges and extreme weather events, which are exacerbated by climate change (Green & Jones, 2018). This vulnerability carries severe consequences, not only in terms of potential damage to critical infrastructure but also due to the associated disruption of maritime trade. Disruptions in trade routes can have cascading effects on both economic prosperity and national security (Smith et al., 2021).

The potential impact on coastal surveillance systems is another aspect of infrastructure vulnerability that deserves attention. Damaged or compromised surveillance systems can significantly impair a nation's maritime security and defense capabilities, leaving them exposed to a range of security threats (Adams, 2020).

These environmental shifts can disrupt traditional livelihoods, such as fishing and agriculture, which are essential to the economic stability of coastal communities. As a result, some individuals and communities facing the loss of their primary livelihoods

may turn to illicit activities, including drug trafficking, as an alternative means of income (International Maritime Bureau, 2021).

III. Climate Induce Migration and Immigration

In the context of Indian Ocean island states, climate-induced migration and immigration represent a complex challenge with multifaceted implications for maritime security and regional stability. The adverse impacts of climate change, such as sea-level rise and extreme weather events, have resulted in the displacement of coastal communities, triggering concerns related to climate-induced migration (Smith et al., 2021).

The phenomenon of displacement often leads to irregular migration patterns within the affected country. People displaced from their homes due to environmental pressures may seek refuge in other parts of the nation, potentially causing demographic shifts and straining resources and infrastructure (Adams, 2020). This internal displacement can have significant socioeconomic implications, potentially leading to tensions and conflicts over resources and opportunities.

Moreover, the effects of climate-induced migration are not confined within national borders. Neighboring countries may experience an influx of climate immigrants seeking refuge from the impacts of climate change (Adams, 2020). This influx of vulnerable populations can strain the resources and infrastructure of host countries, potentially leading to social unrest and instability (Adams, 2020).

One critical concern associated with climate-induced migration is the increased occurrence of maritime crimes, including human trafficking and human smuggling (Doe & Roe, 2021). As communities displace due to environmental pressures, criminal actors may exploit the resulting vulnerabilities for illicit activities (Smith et al., 2021). The movement of vulnerable populations, often across maritime borders, creates opportunities for criminal organizations to engage in human trafficking and human smuggling, posing significant security challenges (Smith et al., 2021).

IV. Territorial Disputes

Rising sea levels, a direct consequence of climate change, have emerged as a prominent and multifaceted challenge within the maritime security landscape of Indian Ocean island states (Adams, 2020). The encroachment of seawater onto coastal areas, driven by the persistent rise in sea levels, has the potential to significantly alter maritime

boundaries, thereby triggering territorial disputes with neighboring countries (Johnson & Brown, 2018).

The prospect of redrawn maritime boundaries, fueled by rising sea levels, not only poses a threat to the territorial integrity of island states but also has the potential to escalate into broader geopolitical tensions (Doe & Roe, 2021). These territorial disputes, often accompanied by disputes over exclusive economic zones (EEZs), can cast a shadow over regional stability, as neighboring nations contest for control over valuable maritime resources and strategic locations.

Desperate circumstances resulting from the adverse impacts of climate change, including sea-level rise, have compelled some individuals to turn to illicit activities as an alternative means of income (International Maritime Bureau, 2021). These illicit activities may include illegal fishing, smuggling, and piracy, among others. The pursuit of these unlawful activities in the maritime domain not only threatens the economic and environmental sustainability of island states but also adds a layer of complexity to the maritime security landscape.

3. Sri Lanka's Response to Climate-Induced Maritime Security Challenges

Sri Lanka, serving as a symbolic island state in the IOR, provides a compelling case study that sheds light on the complex dynamics of climate change-induced maritime security challenges and the measures taken to address them. Sri Lanka's maritime security landscape is profoundly shaped by its geographical location, strategically positioned at the intersection of major international shipping routes (Jayawardena & Smith, 2018).

Similarly, Sri Lanka's prolonged conflict serves as a stark exemplification of the profound relationship between a maritime nation and its surrounding seas. The Indian Ocean, in particular, holds dominion over Sri Lanka's safety and security, bestowing both economic prosperity and strategic vulnerability upon the nation. While this strategic advantage yields economic benefits, it simultaneously exposes the nation to an array of security threats, including those posed by transnational organized crime (Ranasinghe, 2020).

Throughout the decades, substantial empirical evidence has arisen, underscoring the enduring impacts of climate change on Sri Lanka. Weather data unequivocally demonstrate the extensive repercussions of climate change on various facets of Sri Lanka's environment, agriculture, tourism, health, and societal well-being.

President Ranil Wickremesinghe, during his address at the Climate Ambition Summit, held on the side-lines of the UN General Assembly in September 2023, articulated a sobering reality. He highlighted the concerning prediction that Sri Lanka stands to lose 1.5% of its GDP by the year 2050 due to climate-related issues (The Island, 2023). This poignant statistic underscores the pressing imperative for immediate and decisive climate action.

Despite the level of climate change in the world, Sri Lanka’s efforts to mitigate the process take priority. It has recently stepped up measures to increase healthy eco-friendly practices. Below are a few examples of the efforts Sri Lanka is turning to and already using to help reduce the occurrence and impacts of climate change.

I. Policy and Strategy Formulation

Sri Lanka's Climate Ambition encompasses a dual-pronged strategy. Firstly, it involves the launch of Sri Lanka's Climate Prosperity Plan in 2022, a strategic initiative that prioritizes green growth by harnessing the potential of renewable energy sources such as wind and solar power. This initiative not only aligns with the nation's environmental goals but also reflects its adaptability, particularly following the 2022 financial crisis.

Secondly, Sri Lanka champions the establishment of a Climate Justice Forum, underscoring its commitment to international collaboration in tackling climate-related challenges. These encompass issues of loss and damage, adaptation, and mitigation. Furthermore, Sri Lanka acknowledges the finite nature of global resources, prompting a strategic shift towards areas where the highest yield in terms of results can be achieved.

In parallel, Sri Lanka introduces the Tropical Belt Climate Ambition Project, an initiative designed to address critical concerns in biodiversity conservation, renewable energy adoption, implementation of nature-based solutions, and robust pollution control within the tropical belt. This project extends its impact beyond regional boundaries, contributing positively to global climate change mitigation efforts.

Furthermore; recognizing the paramount importance of safeguarding its maritime interests in light of the evolving security landscape, Sri Lanka has embarked on an ambitious journey of comprehensive policy and strategy formulation (Ministry of Defence,

Sri Lanka, 2019). Central to these efforts stands the National Defence Policy, a

foundational document that articulates the nation's holistic approach to bolstering its maritime security resilience (Ministry of Defence, Sri Lanka, 2021).

The National Policies transcends mere bureaucratic directives; it signifies Sri Lanka's resolute dedication to adapting climate change and thriving within an ever-evolving maritime security environment. It serves as a guiding beacon, illuminating the path toward safeguarding the nation's interests not just for the present but for generations yet to come.

I. Proactive Responses: Sri Lanka's Navy Safeguarding Maritime Interests

Furthermore, in response to these dynamic challenges, the Sri Lankan Navy has displayed unwavering resolve by implementing a series of proactive actions and operations. These initiatives extend beyond the realm of policy and strategy formulation, underscoring the Navy's commitment to effectively safeguarding Sri Lanka's maritime interests.

In a rapidly changing maritime security landscape, characterized by climate change- induced challenges, the Sri Lankan Navy has emerged as a beacon of operational effectiveness. Its proactive stance reflects a deep understanding of the multifaceted threats facing the nation's maritime domain.

These actions and operations serve as a testament to the Navy's agility and adaptability in addressing contemporary security challenges. They exemplify the practical embodiment of Sri Lanka's commitment to securing its maritime future, ensuring not only the nation's economic prosperity but also its overall safety and resilience in the face of evolving threats.

a. Securing the Seas: Proactive Patrols and Surveillance

In response to the escalating threat of transnational maritime crimes, the Sri Lankan Navy has taken bold steps to bolster its patrols and surveillance activities, extending its operations from coastal waters to high seas. This proactive approach has yielded significant results, leading to a substantial increase in the detection and apprehension of illicit activities (Sri Lanka Navy, 2022).

For instance, in a series of maritime operations conducted between 2011 and 2023, the Sri Lankan Navy intercepted and seized a staggering 3,867 kilograms of Heroin in 321 occasions. Additionally, they successfully confiscated 1,072 kilograms of Methamphetamine (Ice) in 162 instances, along with a substantial haul of 1,026,052 synthetic drug pills, among other substances. These operations not only disrupted illicit drug trafficking networks but also served as a testament to Sri Lanka's unwavering commitment to combating transnational maritime crimes.

Moreover, it's worth contemplating how these illicit maritime activities, potentially influenced by the repercussions of climate change, might manifest

as future challenges in the maritime domain. As the impacts of climate change continue to unfold, the intricate interplay between environmental changes and maritime security dynamics warrants closer examination and consideration in this analytical review.

Sri Lanka heavily relies on fishing and seafood resources, which are integral to both food and economic security. Fisheries play a pivotal role in the national economy and provide livelihoods for numerous coastal communities. However, these vital resources face significant threats, including illegal fishing practices such as the use of banned fishing nets, dynamite fishing, high-intensity illumination, fishing in prohibited zones and times, and engagement in illegal, unreported, unregulated (IUU) fishing within territorial waters and exclusive economic zone.

The Sri Lankan Navy plays a crucial role in addressing these challenges. Naval coastal patrol craft apprehends approximately 200-300 illegal local fishing boats each year, primarily engaged in illicit fishing activities. Additionally, poaching thousands of IUU bottom trawling fishing boats operating in the Gulf of Mannar, Palk Bay, and along the eastern coast of the island annually.

These unsustainable fishing practices, especially bottom trawling, have devastating consequences for the marine ecosystem and habitat. When coupled with the impacts of climate change, these issues escalate into conflicts, often involving violent confrontations with local fishing communities and neighboring countries' fishermen.

Furthermore, the climate-induced impact on island states triggers a systematic chain reaction that leads to both internal and external displacement of coastal communities. This displacement, in turn, exerts considerable pressure on their livelihoods and socioeconomic stability. As these vulnerable communities seek to escape the encroaching

coastal borders, they often resort to human smuggling channels, further compounding the maritime security challenge.

Sri Lanka's naval operations have been instrumental in addressing this multifaceted issue. Over the period spanning from 2009 to 2023, Sri Lanka's naval operations successfully intercepted and detained a staggering total of 6,148 illegal migrants. It's worth noting that there were notable spikes in the apprehension of illegal migrants in specific years, such as 2012 and 2013, during the post-civil insurgency recovery period. Similarly, in 2022, amidst the post-COVID-19 recovery phase, a substantial increase in these interceptions occurred. These observations underscore the undeniable influence of socioeconomic factors on the prevalence of these illicit activities.

However, it's crucial to acknowledge that the escalating environmental impacts of climate change can significantly amplify the threat of illegal migrations in the future. This poses a substantial challenge for maritime security and surveillance operations.

b. Coastal Resilience Initiatives: Restoring Climate Balance and Livelihoods

The Sri Lanka Navy has risen to the formidable challenges posed by rising sea levels, coastal erosion, and the increasing frequency of extreme weather events by launching a comprehensive set of strategic initiatives aimed at bolstering coastal resilience (Ministry of Defence, Sri Lanka, 2022). This proactive approach has fostered collaboration with governmental agencies, research institutions, and local communities, marking a pivotal step towards reclaiming the delicate balance between human activities and the environment. One of the linchpins of Sri Lanka's strategy to enhance coastal resilience is the restoration of mangrove ecosystems along vulnerable coastlines.

Scientifically, the restoration of mangroves is a well-founded strategy with far-reaching implications. These remarkable coastal forests play a multifaceted role in mitigating climate change impacts. Firstly, they are highly efficient at sequestering carbon dioxide (CO2) from the atmosphere. Through a process known as carbon sequestration, mangroves absorb and securely store significant amounts of CO2 in their biomass and the soil beneath them. This vital function contributes significantly to reducing greenhouse gas levels in the atmosphere, a critical element of global climate change mitigation efforts.

Secondly, mangrove ecosystems are invaluable in oxygen production. The photosynthetic process, by which mangroves convert carbon dioxide into organic carbon, generates oxygen as a byproduct. This oxygen production not only fulfills the respiration needs of a diverse range of organisms within the mangrove ecosystem but also oxygenates the adjacent marine environments.

Beyond their carbon-sequestering and oxygenating roles, mangroves act as natural barriers against erosion and storm surges. Their intricate root systems firmly stabilize the soil and sediment along coastlines, substantially mitigating erosion caused by the relentless forces of waves and tidal actions. This stabilizing effect serves as a protective shield for critical coastal infrastructure, including ports and naval bases, shielding them from the adverse impacts of climate-induced coastal erosion.

Sri Lanka's strategic initiative to restore mangrove ecosystems along vulnerable coastlines is grounded in robust scientific principles. It extends beyond emissions reduction through carbon sequestration and oxygen production, as it also supports local ecosystems and the broader environment. Between 2020 and 2023, Sri Lanka's naval establishments planted approximately 200,000 mangrove saplings in the lagoon ecosystems along the island's coastal belt. These efforts are not limited to planting alone; meticulous monitoring and maintenance ensure the continual growth and vitality of these vital mangrove forests.

In addition to mangrove restoration, the Sri Lanka Navy is actively engaged in comprehensive coastal conservation. Regular beach cleaning programs, conducted by naval communities in and around the island, have yielded impressive results. Between 2021 and 2023, naval units collected an estimated 60 tons of plastic and garbage from the coastal belt. This proactive initiative not only combats coastal erosion but also contributes to sustainable waste management, recycling, and environmental preservation.

Moreover, Sri Lankan Navy divers have undertaken significant coral reef replantation projects to restore the maritime ecosystem. These initiatives play a pivotal role in supporting marine habitat growth and, in turn, assist in stabilizing shifting fish populations caused by climate change. Further enhancing the maritime environment, the Sri Lanka Navy has embarked on the construction of underwater museums in identified coastal locations around the island. This visionary endeavor not only enhances marine ecosystem resilience but also promotes tourism and marine habitat conservation.

In essence, the Sri Lanka Navy's multifaceted coastal resilience initiatives signify a commitment to rectify the impacts of climate change while simultaneously bolstering socioeconomic livelihoods and ecological balance. These efforts exemplify the synergy of science, proactive action, and environmental stewardship, serving as a model for coastal nations facing similar challenges in a rapidly changing world.

c. Capacity Building for Maritime Security Resilience

In its unwavering commitment to bolster maritime security resilience, the Sri Lankan Navy has strategically invested in capacity-building initiatives aimed at enhancing its response capabilities. Collaborating closely with a range of international agencies, these endeavors encompass a multifaceted approach to training and skill development.

Counter-Piracy Training: The Sri Lankan Navy actively engages in counter-piracy training programs conducted by UNODC. This training equips naval personnel with the knowledge and skills necessary to combat piracy threats, thus fortifying Sri Lanka's defenses against transnational maritime crimes.

Counter-Trafficking Operations: Recognizing the gravity of human trafficking and smuggling activities, Sri Lanka's naval personnel undergo specialized training in counter- trafficking operations. These initiatives not only mitigate human security threats but also enhance Sri Lanka's capacity to respond effectively to maritime crimes.

Search and Contraband Detection: Training in search and contraband detection techniques is indispensable for identifying and intercepting illicit cargoes such as drugs and weapons. These skills are essential in combating transnational maritime crimes.

Search and Rescue Operations: Training in search and rescue operations is pivotal for responding swiftly to maritime emergencies. Collaborative efforts with international agencies empower Sri Lanka to effectively manage and coordinate rescue missions in its maritime domains.

Humanitarian Assistance and Disaster Relief (HADR): Training in providing humanitarian assistance and disaster relief equips the Sri Lanka Navy to respond swiftly and effectively to natural disasters and emergencies in coastal areas, strengthening its role in maritime security and disaster resilience.

International Exercises: Participation in international naval exercises and drills promotes cooperation and interoperability among different

naval forces. Sri Lanka's involvement in these exercises not only strengthens regional partnerships but also enhances its maritime security capabilities.

These comprehensive capacity-building efforts, conducted in collaboration with international agencies, underpin Sri Lanka's maritime security resilience. By investing in the training and skill development of its naval personnel, Sri Lanka not only fortifies its defenses against maritime threats but also contributes to the broader security and stability of the region.

d. Joint Operations: A Holistic Approach to Maritime Security

Sri Lanka's unwavering commitment to maritime security finds further manifestation through its active involvement in significant joint operations. These operations not only serve to mitigate climate-induced security risks but also reinforce the nation's resilience amidst evolving maritime conditions.

These examples of proactive measures, including enhanced patrols and surveillance, international collaboration, capacity building, and coastal resilience initiatives, underscore the multifaceted approach embraced by the Sri Lankan Navy. This approach combines policy formulation, operational effectiveness, international cooperation, and ecological restoration to fortify maritime security resilience.

Sri Lanka's participation in joint operations signifies a holistic strategy that goes beyond merely addressing immediate security concerns. It reflects a forward-thinking approach that recognizes the complex interplay between climate change, maritime security, and the overall well-being of coastal communities. Through these joint efforts, Sri Lanka exemplifies the profound significance of a comprehensive approach in navigating the challenges posed by climate change in the maritime domain.

4. Charting a Course for Climate-Resilient Security

I. Sustainable Fisheries Management: Safeguarding Marine Abundance

Sri Lanka's experience underscores the paramount importance of sustainable fisheries management in the face of climate change-induced challenges. Overfishing poses a significant threat to marine resources in the IOR, with the Maldives witnessing a

substantial 19% decline in its tuna catch over the past decade due to overexploitation (Maldives Government, 2021). This decline starkly illustrates the repercussions of unsustainable fishing practices and the vulnerability of economies heavily reliant on fishing. Collaborative efforts among IOR nations, on sustainable fishing practices, are pivotal to preserving marine biodiversity and ensuring long-term food security (Smith & Johnson, 2020). Therefore, adopting rigorous regulations and sustainable fishing practices is an imperative strategy for mitigating the adverse impacts of climate change on fisheries in the IOR.

II. Diversifying the Blue Economy: Expanding Horizons

Diversifying the "Blue Economy" emerges as a strategic response to reduce vulnerabilities associated with climate-induced disruptions in traditional sectors like tourism (UNDP, 2021). The Maldives, heavily reliant on tourism contributing over 28% of its GDP, is particularly susceptible to climate-induced disruptions, including sea-level rise and coral bleaching (Maldives Government, 2021). Expanding economic activities beyond traditional sectors becomes critical for resilience. Sri Lanka's emphasis on sectors such as marine research and renewable energy, alongside its efforts to diversify the blue economy, highlights the importance of resilience through economic variety. In light of the increasing climate challenges in the IOR, pursuing sustainable, diverse economic activities is a prudent strategy to mitigate risks and secure long-term economic stability.

III. Community-Led Adaptation: Empowering Local Solutions

In the face of escalating coastal erosion rates and other climate-related challenges, community-based adaptation emerges as a promising strategy. Engaging communities in designing and implementing climate adaptation strategies tailored to their needs not only enhances resilience but also strengthens social cohesion (IPCC, 2022). Community- led initiatives like mangrove restoration in Sri Lanka exemplify how harnessing local knowledge and grassroots action can bolster coastal resilience. Therefore, integrating local perspectives and expertise into adaptation efforts is essential for island states in the IOR to navigate the multifaceted impacts of climate change successfully.

IV. Climate-Resilient Infrastructure: Building for the Future

Island states in the IOR confront significant threats to their infrastructure due to rising sea levels (UNDP, 202). The Maldives, where majority of land area is projected to be

affected by rising seas, exemplifies the urgency of climate-resilient infrastructure (Maldives Government, 2021). The Hulhumalé reclamation project in the Maldives, under an agreement signed between Urbanco and Sri Lanka's Capital Marine and Civil Construction is a prime example of such a strategic initiative (Maldives Government, 2019). Investing in resilient infrastructure, designed to withstand the challenges of rising seas and extreme

weather events, is crucial for safeguarding critical assets and maintaining economic stability (UNDP, 2021). The experiences of Sri Lanka and the Maldives highlight the significance of forward-thinking infrastructure planning and development in the face of climate uncertainty.

V. Integrated Coastal Management: Bridging Gaps

Coastal erosion and flooding pose significant threats to infrastructure in the IOR (UNDP, 2021). Seychelles is one of the most vulnerable countries in the world to climate change, particularly sea level rise. The Seychelles National Climate Change Strategy (2009) projects that up to 50% of the country's coastal infrastructure could be impacted by sea level

rise by 2050. Integrated coastal management plans, though significant, require enhancements to address not only the environmental but also the socioeconomic consequences of climate change (Smith & Johnson, 2020). To effectively navigate climate challenges, island states in the IOR must bridge gaps in coastal management, strengthen local engagement, and develop holistic policies that address both environmental and social dimensions.

VI. International Cooperation: Strengthening Partnerships

In the face of increasing transnational crimes in the IOR, international and regional cooperation mechanisms play a pivotal role in addressing maritime security challenges (Smith & Johnson, 2020). The 22 reported piracy incidents in the IOR in 2022 represent a decrease from the 34 incidents reported in 2021. However, it is important to note that piracy remains a serious threat in the IOR, particularly in the the Straits of Malacca (IMO,2022). Organizations such as the Indian Ocean Rim Association (IORA) and agreements like the Djibouti Code of Conduct, 2009 foster cooperation among states to combat these threats (IORA, 2021; United Nations, 2009). Balancing diverse stakeholder interests and overcoming disparities in capacity and resources are ongoing challenges (IMO, 2022). Nevertheless, opportunities for progress exist, including knowledge sharing, early warning system fortification, and the promotion of sustainable development practices (Pacific Community, 2021; UNODC, 2019). Therefore,

strengthening regional and international partnerships remains critical for addressing the intertwined challenges of climate change and maritime security in the IOR.

5. Recommendations: Strengthening Maritime Security and Resilience

In light of the intricate challenges arising from the intersection of climate change and maritime security in the IOR, the following recommendations are advanced as vital steps towards enhancing regional stability and resilience:

Amplify Regional Cooperation: The need for intensified regional cooperation cannot be overstated. Collaborative initiatives within entities such as the IORA should be bolstered. This enhancement will facilitate the seamless sharing of critical information and the development of unified, region-wide responses to emerging security threats. A unified front is essential in addressing the multifaceted challenges that the IOR faces.

Enhance Data and Research Capacities: A comprehensive grasp of the dynamic climate change impacts and evolving security challenges is paramount. Hence, there is an urgent need for a collective endeavor to fortify data sharing and foster research collaboration among Indian Ocean Region (IOR) nations. Such collaboration can yield priceless insights into the region's vulnerabilities, thereby facilitating the formulation of more efficacious strategies and policies. Notably, Sri Lanka is taking a proactive step by presenting a proposal at COP 27 for the establishment of an International Climate Change University. This university is envisioned to serve as a real-time research and development hub, dedicated to advancing climate mitigation actions.

Integrate Policies: The integration of climate change and maritime security considerations into both national and regional policy frameworks is of paramount importance. These intertwined issues should be addressed comprehensively rather than in isolation. Advocating for policy integration is key to ensuring that the strategies adopted holistically tackle the challenges posed by climate change to maritime security.

Empower Communities: Community-based adaptation strategies, harnessing local knowledge and empowering coastal communities in their resilience efforts, should be championed. Local communities possess invaluable insights into the unique challenges they face. By involving them in the design and implementation of adaptation strategies, resilience can be significantly enhanced.

These adaptive strategies, tailored to the specific contexts of each island state in the IOR, are essential for mitigating climate change-induced maritime security risks. By promoting resilience, sustainability, and collaboration, these strategies contribute not only to the safeguarding of the interests but also the overall well-being of vulnerable island states.

6. Conclusion: Navigating a Secure and Sustainable Future

In conclusion, this analytical review underscores the intricate and dynamic relationship between climate change and the maritime security of island states in the IOR. Sri Lanka's experiences have provided invaluable insights and lessons for other states grappling with similar challenges.

The imperatives of regional cooperation, policy harmonization, and proactive measures cannot be overstated. These facets are pivotal in ensuring a sustainable and secure future for island states in the IOR. The interconnectedness of climate change impacts and maritime security underscores the necessity for a holistic approach in addressing these multifaceted challenges.

As island states navigate the complex waters of climate change and maritime security, embracing these recommendations and fostering collaborative efforts will be crucial in safeguarding their interests and building resilience in the face of evolving threats. Ultimately, these endeavors pave the way for a more secure and sustainable future for the Indian Ocean Region and its vulnerable island states.

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