

The Sundarbans: A Mangrove Microcosm Shaping South Asian Geopolitics

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Abstract

The Bengal Basin and the Bay of Bengal have historically connected South Asia. This article examines how the Sundarbans, a vast mangrove forest shared by India and Bangladesh, shape the geopolitical landscape of South Asia. The Sundarbans' significance goes beyond national borders, impacting the region's economic ties, environmental health, cultural exchange, and strategic partnerships. The research employs environmental security and governance theories to analyse the Sundarbans' multifaceted influence on the region's geopolitics. The analysis focuses on three key areas: ecological interdependence, the blue economy, and governance structures. This approach reconnoitres the interplay between local dynamics within the Sundarbans and the broader regional context. While previous investigations recognise the Sundarbans' ecological significance, their role in shaping South Asian geopolitics has been understudied. The article emphasises the Sundarbans' critical position in maintaining regional biodiversity, mitigating climate change impacts, and protecting coastlines. Additionally, it supports the blue economy by enduring activities like fishing and potentially offering resources for economic development. However, challenges exist. Maritime security concerns, intricate border management, and regional rivalries in the Bay of Bengal pose noteworthy threats. The Sundarbans are a captivating case study, highlighting how seemingly local environmental issues can have profound geopolitical consequences. The article concludes by calling for a unified regional approach highlighting ecological sustainability, economic development, and enhanced maritime security cooperation. This collaborative approach would promote stability and shared prosperity across South Asia, benefiting India and Bangladesh.

Keywords: *Sundarbans, geopolitics, South Asia, environment, economy, security, cooperation, sustainability.*

Introduction

The vast Sundarbans mangrove forest, straddling the India-Bangladesh border, transcends its ecological grandeur to emerge as a key player in shaping the evolving geopolitics of South Asia. The Sundarbans' dense network of waterways, rich biodiversity, and strategic location places it at the centre of regional

dynamics concerning economic integration, security cooperation, environmental sustainability and cultural exchange. While there is a wealth of literature on the ecological significance of the Sundarbans, little is known about its multi-level governance structure and its impact on the economy, especially the circular economy. This paper delves deep into this unexplored territory, examining how the mangroves and their local habitats act as microcosms, magnifying regional trends. The Sundarbans' ecological health is linked to regional power dynamics through environmental geopolitics. Its role as a natural safeguard against climate change and natural disasters, a key centre for the blue economy and a source of sustainable resources, and the challenges of maritime security and border management in this complex mangrove maze. Understanding the Sundarbans' multifaceted impact can secure its ecological future and promote a more stable, prosperous South Asia. By harnessing its potential and working together, we can create a united regional approach that prioritises ecological sustainability, economic growth, maritime security cooperation, and a brighter future for the Sundarbans and the wider region. Internally, they act as a natural barrier against cyclones, storm surges, and tsunamis, protecting millions living in coastal communities from natural disasters. This translates to reduced economic losses and humanitarian crises, bolstering regional stability.

In addition, mangroves are an asset to the range of livelihoods, including fisheries and aquaculture, as well as honey manufacturing and tourism. The sustainable management of these sources ensures economic well-being and the reduction of the potential for any economic and social unrest. Externally, illegal activities such as piracy and infiltration challenge the Sundarbans' intricate waterways. In order to protect the marine environment, safeguard trade routes, and avoid potential threats, effective management and collaboration between coast authorities must be ensured. Preserving the Sundarbans is vital to the environment and an investment in the region's internal and external security, ensuring a more stable and prosperous future for all.

Objective: The Sundarbans, the extensive mangrove forest at the heart of the Ganges Delta, surpass their ecological magnificence to intertwine an intricate tapestry of effect on the evolving geopolitics of South Asia. This research delves into this interwoven fabric, seeking to untie the multilayered effect of the Sundarbans on an array of perilous geopolitical aspects, ultimately aiming to foster regional stability and prosperity.

Environmental Governance: We examine the existing frameworks surrounding the Sundarbans, assessing their effectiveness in ensuring the ecosystem's sustainable management and ability to adapt to climate change and other environmental challenges. This paper delves into the various stakeholders involved, including national governments, international organisations, and local communities, and their roles in shaping environmental policies and practices. We explore the challenges and opportunities

for transboundary environmental cooperation between India and Bangladesh, aiming to identify potential pathways for strengthening governance and ensuring the long-term ecological health of the Sundarbans.

Economic Significance: We explore the Sundarbans' contribution to the regional blue economy, analysing its value in supporting traditional livelihoods like fishing and aquaculture and emerging sustainable practices like ecotourism. The paper investigates the Sundarbans' role as a natural capital asset, evaluating its economic potential for resource extraction while emphasising the need for sustainable and equitable management practices. We examine the impact of the Sundarbans on regional trade and investment, considering its location along vital trade routes and its potential further to facilitate economic connectivity between South Asian countries.

Intersecting Threads: This paper also emphasises the intricate inter dependence between these geopolitical aspects. We will analyse how environmental governance decisions impact the Sundarbans' economic potential and how economic activities, in turn, influence the ecosystem's health and sustainability. Furthermore, we will explore how these factors shape regional security dynamics, cultural exchanges, and overall stability. By unravelling the complex interplay between environment, governance, and economy within the Sundarbans, the paper aims to (1) Inform policy decisions related to the Sundarbans' sustainable management, promoting effective environmental governance and inclusive economic development. (2) Advocate for a collaborative approach that prioritises ecological integrity and regional prosperity, ensuring the Sundarbans continue to serve as a beacon of stability and opportunity in the heart of the Bay of Bengal.

Theoretical Foundations: The Sundarbans' influence on South Asian geopolitics extends beyond its ecological majesty. Understanding this multifaceted impact requires exploring its intricate interplay with various theoretical frameworks encompassing environmental governance, the blue economy, and broader geopolitical forces.

Polycentric governance: This framework, advanced by Elinor Ostrom (2009), acknowledges the multilayered and interconnected nature of governance structures. In the Sundarbans, this translates to understanding how local communities, national governments (India and Bangladesh), and international organisations like UNESCO interact and collaborate to manage the ecosystem. Analysing power dynamics, decision-making processes, and accountability mechanisms within this intricate web is crucial to evaluating the effectiveness of current governance practices. Ghezlbash's (2020) analysis of ocean governance highlighted the management of marine resources in the Bay of Bengal, where the Sundarbans are located. Examining international instruments like the UN Convention on the Law of the Sea and regional cooperation mechanisms like the Bay of Bengal Initiative for Multi-Sectoral

Technical and Economic Cooperation (BIMSTEC) becomes crucial for understanding how shared resources are managed and addressing potential conflicts. This framework fosters collaboration and ensures sustainable resource management across national boundaries.

Adaptive governance: Developed by Carl Folke (2005), this framework acknowledges the dynamic nature of social-ecological systems like the Sundarbans. Climate change, rising sea levels, and resource use constantly challenge the ecosystem's health. The framework tried to analyse how governance systems adapt to these challenges, learning from past experiences and incorporating flexibility into decision-making that is essential for long-term sustainability.

Equity and justice: Frameworks like Jentoch's (2018) work explore how different stakeholders access and benefit from the Sundarbans' resources. Recognising the needs and concerns of diverse communities, including fishing communities, indigenous populations, and conservation groups, is vital for ensuring fair and equitable governance practices. This framework helps identify potential power imbalances and advocate for inclusive decision-making processes.

Blue Economy:

Sustainable economic development: As Jacobs et al. (2021) emphasise, economic activities within the Sundarbans must prioritise long-term ecological sustainability. Evaluating economic practices like fishing, aquaculture, and ecotourism through this lens ensures that resource use does not compromise the ecosystem's health. Balancing economic benefits with conservation efforts is crucial for achieving sustainable development.

Circular economy: Potentially, the effect of sustainable development must accept and integrate the conservation of the environment. It originates from the idea of circular economy. The Ellen MacArthur Foundation (2023) promotes the circular economy framework, advocating for minimising waste and maximising resource reuse within the blue economy. Exploring how to implement closed-loop systems in the Sundarbans, where waste management poses significant challenges, can offer innovative solutions for sustainable economic development. This framework encourages efficient resource utilisation and minimises environmental impact.

Critical environmental geopolitics: As Bryant (2001) discussed, this framework highlights the power dynamics and inequalities embedded within environmental issues. Exploring how powerful actors influence environmental decision-making in the Sundarbans and navigating issues like climate change with diverse interests is crucial for understanding the region's geopolitical landscape.

When applied systematically, these frameworks offer a holistic lens to analyse the Sundarbans' multifaceted geopolitical significance. Their combined exploration allows us to understand the complex

interplay between environment, governance, economy, and broader geopolitical forces shaping the Sundarbans' future and ultimately influencing regional stability and prosperity.

Research Gap: While existing theoretical structures illuminate the intricate mechanism of environmental governance, the blue economy, and broader geopolitical forces, a distinct research gap remains regarding their interconnected application in understanding the Sundarbans' distinct influence on South Asian geopolitics. While individual studies have explored these factors in isolation, none have comprehensively examined their combined and dynamic interplay within the Sundarbans' specific context. This research gap brings unaddressed questions to the fore, which are as follows:

1. Bridging Governance and Economy: How effectively do polycentric governance structures incorporate blue economy principles like sustainability and circularity within the Sundarbans?

How do major power rivalries in the Bay of Bengal impact the governance and sustainability of the Sundarbans' blue economy?

How can adaptive governance mechanisms be operationalised within the multilayered context to ensure timely and effective responses to challenges like climate change and resource diminution?

Can active environmental governance in the Sundarbans raise trust and cooperation between India and Bangladesh, potentially mitigating potential border disputes and other security concerns?

2. Blue Economy and Geopolitics: Do existing policy frameworks effectually tackle the trade-offs between economic development and ecological conservation in the blue economy of the Sundarbans?

How can the blue economy act as a bridge for international collaboration on shared challenges like climate change adaptation and disaster preparedness in the Sundarbans region?

3. Environment and Security: How do environmental governance practices in the Sundarbans, particularly regarding transboundary resource management and climate change adaptation, influence regional security dynamics in South Asia?

How can a critical environmental geopolitics framework empower marginalised communities within the Sundarbans and ensure their voices are heard in decision-making processes impacting their environment and livelihoods?

Methodology

1. Integrating Blue Economy Principles: The effectiveness of polycentric governance structures in integrating blue economy principles within the Sundarbans remains a complex and under-researched question. Studies suggest challenges in coordinating sustainable livelihood practices across the Sundarban Reserve area, but habitat suitability analysis (Sahana et al., 2022) also revealed that nearly half of the grids are highly suitable for mangrove habitats. However, the extent to which these challenges

translate into concrete policy gaps and their impact on sustainability indicators like fish stock depletion or traditional livelihood practices remains unclear.

Data collection: *Policy analysis*: Examining national and regional policies promoting sustainable fishing and circular economy principles in the Sundarbans.

Stakeholder interviews: Interviewing fishermen, local inhabitants, government officials, and NGOs to understand their perspectives on policy implementation and adoption of blue economy principles. Analysing fish catch volumes and species composition data to assess existing practices' impact on resource sustainability.

2. Balancing Economic Development and Conservation: Whether existing policy frameworks adequately address the trade-offs between economic development and ecological conservation in the Sundarbans' blue economy requires a nuanced understanding of current practices and their outcomes. While studies like UNEP (2023) highlight the potential of sustainable practices, data on their actual implementation and economic viability is limited.

Data collection: *Economic analysis*: Assessing the economic contribution of various blue economy activities (e.g., sustainable fishing, ecotourism) compared to traditional practices.

Ecological impact assessment: Evaluating the environmental impact of different blue economy activities on key ecological indicators (e.g., mangrove health, biodiversity).

Cost-benefit analysis: we have examined various policy measures and actions taken report to examine the economic costs and benefits of implementing specific sustainability measures and conservation efforts.

4. Operationalizing Adaptive Governance: Translating adaptive governance principles into action within the Sundarbans' multilayered context demands a deeper understanding of existing mechanisms and their effectiveness in responding to climate change and resource depletion. Studies like Mondal et al. (2023) identify challenges in information sharing and stakeholder collaboration. However, concrete examples of successful adaptation and their impact on resource management remain largely unexplored.

Data collection: *Case studies*: Analysing specific instances where adaptive governance mechanisms were employed to address challenges (e.g., community-based resource management, early warning systems).

Expert interviews: Interviewing policymakers, scientists, and community leaders to understand their perspectives on existing adaptive governance mechanisms and their effectiveness.

Document analysis: Examining reports and plans outlining strategies for adapting to climate change and resource depletion challenges. By combining these data collection methods, one can gain valuable insights into the effectiveness of polycentric governance structures, the trade-offs between economic development and conservation, and the operationalisation of adaptive governance mechanisms within the Sundarbans' blue economy. This information will be crucial for informing policy recommendations and promoting more sustainable and equitable blue economy practices in the region.

Challenges and threats

1. Governance Challenges: A Top-Down Approach and the Need for co-management is imminent in Sundarban. Traditionally, forest management in the Sundarbans has adopted a top-down approach, with centralised agencies like the Forest Department dictating policies and regulations (Dasgupta & Shaw, 2013). While this approach aims for uniformity and efficiency, it often overlooks the crucial role of local communities in conservation efforts. This approach has been criticised for failing to consider local knowledge and neglecting community participation, hindering the effectiveness of conservation strategies (Dasgupta & Shaw, 2013). An alternative approach gaining traction is co-management, which involves collaborative decision-making between government agencies, local communities, and other stakeholders (Dasgupta & Shaw, 2013). This approach fosters a sense of ownership and responsibility among local communities, potentially leading to more sustainable resource management practices. While the Sundarbans has witnessed some recent attempts at co-management initiatives, these remain limited in scope and require further scaling up and deeper engagement with local communities (Ghosh & Ghosh, 2019).

2. Economic Pressures: This area's significant challenges are unsustainable resource extraction and land use changes. The Sundarbans faces intense pressure from unsustainable resource extraction practices driven primarily by high population growth and poverty in the surrounding areas (Singh, 2017; Ghosh, 2015). Local communities, often lacking alternative livelihood options, resort to overfishing, extracting non-timber forest products (NTFPs) like fuelwood and leaves, and engaging in activities like shrimp farming, all contributing to habitat degradation and resource depletion (Chowdhury & Brahma, 2019; Chakraborty, 2011). This overexploitation, coupled with weak enforcement of regulations and inadequate monitoring, further exacerbates the situation (Dasgupta & Shaw, 2013).

Land-use changes also pose a significant threat. Conversion of mangrove forests for agricultural expansion and aquaculture ventures, particularly shrimp farming, is a major driver of habitat loss (Dasgupta & Shaw, 2013). The extent of this conversion is alarming, with regional reports suggesting that 90% of mangrove loss is attributed to agricultural and aquaculture development (Dasgupta & Shaw, 2013).

3. Climate Change and its Cascading Effects: Climate change, with its rising sea levels, increased cyclone frequency and intensity, and altered precipitation patterns, poses another significant threat to the Sundarbans (Dasgupta & Shaw, 2013; Ghosh, 2015). Sea level rise leads to coastal erosion and inundation of low-lying islands, displacing communities and further impacting the ecosystem (Chaudhury, 2015; Guha & Roy, 2016). Cyclones wreak havoc on the fragile ecosystem, causing widespread damage to mangroves and infrastructure while altering sedimentation patterns and disrupting ecological processes (Raha, 2012).

These climate-induced changes have cascading effects on livelihoods and social structures. Increased vulnerability to food insecurity due to disrupted fishing practices and agricultural losses disrupt traditional food sources (Kanjilal, 2010). Livelihood options like kitchen gardens and livestock rearing become unreliable due to erratic weather patterns and rising salinity levels, forcing communities to become more dependent on markets and potentially unsustainable practices (Ghosh et al., 2018). Male migration in search of work, while a coping strategy for some families, often places additional burdens on women who must manage households, contribute to income, and care for children and elders (Kanjilal, 2010). These combined pressures exacerbate vulnerabilities and threaten the social fabric of communities.

The Sundarbans face complex challenges, including governance shortcomings, unsustainable resource use, and climate change. Addressing these challenges requires a multifaceted approach that prioritises integrated management strategies. This approach should encompass empowering local communities by fostering co-management initiatives, ensuring their participation in decision-making processes, and providing alternative livelihood options that reduce dependence on unsustainable practices. Strengthening governance by promoting transparency, accountability, and effective enforcement of regulations alongside collaborative decision-making with stakeholders is imperative.

While ecotourism has been promoted as a potential solution, with its promise of involving tourists, investors, government officials, and local communities (Ghosh & Ghosh, 2019), concerns linger regarding its effectiveness in the Sundarbans. Experts and authorities harbour scepticism about the actual benefits accruing to local communities. Literature suggests minimal control by local communities over ecotourism activities and limited economic participation (Ghosh & Ghosh, 2019). Concerns exist about tourist behaviour, with evidence suggesting a lack of respect for the fragile ecosystem and its processes. Research by Ghosh and Ghosh (2019) highlights the unequal distribution of economic benefits from ecotourism in the Sundarbans, with the poorest and most marginalised communities failing to reap tangible rewards. These factors necessitate a critical evaluation of the current ecotourism model in the Sundarbans.

4. Dependence on Natural Resources and Environmental Degradation

Precarious Livelihoods: Women in the Sundarbans, particularly those from low-income families, are disproportionately affected by environmental degradation due to their dependence on natural resources for survival. This includes gathering resources like fruit and roots for food, fetching water for household use, and relying on biofuels for cooking.

Exacerbated by Climate Change: The depletion of natural resources and the effects of climate change, such as cyclones and erratic weather further threatens their livelihoods. They are forced to travel increasingly longer distances to obtain essential resources, facing dangers like physical assaults and increased economic hardship.

Limited Control and Unequal Impact: Pre-existing gender inequalities further disadvantage women. They lack control over decision-making and resource distribution, often lacking access to education and alternative livelihood options. This makes them more vulnerable to the negative consequences of environmental degradation and climate change than men.

5. Gendered Problem

5.1. Governance and Gender Equity: While government interventions like housing schemes and subsidised food distribution have alleviated some pressure on the environment, other aspects of governance raise concerns.

5.2. Forest Management and Community Disconnect: The Forest Department's regulations and lack of involvement of local communities in forest management are perceived as ineffective and create resentment. Women feel their dependence on forest resources is not fully understood by authorities, leading to unsustainable practices and limited involvement in conservation efforts.

5.3. Ecotourism's Uneven Benefits: Government-led ecotourism initiatives are criticised for failing to consider the real needs of local communities, particularly women, and potentially exacerbating existing inequalities.

5.4. Livelihood Strategies and Challenges: Crab Catching: Many women rely on crab catching as their primary source of income, often accompanying their husbands into the forest despite the challenging conditions and safety risks. This work depends entirely on the tidal cycle, requiring long hours and significant physical exertion.

5.5. Limited Options and Vulnerability: Apart from crab catching, honey bee farming and livestock rearing are present in the region, but they are either seasonal or declining due to environmental factors. This limited range of options increases women's vulnerability and dependence on the increasingly stressed ecosystem.

5.6. Power Dynamics and Domestic Realities: While tribal women appear to have a slightly greater voice in financial decisions within their households, overall control over income and assets remains limited for most women. This lack of agency restricts their ability to plan for the future and address basic needs. Women in the Sundarbans face a double burden of earning income and managing household chores. They often receive little to no help from men, leading to feelings of exhaustion, resentment, and hopelessness.

5.7. Violence and Social Norms: Domestic violence is reported as a common occurrence, further adding to women's struggles and highlighting the societal power imbalances they face. The normalisation of such violence within the community demonstrates the need for broader social and cultural change.

Overall, the women of the Sundarbans face many challenges related to livelihood security, lack of agency, and limited access to essential resources and services. Addressing these issues requires a multifaceted approach that prioritises empowering women through education, skills training, and access to decision-making processes. It may also promote sustainable resource management practices in collaboration with local communities, including women. Addressing gender inequalities within the household and broader society through social awareness campaigns, policy changes, and improving access to essential services like healthcare and education for women and their families is essential for understanding the island.

Due to space restraints, we cannot bring the true representation of all the data gathered, but we would like to bring in two interviews that could reflect part of it. Many of our respondents (name and address withheld) also resonate the same. By integrating all of their records, the key findings are:

Two case studies: a) Interview with Maya (Female, age 45, widowed, collects fish and crabs):
Livelihood struggles: Maya describes a decline in fish populations and increased difficulty in earning a living. This is attributed to tourism activities and more frequent, intense storms.

Vulnerability and Limited Options: Losing a spouse leaves Maya in a precarious position, forcing her to rely on depleting natural resources. Her daughter Asha's dream of becoming a doctor seems out of reach due to limited educational opportunities.

Need for Sustainable Solutions: Maya desires alternative livelihoods less dependent on the already stressed ecosystem. It suggests that interventions aimed at sustainable resource management and improved access to education and healthcare are imminent. Empowering women through income generation opportunities is crucial for improving women's lives in the Sundarbans and ensuring a more sustainable future for the region.

b) Circular Solutions for a Sustainable Sundarbans: A Conversation with Jeet: This piece explores the potential of a circular economy in the Sundarbans through a conversation with Jeet, a 35-year-old fisherman with a family of 4 persons- two kids and a wife. Jeet's perspective highlights the community's challenges and inherent resourcefulness in utilising what they have.

1. Resource Scarcity and Waste Management: Jeet emphasises the decline in fish populations and the increasing difficulty in making a living. He identifies plastic waste from tourism as a significant concern, polluting the ecosystem and damaging fishing nets.

2. Traditional Practices and Circular Ethos: Despite limited resources, Jeet exemplifies the existing circular practices within the community. Mending nets until they are practically unusable demonstrates their commitment to minimising waste.

3. Potential for Innovation: The interview explores the possibility of adopting new practices that align with circular economy principles. Collecting and recycling plastic waste into usable objects like fishing nets resonates with Jeet, offering a solution to waste management and resource scarcity.

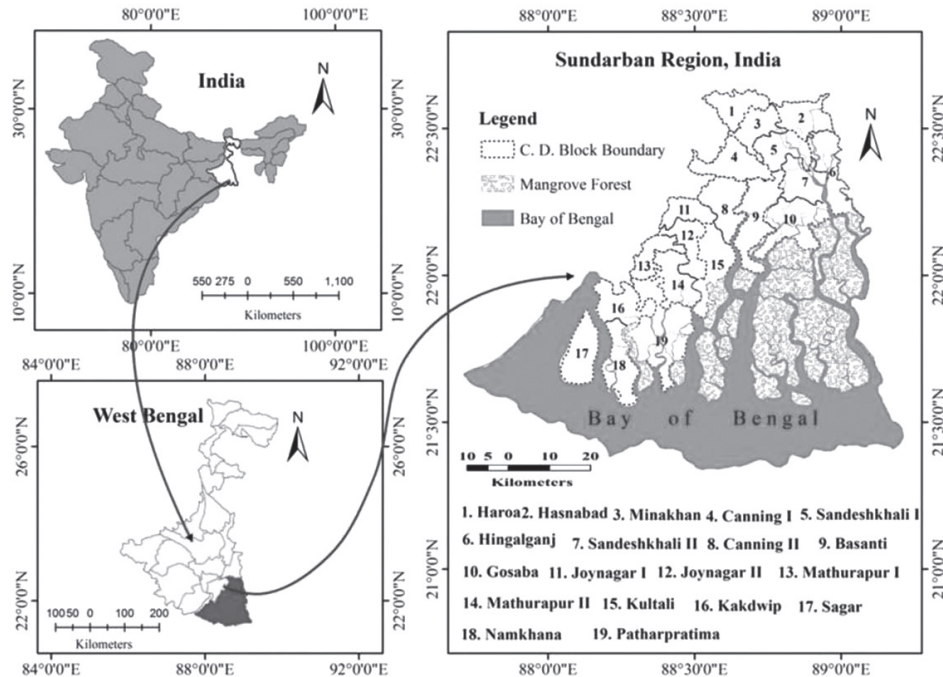
4. Minimising Waste and Maximising Resource Use: Jeet acknowledges the issue of wasted fish due to market fluctuations. The suggestion of fish preservation techniques like drying or salting for later sale or conversion into fertiliser resonates with him, demonstrating the potential for minimising waste and maximising resource utilisation within the food system.

5. Collaboration for a Sustainable Future: Jeet's openness to new ideas underscores the importance of collaborative efforts between researchers and local communities. Integrating traditional knowledge with innovative solutions can pave the way for a more sustainable future for the Sundarbans and its inhabitants. This brief exchange with Jeet highlights the potential of a circular economy approach to address waste management, resource scarcity, and livelihood challenges in the Sundarbans. Further research and collaboration with the community are crucial to developing and implementing practical solutions that ensure the ecosystem's and its people's well-being.

Conclusion: The Sundarbans face complex challenges from environmental degradation, climate change, and socio-economic pressures. Based on interviews with Maya (a widowed resident) and Jeet (a fisherman), this report underscores the disproportionate impact these challenges have on women and the critical need for a multifaceted approach to ensure the region's sustainability. Education and skill development are significant areas to highlight. Investing in girls' education and providing women with alternative livelihood options beyond resource extraction are crucial steps towards empowering and reducing their vulnerability.

Collaborative efforts between local communities, government agencies, and NGOs are necessary to develop and implement sustainable resource management practices that minimise environmental degradation while ensuring long-term livelihoods. Initiatives aimed at collecting and recycling plastic waste, exploring fish preservation techniques, and promoting using recycled materials can significantly reduce waste and increase resource efficiency. Effective governance requires active participation from local communities in decision-making processes. This fosters a sense of ownership and promotes solutions that address their specific needs and concerns. Targeted interventions are needed to address gender inequalities within households and broader society. This includes promoting shared domestic responsibilities, ensuring women's control over income and assets, and providing access to essential services like healthcare and education. By prioritising women's empowerment, promoting a circular economy, and strengthening governance, a more sustainable future for the Sundarbans can be achieved. This future will ensure the well-being of the ecosystem and the communities that depend on it for generations.

On the other hand, the state should recognise the maritime infrastructure development, including infrastructure, maritime connectivity projects, and maritime trade facilitation initiatives. Enhanced maritime infrastructure can enhance the strategic position of South Asian countries such as India and Bangladesh as maritime hubs and promote regional economic growth and development. Better cooperation among states in disaster risk management and humanitarian assistance, including coordination of disaster response efforts and capacity-building initiatives, could easily facilitate this area as the critical point of trade and commerce. Improved disaster risk management can enhance the resilience of South Asian countries to natural disasters such as cyclones, floods, and tsunamis, contributing to regional stability and security. Sustainable development of the blue economy, including fisheries management, marine biodiversity conservation, and ocean renewable energy, could enhance cooperation in the blue economy, promoting economic growth and sustainable development in South Asian countries with significant marine resources, such as India, Bangladesh, and Sri Lanka. Overall, the Sundarbans contribute to the strategic relationship of South Asian countries by fostering cooperation in maritime security, trade and connectivity, maritime infrastructure development, disaster risk management, and blue economy development, thereby promoting regional stability, prosperity, and security.



Source: Ali, Sk Ajim & Khatun, Rumana & Ahmad, Ateeque & Ahmad, Syed. (2019). Application of GIS-based analytic hierarchy process and frequency ratio model to flood vulnerable mapping and risk area estimation at Sundarban region, India. *Modeling Earth Systems and Environment*.

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