IJMRRS

International Journal for Multidisciplinary
Research, Review and Studies

ISSN: 3049-124X (Online)

VOLUME 1- ISSUE 4

2024

Contesting the Shoreline: Negotiating Climate Change and the Politics of Coastal Justice in the Asia-Pacific

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1. Abstract

The Asia-Pacific region is facing disproportionate and escalating threats due to climate change, particularly in its coastal areas. According to the IPCC (2021), sea levels in the Bay of Bengal are projected to rise up to 1 meter by 2100, putting millions in Bangladesh and India at risk. In PNG, sea-level rise is estimated at 7 mm per year, nearly twice the global average (Australian Bureau of Meteorology & CSIRO, 2021). This research paper explores six country case studies—Sri Lanka, India, Bangladesh, PNG, Solomon Islands, and Fiji—highlighting climate impacts, mitigation efforts, and resilience strategies. Using secondary data collection, field surveys, and interviews, this article provides a comparative analysis and proposes a regional framework for coastal justice to amplify local voices, implement adaptive policies, and support long-term resilience.

Keywords: Climate Change, Sea-level rise, coastal erosion, Asia-Pacific, Climate Justice, Community-based Adaptations, Youth Climate Action.

2. Introduction

"I've seen this island break and rebuild, again and again. That's who we are — unbreakable." — Abdul Khalek, *53 years old, Manpura Island, Bangladesh, -lost his home multiple times to erosion.*

Sea-level rise is no longer a distant projection; it is a pressing reality. In the Asia-Pacific region, where coastlines are integral to cultural identity, climate change is not only eroding land but also disconnecting communities from their memories, traditions, and sense of belonging. With over 2.4 billion people residing in low-lying coastal areas, this region is among the most climate-vulnerable in the world (UNDP, 2024). Ancestral lands are disappearing beneath rising seas, taking with them sacred connections to place.

Between 1993 and 2023, sea levels in Asia rose dramatically—nearly twice the global average (World Meteorological Organization, 2024). This increase has intensified cyclones, flooding, and saltwater intrusion, displacing millions and degrading ecosystems. However, the loss extends beyond geography: with each retreating coastline, oral histories, spiritual practices, and generational knowledge are also erased. The human toll resonates in narratives of both grief and resilience.

Six countries—Sri Lanka, Bangladesh, India, Fiji, the Solomon Islands, and Papua New Guinea—exhibit both significant exposure to climate threats and notable local resilience. Sri Lanka, India, and Papua New Guinea are confronting increasing dangers from coastal erosion and severe storms (World Meteorological Organization, 2024). In India, villages such as Alappad are gradually

disappearing into the sea. In Papua New Guinea, the Carteret Islands serve as a poignant symbol of this crisis—once vibrant, they are now nearly submerged (UN Global Pulse, 2024).

This study highlights the human dimensions of climate change, supports local adaptation efforts, and advocates for international climate justice for those most affected.

3. Methodology

This research adopts a qualitative, multi-method approach using both primary and secondary sources. Data was compiled and compared across regional contexts.

- Sri Lanka data was compiled by Srijita Talukdar, including an expert interview with climate advocate Sudarsha De Silva.
- India data was compiled by Aakash Viswan from policy reports, journalistic sources, and climate action databases.
- Bangladesh data was compiled and supported by field survey work conducted by Hridoy Saha on Manpura Island.
- Pacific data, including PNG, SI, and Fiji, was compiled and contextualized by Shonaye Leslie using national reports and multilateral publications.

The comparative nature of the research allows for cross-country synthesis and the identification of recurring climate challenges and innovations.

4. Results Summary

The six communities of Jaffna Peninsula (Sri Lanka), Alappad (Kerala, India), Kariyachalli Island (Gulf of Mannar, Tamil Nadu, India), Manpura Island (Bangladesh), Carteret Island (PNG), Sikaiana Atolls (SI), and Vunidogoloa (Fiji) demonstrate the localized and diverse realities of climate change across the Asia-Pacific region. Each community faces distinctive environmental challenges while representing resilience through targeted mitigation efforts and vibrant grassroots participation. Results are categorized into environmental challenges; mitigation efforts and key themes identified with these communities.

4.1. Environmental challenges and efforts across each community.

i. **Jaffna Peninsula, Sri Lanka**
The Jaffna Peninsula experiences increasing droughts, saltwater intrusion, and unpredictable rainfall patterns, undermining agriculture and freshwater supplies. Communities have adopted rainwater harvesting, drought-resistant crops, and mangrove restoration to counteract soil salinity and water scarcity. Youth-led awareness campaigns and local disaster preparedness workshops have played a crucial role in fostering adaptive capacity among vulnerable populations.

ii. **Alappad, Kerala, India**
Alappad, a coastal fishing village, has suffered severe land erosion—losing nearly 90% of its landmass over seven decades due to rising sea levels and unsustainable sand mining (The

Hindu, 2019). The community's resilience is marked by youth-led activism, such as the Save Alappad Movement, which uses digital storytelling and public demonstrations to demand stricter coastal regulations and ban sand mining. Government responses include enforcement of the Coastal Regulation Zone and nature-based interventions like mangrove planting to stabilize shorelines.

iii. **Kariyachalli Island, Gulf of Mannar, Tamil Nadu, India**

The fragile coral ecosystem of Kariyachalli Island has shrunk significantly due to coral bleaching and tidal erosion, leading to biodiversity loss and declining fish stocks (Times of India, 2019). Mitigation includes a ₹50 crore coral restoration project deploying artificial reefs and mangrove sapling plantations. The Tamil Nadu government's innovative programs, such as the Blue Carbon Agency and youth engagement through the TN Green Fellows Program, empower local fishers and youth as stewards of marine conservation and climate monitoring.

iv. **Manpura Island, Bangladesh**

Manpura faces severe coastal erosion, frequent cyclones, and saltwater intrusion, resulting in loss of farmland and displacement of communities (Banglapedia, 2024; Akhter et al., 2024). Adaptation efforts emphasize nature-based solutions such as community-led mangrove plantations and sediment management. Infrastructure projects like the ongoing levee construction aim to protect vulnerable zones. Youth participation in climate education and disaster preparedness workshops strengthens local resilience, though funding gaps and governance challenges persist.

v. **Carteret Island, Papua New Guinea**

Carteret Island, slowly sinking due to sea-level rise and coral reef degradation, has become a symbol of climate-induced displacement. The island's inhabitants have initiated planned relocation strategies supported by government and NGOs. Community efforts focus on preserving cultural heritage during relocation, while youth groups engage in environmental education and advocacy to highlight their plight in national and international forums.

vi. **Sikaiana Atolls, Solomon Islands**

The remote Sikaiana Atolls face rising seas and storm surges that threaten habitability and food security (Solomon Star News, 2024). Local mitigation includes traditional ecological knowledge application, such as sustainable fishing practices and coastal vegetation restoration. Youth-led initiatives aim to document climate impacts digitally and promote awareness both locally and globally, advocating for increased government support and climate justice.

vii. **Vunidogoloa, Fiji**

Vunidogoloa was among the first communities globally to undergo a government-supported planned relocation due to rising sea levels and frequent flooding (SPREP, 2023). The community's transition highlights the integration of traditional leadership with state-led adaptation policies. Efforts focus on rebuilding resilient infrastructure, strengthening food security through diversified farming, and fostering youth involvement in climate education and eco-tourism initiatives.

4.2. Cross-analysis of mitigation efforts

Community	Mitigation Efforts	Strengths	Limitations
Manpura Island, Bangladesh	Mangrove planting, levee construction, early warning systems (The Daily Star, 2023; Biswas et al., 2022)	Cost-effective, local ownership, improves biodiversity	Infrastructure often damaged by storms; limited local input in planning (BIPR, 2024)
Alappad, Kerala, India	Youth activism against sand mining, mangrove regeneration	High youth engagement; media impact pressured government action	No formal government ban; erosion continues; illegal mining persists (The Hindu, 2019)
Kariyachalli Island, India	₹50 crore coral rehabilitation project, Blue Carbon Agency, TN Green Fellows (Times of India, 2019)	Strong government-science collaboration; fosters youth capacity	Long-term results uncertain; risks of coral transplant failure
Jaffna Peninsula, Sri Lanka	Drought-resistant agriculture, rainwater harvesting, awareness campaigns	Low-cost, empowers women and youth; replicable	Poor infrastructure; weak national coordination and limited investment
Carteret Islands, PNG	Voluntary relocation, mangrove planting, awareness workshops, and small seawalls, combined with LiDAR mapping for risk analysis (UNFCCC, n.d.).	Culturally sensitive relocation; strong community networks Builds foundational knowledge, enhances coastal mapping.	Limited state support; high risk of loss of identity; lack of scalability Weak enforcement, fragmented governance, and funding gaps severely limit impact (RCCC, 2024; SPREP, 2023).
Sikaiana Atolls, Solomon Islands	Traditional ecological knowledge, youth digital advocacy, coastal vegetation planting (Solomon Star News, 2024)	Culturally relevant; fosters intergenerational learning	Marginalized in national planning; underfunded; atolls remain vulnerable
Vunidogoloa, Fiji	Government-led relocation, diversified farming, resilient housing (SPREP, 2023)	Successful relocation model; government-community trust	Relocation is expensive; replicability limited to few communities.

Table 1: Community-Level Climate Adaptation in the Asia-Pacific: Comparative Analysis of Mitigation Efforts, Strengths, and Limitations.

4.3. Key Themes Identified Across these communities.

i. **Environmental Impacts:** All communities confront severe climate stressors—coastal erosion, sea-level rise, coral bleaching, saltwater intrusion, and extreme weather—threatening their livelihoods, homes, and cultural identities.

ii. **Mitigation and Adaptation:** Nature-based solutions (mangrove restoration, coral reef rehabilitation), infrastructure development (levees, relocation), and sustainable resource management are central to community and government approaches.

iii. **Youth and Community Leadership:** Young people emerge as critical agents of change through activism, education, conservation efforts, and advocacy, bridging local knowledge with policy engagement.

iv. **Challenges:** Persistent issues include limited funding, governance fragmentation, inadequate inclusion in decision-making, and the difficulty of sustaining infrastructure in high-risk environments.

Overall, this comparative analysis highlights diverse adaptation strategies across Asia-Pacific coastal communities, revealing both innovation and shared constraints. Communities like Vunidogoloa and the Carteret Islands demonstrate the potential and complexity of relocation, while places like Manpura and Alappad show how grassroots action can influence national policy. Kariyachalli and Jaffna reflect efforts to integrate science, government, and community participation, though outcomes remain uneven due to resource limitations.

Common challenges include poor infrastructure, underfunding, fragmented governance, and exclusion of vulnerable groups from decision-making. However, cultural relevance, intergenerational knowledge, and strong local networks consistently emerge as success factors. The table underscores the urgent need for scalable, community-centered, and well-financed climate adaptation strategies across the region.

5. Discussion

5.1 Asia-Pacific Regional Overview on Climate Change Impacts

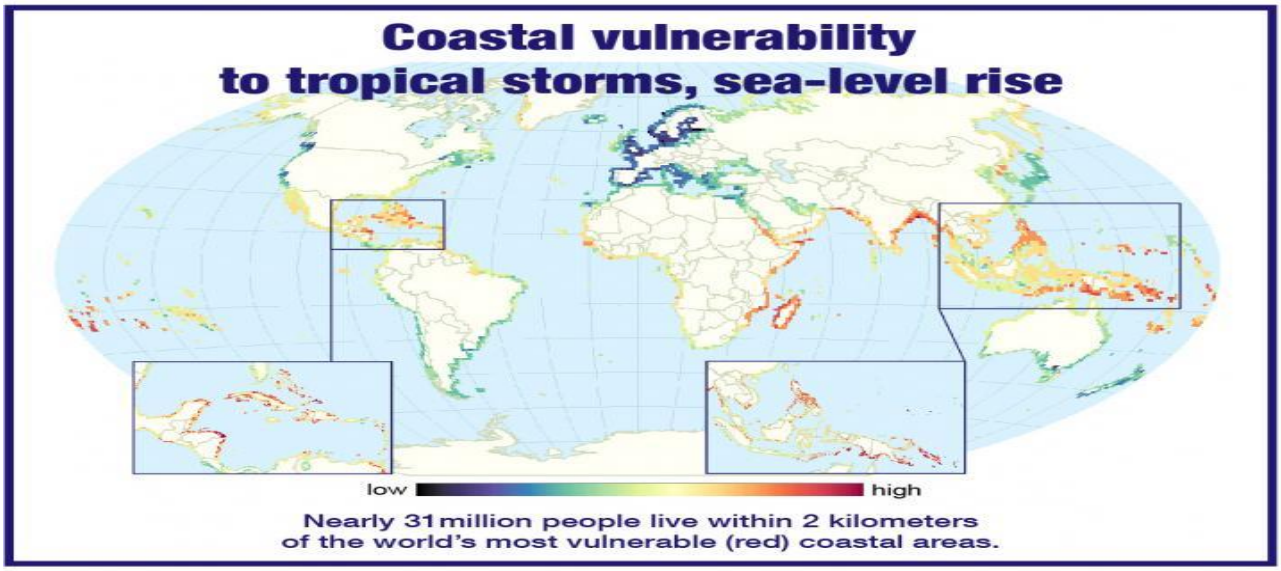

Figure 1. Approximately 31 million people globally reside in coastal regions classified as "highly vulnerable" to future tropical storms and sea-level rise caused by climate change (Image Credit: Northern Illinois University)

The Asia-Pacific region stands among the most vulnerable in the world to the escalating impacts of climate change, facing a complex web of environmental, social, and economic challenges (Refer to Figure 1). This vast and diverse region covers some of the globe's most populated nations and fragile island states, each struggling against rising temperatures, shifting weather patterns, and increasing frequency of extreme events. Countries like India are experiencing intensifying heatwaves and unpredictable monsoons that disrupt agriculture and threaten the livelihoods of over 600 million people reliant on climate-sensitive sectors (World Bank, 2013; UNICEF India, 2024). Coastal erosion and rising sea levels are critically endangering low-lying areas, with Bangladesh's Manpura Island losing over 26 square kilometers of land since 2000 and facing frequent cyclones that displace thousands annually (Banglapedia, 2024; Akhter et al., 2024).

Meanwhile, Pacific Island nations such as Fiji and the SI face existential threats from sea-level rise, saltwater intrusion, and increasingly severe storms that endanger communities' food security and cultural heritage (SPREP, 2023; Solomon Star News, 2024). The environmental degradation is intensified by socioeconomic vulnerabilities, disproportionately impacting women, children, and marginalized groups, and challenging national development pathways across the region (Climate Reality Project, 2023; BIPR, 2024). Despite these mounting pressures, grassroots movements and youth-led initiatives are emerging as vital forces for resilience, advocating for inclusive climate policies, nature-based solutions, and community empowerment (BBC News, 2019; The Environment, 2024).

To better understand the nuanced realities and responses across this vast region, we will now undertake a detailed examination of six countries—Sri Lanka, Bangladesh, and India in Asia, alongside PNG, Fiji, and the SI in the Pacific—highlighting their unique climate challenges, community impacts, and adaptive strategies.

5.2 Case Study 1: Jaffna Peninsula, Sri Lanka

Sri Lanka, a vibrant island nation nestled in the Indian Ocean, finds itself increasingly vulnerable to the intensifying effects of climate change. From erratic weather patterns and extended droughts to rising sea levels and severe coastal erosion, the impacts are multifaceted and far-reaching. Ranked among the most climate-vulnerable nations globally, Sri Lanka is at a fundamental juncture—facing a choice between urgent adaptation through sustainable development or the looming threat of irreversible ecological and social destruction.

The scope of this vulnerability is emphasized by the United Nations Development Programme (UNDP), which reports that over 80% of Sri Lanka's landmass is prone to natural hazards. Climate change has only deepened the fragility of rural communities and agricultural systems. Disruptions in rainfall have left vast areas parched and unproductive, while erratic monsoons have caused devastating landslides and flash floods, displaced thousands and damaging critical infrastructure (UNDP, 2023).

Among the most alarming consequences is the dwindling availability of clean water. The UNDP's Integrated Water Resource Management initiative reveals a growing crisis—many of the country's water systems are either drying up or turning saline. This has left millions of Sri Lankans without access to safe drinking water, with serious ramifications for public health, agricultural productivity, energy supply, and sanitation (UNDP, 2023). The water crisis serves as a stark reminder of how climate impacts are deeply interconnected across various sectors.

At the same time, Sri Lanka's ecosystems are being pushed to the brink by unchecked urbanization, poorly regulated tourism, and unsustainable farming practices. These human-induced pressures compound the environmental toll, leading to soil degradation, deforestation, and pollution. As *Groundviews* reports, the country's national climate commitments often falter due to fragmented leadership, limited community engagement, and an overreliance on international aid (Groundviews, 2024).

Jaffna Peninsula: Rising Seas and the Race to Adapt

Nowhere are the stakes more visible than in the Jaffna Peninsula—a region rich in biodiversity and cultural history, yet acutely vulnerable to climate threats. Post-war reconstruction has made progress; however, climate change poses a new kind of challenge. According to recent projections, as much as 58.5% of Jaffna's land could be submerged by 2100 under the high-emissions RCP8.5 scenario. Alarmingly, half of the peninsula already sits less than two meters above sea level, leaving homes, schools, and agricultural land in the path of encroaching waters.

Saltwater intrusion is another growing concern, as salinization of both soil and groundwater accelerates. Once-thriving paddy fields—an economic and cultural staple of the region—are now producing diminished yields. It is estimated that between 10,630 and 36,786 hectares of farmland may be at risk, threatening food security and the livelihoods of farming communities.

Environmental degradation continues offshore as well. The area's coral reefs and mangrove forests, natural protectors against storm surges, are deteriorating at an alarming rate. These fragile ecosystems, which once served as buffers and biodiversity havens, are now losing their ability to shield coastal communities from the full force of climatic events.

Despite these daunting challenges, both local and national activists are mobilizing to build resilience. Ecosystem restoration initiatives, such as mangrove replanting and coral reef rehabilitation, are gaining momentum. Community education programs aim to raise awareness about climate impacts and promote sustainable living. In Colombo and other cities, urban climate planning is attempting to incorporate green infrastructure and regulate coastal development. Yet these scattered efforts demand better coordination, sustainable financing, and—most crucially—political will to create meaningful and lasting change.

Sudarsha De Silva on Marine Resilience and Youth Leadership

Figure 2 Mr. Sudarsha de Silva speaking during Sri Lanka's Climate Initiative Summit (Image Credit: Peacegong Fellowship Website)

Amidst escalating global climate challenges, individual leaders like Sudarsha De Silva are playing critical roles in steering change. As the Executive Director of Earthlanka, De Silva has dedicated over 15 years to advancing marine conservation and youth engagement both at the grassroots and policy levels.

In a recent conversation with Srijita Talukdar, De Silva reflected on the trajectory of youth participation in climate diplomacy. He noted significant progress over the past decade and a half, particularly in accessibility and representation*: "Looking at the past 15 years… it is now much better in terms of engagement and the space for young people to participate from any part of the world."*

However, he emphasized the importance of maintaining momentum through sustained mentorship and consistent involvement in global decision-making processes. Addressing marine ecosystem degradation, De Silva advocated for the regional adoption of a unified blue economy strategy. He underscored the relevance of global initiatives such as the 30×30 framework, the global plastic treaty, and calls for a moratorium on deep-sea mining. According to De Silva, these frameworks can enhance long-term marine resilience if coupled with local-level implementation.

He also highlighted national innovations in marine protection, citing Sri Lanka's efforts in deploying Extended Producer Responsibility (EPR) policies to curb plastic pollution and pioneering ex-situ coral conservation practices. Public-private collaborations, especially in marine debris removal, were presented as replicable models for ecological restoration.

Concluding his insights, De Silva returned to the theme of intergenerational justice. He stressed the importance of knowledge transfer in shaping inclusive marine policy: *"Sharing insights on habitat management, traditional fishing, and restoration with younger generations ensures that future marine policies are rooted in inclusive resilience."*

De Silva's work summarizes the intersection of science, policy, and community empowerment—offering a holistic model for addressing marine challenges through youth leadership and collaborative governance.

In Summary, Sri Lanka's climate crisis is far more than a matter of environmental statistics—it is a profound test of social, cultural, and ecological endurance. In regions like Jaffna, communities are already grappling with the lived realities of rising seas, salinized soil, and declining ecosystems. However, through innovative local action, inclusive policy reform, and the unwavering spirit of advocates like Sudarsha De Silva, there is still hope. The story of Sri Lanka is not only one of vulnerability but also of resilience—a country that, despite adversity, continues to fight for a more just and sustainable future.

5.3 Case Study 2: India

India, with its diverse terrain—ranging from the Himalayas to vast coastlines—is squarely on the frontlines of the climate crisis. Once a looming concern, climate change has become an everyday reality for millions, marked by erratic monsoons, crippling heatwaves, sea-level rise, and glacial retreat.

The World Bank (2013) notes that disruptions in monsoon patterns and glacier-fed rivers are already impacting agriculture and freshwater access. With over 600 million people reliant on climate-sensitive sectors like farming and fishing, these changes carry far-reaching consequences. Children are among the worst affected. As UNICEF India (2024) reports, rising temperatures, water shortages, and declining food security are fuelling malnutrition, disease, and stress—embedding climate risk into childhood itself.

Public awareness is growing. Yale University (2023) found that 80% of Indian adults believe global warming is happening, and 72% are concerned. Yet this concern often fails to translate into action. Urban planning remains poorly regulated, illegal construction persists, and environmental literacy varies widely across regions. These gaps, coupled with extractive industries, heighten vulnerability and undermine preparedness.

India witnessed over 1,500 climate-related deaths in 2023 (Statista, 2024). Coastal states like Kerala, Tamil Nadu, and West Bengal are increasingly exposed to storm surges and sea-level rise. While the central government has made strides in renewable energy and climate diplomacy,

enforcement at the local level is inconsistent—leaving frontline communities to absorb the brunt of the impacts.

Alappad, Kerala: Vanishing Land, Enduring Spirit

In Kerala's Kollam District lies **Alappad**, a narrow strip of land between the Arabian Sea and TS Canal. Once covering 89.5 km² in 1955, the village had shrunk to just 7–8.7 km² by 2019—a loss of about 90% (The Hindu, 2019). This drastic erosion is blamed on both sea-level rise and decades of unregulated sand mining that stripped away natural defenses.

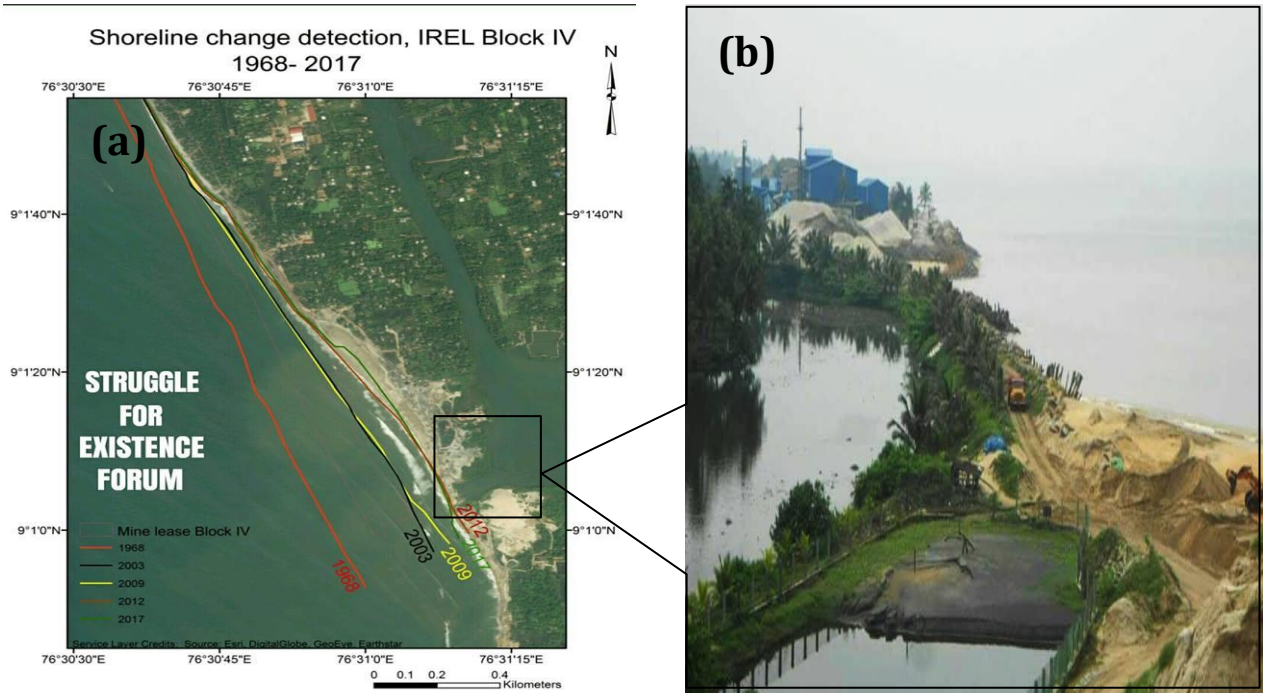

Figure 3. (a) The depleting shoreline of Alappad, Kerala from 1968 to 2017 (Image credit: NIIST) (b) Arial view of Alappad, Kerala (Image Credit: Sreekesh Ravindran Nair)

The destruction has been severe. More than 85 hectares of land have vanished, agriculture has collapsed due to saline intrusion, and biodiversity has dwindled. Mangroves, turtles, and migratory birds are largely gone. Over 6,000 fishing families have been displaced, leaving villages like Panmana scarred by abandonment and despair.

But Alappad's residents refused to stay silent. In 2018, local youth launched the **Save Alappad Movement**. Through digital campaigns, human chains, and hunger strikes, they drew national attention to their struggle (BBC News, 2019). Supported by groups like the Kerala Catholic Youth Movement, these efforts sparked public discourse on coastal exploitation.

The Kerala State Disaster Management Authority responded with CRZ enforcement recommendations, erosion control via Casuarina and mangrove planting, and broader disaster preparedness strategies. Still, Alappad's youth continue to press for a complete ban on sand mining, greater community representation in disaster committees, and platforms to share their stories and insights.

Kariyachalli Island, Tamil Nadu: A Reef in Retreat

Figure 4 Kariyachalli Island, one of 21 islands in the Gulf of Mannar

South of Kerala, off Tamil Nadu's coast, lies **Kariyachalli Island**—part of the Gulf of Mannar Marine Biosphere Reserve. Once spanning 20.85 hectares in 1969, it has shrunk to just 5.97 hectares by 2018 due to coral bleaching, tidal erosion, and rising seas (Times of India, 2019). Though uninhabited, the island's deterioration has disrupted nearby fishing communities that depend on the health of local reefs and seagrass ecosystems.

With fish stocks falling, many fishers report longer trips for smaller catches, driving families into debt and insecurity. Recognizing the urgency, Tamil Nadu launched a ₹50 crore restoration project under **TNSHORE** in 2025 (The Environment, 2024). The project includes over 8,500 artificial reef modules and has trained 300 youth and fishers in reef gardening and biodiversity monitoring—transforming them into marine conservation stewards.

On land, the initiative is also planting 12,500 mangrove saplings along Chennai's **Buckingham Canal** in a "fishbone layout" to maximize flood resilience. These nature-based solutions are not only restoring ecosystems but also reconnecting communities with their environment.

Tamil Nadu's climate leadership extends to policy. Programs like the **Tamil Nadu Blue Carbon Agency** and **TN Green Fellows** are bringing young professionals into environmental planning and promoting eco-tourism, drone-assisted coastal monitoring, and school-based climate education. These efforts are part of a growing movement toward decentralized, participatory climate action.

India's southern coastlines—from Alappad's eroding shores to Kariyachalli's fading reef—offer a microcosm of the country's climate struggle. These are not remote tragedies; they are lived experiences that demand attention, empathy, and action. Amid destruction, what shines through is the courage and leadership of young Indians.

Their activism—through protests, coral restoration, or policy advocacy—redefines what climate response looks like. They are not only witnesses to climate change; they are change-makers. As they demand inclusion in policy, recognition of their lived experience, and support for local solutions, their message is clear: India's climate future must be built with its people, not just for them.

If India is to confront the climate crisis with justice and resilience, it must scale up nature-based solutions, empower frontline communities, and listen—truly listen—to the young protectors of its coast. The land may be receding, but the movement to defend it is only gaining ground.

5.4 Case Study 3: Manpura Island, Bangladesh

Bangladesh sits on the frontlines of the global climate crisis. With 19 of its 64 districts in low-lying coastal zones, around 46 million people face direct exposure to rising seas, intensifying cyclones, and recurrent flooding. The country's flat landscape and dense population make even minor environmental shifts deeply disruptive.

According to the World Bank (2022), climate-related disasters could displace more than 13 million people and reduce GDP by up to 9% by 2050. Urban slums are swelling with families fleeing drowned fields and fractured coastlines (Migration Policy Institute, 2022). The burden falls heaviest on women, children, and the rural poor. Prolonged droughts, soil salinity, and land erosion are reversing gains in education, nutrition, and gender equity (Climate Reality Project, 2023; Action Contre La Faim, 2024). In response, Bangladesh has launched national adaptation strategies, including the Bangladesh Delta Plan 2100 and early warning systems. However, fragmented governance and limited grassroots involvement often weaken these efforts (BIPR, 2024).

Manpura Island: Erosion on the Edge

Figure 5 Coastal Erosion in Manpura Island, Bangladesh (Image Credit: Hridoy Saha)

Manpura Island, at the confluence of the Meghna River and Bay of Bengal, exemplifies the stakes. Less than two meters above sea level, the island has lost over 26 square kilometers of land since 2000—roughly one square kilometer annually (Banglapedia, 2024). Cyclones Sidr, Aila, Sitrang, and Mocha have ravaged the area, displacing thousands and devastating livelihoods.

Saltwater intrusion has rendered farmland infertile, and traditional fishing is in decline. "I've seen neighbors migrate, homes vanish, and fields turn to salt. We need action that reaches our shores — not just headlines," said Mahinuddin Hawlader, a 43-year-old volunteer.

Despite these challenges, resilience runs deep. Youth-led mangrove planting, sediment management, and natural barrier restoration offer hope. A 193 crore BDT levee is under construction, aiming to protect Manpura's vulnerable southern coast by 2025 (The Daily Star, 2023). NGOs like BRAC are supporting livelihoods through microloans and climate-resilient training.

Education has become central to local adaptation. Community workshops and preparedness drills are building a culture of resilience. "I've lived through floods, cyclones, and loss — but I've never lost hope in the strength of our people," said Shahajul Islam, 61, a local official.

Still, Manpura's remote location makes implementation difficult. Many projects are damaged by storms before completion. Youth, though active in adaptation, are often excluded from national dialogues. "I've seen this island break and rebuild, again and again. That's who we are — unbreakable," shared Abdul Khalek, 53, displaced multiple times by erosion.

Manpura represents the harshest face of climate change—where land, culture, and lives are eroding. Yet its people are not passive victims. They are builders of resilience, crafting a future through grassroots action and local knowledge. Their fight is not only for survival, but for dignity—and their story is a call to the world to act, inclusively and urgently.

5.5 Case Study 4: Carteret Island, Papua New Guinea

Figure 6 Sand erosion in Papua New Guinea (Image Credit: Godfreeman Kaptigau)

Papua New Guinea (PNG), part of the vast "Blue Pacific Continent," is one of the world's most climate-vulnerable nations. Its 600-plus islands and diverse terrain—from highland forests to low-lying coastal atolls—face a convergence of risks: sea-level rise, cyclones, floods, droughts, and intense coastal erosion (UNFCCC, n.d.; Kuir-Ayius, 2024). This geographic richness, while stunning, brings immense complexity in adapting to climate change.

PNG's climate risk isn't just theoretical—it's urgent. Ranked 9th in the 2021 World Disaster Index and 12th in the 2024 INFORM Risk Index, the country struggles with low coping capacity (Kuir-Ayius, 2024). Past disasters offer a glimpse into the human toll: the 1997 and 2015 droughts sparked bushfires and food shortages, while Cyclone Guba in 2008 devastated communities in Oro Province (Red Cross Climate Centre, 2024).

Coastal areas are particularly exposed. The UNFCCC reports that more than 10,000 buildings across Pacific nations—including PNG—face direct threats from rising seas in the coming decades (UNFCCC, n.d.). And with the Pacific Ocean warming and rising faster than the global average of 3.4 mm per year, infrastructure, ecosystems, and cultural heritage are all under pressure (World Meteorological Organization, 2024).

While nations like Tuvalu and Vanuatu are implementing bold adaptation measures—ranging from seawalls to legal action—PNG's climate response has been fragmented and underfunded. The country still lacks a national relocation strategy and sufficient climate finance, leaving vulnerable communities to face rising threats with little support (ReliefWeb, 2024; RCCC, 2024).

Carteret Islands: A Story of Displacement

Among PNG's most visible examples of climate impact are the Carteret Islands—six low-lying atolls in Bougainville Province. Just two meters above sea level, they've lost 60 to 70 meters of shoreline due to storm surges and sea-level rise (Kuir-Ayius, 2024; Wikipedia, 2024). Farming has become impossible. Water sources have turned salty. Families began relocating as early as 2003.

Figure 7. Maria Kamin, Carteret Islander (Image credit: Thibault Le Pivain, Mongabay, 2024)

Led by the NGO Tulele Peisa, resettlement to Bougainville began in 2009, with 81 hectares secured in Tinputz for displaced families (ReliefWeb, 2024). But PNG still lacks a national framework for relocation, leaving future efforts uncoordinated. As islander Maria Kamin explained, *"We are not just leaving. We're trying to bring a part of our islands with us"* (Mongabay, 2024).

Resettled Carteret families face numerous hurdles: land conflicts with host communities, poor infrastructure, food shortages, and limited access to health care (Kuir-Ayius, 2024). Overcrowding has led to rising cases of malaria and diarrheal diseases, especially affecting women and children who lack basic services.

Manam Island and a National Pattern

The Carterets aren't alone. Volcanic activity in 2004 and 2005 forced more than 9,000 residents of Manam Island in Madang Province to relocate. Many were resettled in areas like Potsdam and Asuramba, which now face their own climate risks (Kuir-Ayius, 2024). Like the Carteret Islanders, Manam's displaced people live with limited land rights, poor infrastructure, and little government assistance. Despite growing numbers of climate migrants, PNG's national commitments remain vague. The Enhanced Nationally Determined Contributions (NDCs) acknowledge climate-induced migration but fall short of a real policy framework (Kuir-Ayius, 2024).

Looking Forward: Lessons from the Region

Elsewhere in the Pacific, nations like Kiribati and Tuvalu are combining traditional knowledge with modern adaptation—restoring mangroves, building seawalls, and pushing for legal recognition of

climate loss (Wikipedia, 2024). Fiji's SPREP-led Coastal Cities Workshop emphasized integrated solutions that pair ecosystem restoration with planned relocation (SPREP, 2023).

PNG is beginning to build technical capacity—195 officials trained through UNFCCC's Mapping Exposure project, and new tools like LiDAR and GIS introduced for flood risk mapping. But these tools remain largely disconnected from national planning (UNFCCC, n.d.; RCCC, 2024).

PNG's climate future is uncertain, but it's not without hope. From the Carteret Islands to the volcanic slopes of Manam, its communities are already adapting in the face of profound disruption. What's needed now is national coordination, resilient infrastructure, and investment in community-driven solutions. With greater policy support, funding, and integration of local knowledge, PNG has the potential to transform its climate vulnerability into leadership—and stand not only as a victim of climate change, but as a voice for justice in the Pacific.

5.6 Case Study 5: Sikaiana Atoll, Solomon Islands

While Fiji offers an example of coordinated relocation and policy-driven adaptation, the Solomon Islands (SI) reveal a more sobering reality—where cultural loss and physical displacement are outpacing national response. Made up of nearly 1,000 islands in the southwest Pacific, the SI faces some of the most direct and devastating consequences of climate change: rising seas, saltwater intrusion, and disappearing land (Albert et al., 2017; Kuruppu & Willie, 2015).

The same features that define the country's natural beauty—fragile atolls, coral reefs, and low-lying coastlines—also make it deeply vulnerable. In recent decades, more than five reef islands have vanished beneath the ocean, and others are quickly eroding (HRW, 2025). Coastal communities in places like Manus and Ontong Java report salt-contaminated freshwater, shrinking food gardens, and increasing displacement (PreventionWeb, 2024). These aren't isolated incidents—they are part of a wider trend across the archipelago.

The Human Toll of Displacement

As shorelines recede, Solomon Islanders are not only losing land but also losing pieces of their identity. Burial grounds have been washed away. Subsistence farming is failing. Homes are abandoned not through choice, but necessity. Makeshift seawalls—often built with coral rubble or scrap—rarely withstand intensifying storms.

Government support remains limited. UNDP (2024) highlights that while some adaptation projects exist—focused on water systems, traditional architecture, and food resilience—access is uneven. Most communities must rely on their own knowledge and improvisation, often without technical or financial backing. In a country with limited infrastructure and strained governance, people adapt with what they have.

Despite contributing virtually nothing to the global emissions driving this crisis, Solomon Islanders are among its first and worst-hit victims. This injustice is not lost on the nation's youth. In Malaita and Guadalcanal, young leaders are documenting disappearing coastlines, collecting oral histories, and speaking at international climate forums. Their message is clear: the Solomon Islands must not be allowed to disappear from maps—or from memory.

Sikaiana Atolls: A Microcosm of Crisis

Nowhere is this struggle more visible than on Sikaiana, a remote Polynesian outlier northeast of Malaita Province. At just under two meters above sea level, it is one of the most climate-exposed islands in the country. Life here depends on small-scale farming, rainwater collection, and reef fishing—all of which are under threat.

"Climate change has greatly affected our beloved Sikaiana Island," said Chief Leonard Semaru in 2024. "The sea-level is rising, our crops are failing and our homes are threatened by the encroaching waters. Our traditional ways of life are being challenged like never before" (Solomon Star, 2024).

Scientific assessments back his warning. Saltwater intrusion and tidal flooding are reducing freshwater and arable land (Albert et al., 2017; Campbell, 2015). For many, moving inland—or leaving entirely—is becoming the only choice. Yet unlike Fiji, which has established national relocation plans and funding mechanisms, SI lacks a coordinated approach. Families must navigate relocation without state support, legal protection, or long-term solutions. Cultural heritage is particularly at risk. Sikaiana's communal institutions, sacred sites, and traditional land systems are eroding alongside the coastline. This is not just an environmental crisis—it is an existential one.

Finding Voice in the Face of Loss

The Solomon Islands' climate crisis is no longer hypothetical. It is real, it is urgent, and it is unfolding now. Sikaiana's experience mirrors that of many islands across the nation, where environmental collapse is intimately tied to cultural erosion and government inaction. What's needed is not only funding or infrastructure, but a dual strategy: one that values Indigenous knowledge and empowers local communities, while building stronger national and regional coordination. Without this, adaptation will remain piecemeal and unjust.

The Solomon Islands may be losing ground—but its people are refusing to lose their voice. That voice is rising—not in desperation, but in demand—for recognition, support, and justice.

5.7 Case Study 6: Vunidogoloa, Fiji

Amid the rising tide of climate crises across the Pacific, Fiji stands out as both vulnerable and visionary. With over 330 islands, the nation faces serious threats from sea-level rise, saltwater intrusion, extreme weather, and heatwaves. Already, more than 80 coastal communities are at risk of relocation—and that number is rising (ABC News, 2023).

Unlike many of its regional neighbors, Fiji has responded with proactive, structured planning. The government established the Relocation Guidelines and the Climate Relocation and Displaced Peoples Trust Fund, designed to manage displacement with foresight and dignity (Earth.Org, 2024). These frameworks offer one of the Pacific's most comprehensive responses—especially when compared to PNG's fragmented approach (ReliefWeb, 2024).

Still, relocation in Fiji is not simply a logistical exercise—it is emotionally and culturally charged. Land, or *Vanua*, is more than a place; it is spiritual, ancestral, and communal. Even when safety demands moving, leaving behind sacred land is painful. As *The Conversation* (2019) notes, Fiji's

relocations involve careful consultation, land negotiations, and an emphasis on keeping communities intact. Yet the trauma of resettlement remains real, particularly for elders who feel the loss deeply.

Vunidogoloa: A Blueprint for Managed Retreat

Figure 8 Sailosi Ramatu stands in the sea where his house once stood in Vunidogoloa village, Fiji (Image Credit: Craig Hansen, Foreign Correspondent/ABC News, 2023)

The village of Vunidogoloa on Vanua Levu became Fiji's first government-supported relocation in 2014. Rising seas and saltwater had made traditional farming and housing untenable. The state stepped in, building new homes, a school, a church, and infrastructure two kilometers inland (Piggott-McKellar et al., 2024). While often seen as a "model relocation," the experience came with challenges. People struggled to adapt to new livelihoods and altered social dynamics. Access to fishing grounds was reduced, and the emotional toll of leaving ancestral land weighed heavily. As *Sailosi Ramatu* expressed, "Because we were born here, our parents were here, leaving it behind, and going, that's something that really hurts us," (Foreign Correspondent, 2022). Even so, Vunidogoloa now serves as a regional example of how to manage climate-induced displacement with care. Over 40 more communities across Fiji are planning similar moves, applying the lessons learned here (Earth.Org, 2024).

Restoring Nature, Preserving Culture

Relocation is only part of Fiji's climate strategy. The country is also investing in nature-based solutions—from mangrove planting and coral reef restoration to eco-engineered seawalls (The Commonwealth, 2024). These are not just ecological tools, but cultural ones. Coastal communities see these ecosystems as kin—living parts of their heritage. One shining example is the youth-led coral restoration at the Great Sea Reef, the third-largest barrier reef in the Southern Hemisphere. Young people are leading coral propagation, biodiversity monitoring, and environmental education. As *Litia Tuinasau*, a youth coordinator, said: "Reef restoration is not just a science project—it's

how we defend our island home" (PMC, 2023). These actions blend science with tradition, demonstrating how adaptation can be rooted in local stewardship and generational knowledge.

Legal Leadership on Climate Action

Fiji has also enshrined its climate commitment in law. The Climate Change Act (2021) mandates emissions reduction, climate integration in planning, and codifies relocation as a legal right (The Commonwealth, 2024). This legal structure strengthens national goals while bolstering Fiji's voice in international climate diplomacy. At COP summits, Fijian leaders consistently push for fair financing, Indigenous rights, and global recognition of "loss and damage." As *Dr. Frances Namoumou* stated at COP29, "The Pacific speaks not just for itself—but for the world's future."

Fiji's journey shows what is possible when cultural identity, legal frameworks, and community voices shape climate action. While many challenges remain—especially for remote islands and long-term funding—the country's model of adaptation offers lessons far beyond its shores. Here, climate justice is not only about surviving change, but doing so with dignity, memory, and purpose.

5.8 Comparative Analysis of All Countries

Across Sri Lanka, India, Bangladesh, Papua New Guinea (PNG), Fiji, and the Solomon Islands (SI), coastal communities are navigating the overlapping realities of sea-level rise, extreme weather, and environmental degradation. Yet while these countries share climate vulnerabilities, their responses reveal stark contrasts—shaped by geography, political will, community engagement, and financial capacity. A closer look at the data uncovers key themes:

1. Geographic Exposure: The Shape of Vulnerability

Though all six nations face rising seas, their physical landscapes define how climate impacts unfold. In Bangladesh and PNG, sprawling deltaic zones and small islands are particularly exposed to flooding, erosion, and saline intrusion—making entire regions perilously uninhabitable (Saha et al., 2022; UNFCCC, n.d.). India and Sri Lanka, with long coastlines, are also grappling with shrinking beaches and saltwater creeping into farmlands. Meanwhile, Fiji and the Solomon Islands, made up of low-lying atolls and remote islands, are at risk of losing land altogether—even a small rise in sea level threatens homes, water sources, and food security (SPREP, 2023; Solomon Star News, 2024).

2. Adaptation in Action: A Patchwork of Solutions

Nature is central to most countries' adaptation efforts. Bangladesh, PNG, Fiji, and SI are investing in mangrove restoration—low-cost, community-driven solutions that buffer coastlines from erosion and storm surges. India has taken a different route, with ambitious coral reef rehabilitation in the Gulf of Mannar (Times of India, 2019). Fiji and PNG have gone a step further, initiating relocation programs for communities that can no longer remain in place. In Bangladesh, defensive infrastructure like embankments is being scaled up, reflecting a hybrid model that blends ecological and engineering responses (The Daily Star, 2023).

3. Governance and Policy: Plans on Paper vs. Action on the Ground

Government strategies vary widely. Bangladesh leads with a long-term vision through its Bangladesh Delta Plan 2100, coupled with strong disaster preparedness mechanisms (BIPR, 2024). India's decentralized model empowers states to implement their own climate solutions, as seen in Tamil Nadu's marine initiatives. Fiji and the Solomon Islands align their planning with broader Pacific frameworks such as National Adaptation Plans (SPREP, 2023). But PNG still lacks a cohesive national adaptation strategy, and Sri Lanka struggles with institutional fragmentation and underfunding—hindering the continuity and scale of response (RCCC, 2024).

4. Relocation: From Last Resort to Policy Blueprint

Relocation remains a difficult but necessary response in many high-risk areas. Fiji has set a regional precedent with government-supported, community-informed relocation plans (SPREP, 2023). In contrast, PNG's Carteret Islanders are moving with limited state support, relying instead on grassroots efforts. Bangladesh is witnessing growing internal displacement without a national framework for resettlement. India and the Solomon Islands, for now, continue to focus on in-place adaptation, lacking structured plans for planned relocation even as the need escalates.

5. Youth at the Frontlines: Voices for the Future

Across the region, young people are stepping up—but their visibility varies. In India, youth-led activism like the Alappad Movement has sparked national debate. In Bangladesh, young volunteers lead community planting and awareness drives. SI youth are using digital tools to archive land loss and advocate for justice. Fiji and PNG show pockets of youth engagement, mostly in eco-tourism and environmental education. Sri Lanka's youth have been active in coastal conservation and education campaigns, particularly in areas like Jaffna. Still, in many countries, youth remain underrepresented in policymaking.

6. Financing and Coordination: Uneven Support

Access to climate finance is uneven and often disjointed. Fiji and Bangladesh have managed to secure significant international funding, but coordinating across ministries and levels of government remains a challenge (World Bank, 2022). India is beginning to rely more on internal state budgets and capacity, showing signs of self-reliance. In PNG and the Solomon Islands, efforts are fragmented and underfunded, leaving communities vulnerable and overstretched (SPREP, 2023; RCCC, 2024). Research suggest that Sri Lanka is facing both political volatility and economic constraints, has yet to establish consistent funding pathways for climate resilience.

6. Conclusion

Across the Asia-Pacific, communities in Sri Lanka, India, Bangladesh, PNG, Fiji, and the SI are enduring the frontlines of climate change—not as passive victims, but as proactive agents of resilience. From the eroding shores of Manpura and Carteret to the relocated village of Vunidogoloa and the coral-sustaining coasts of Tamil Nadu, a shared narrative emerges: one of loss, adaptation, and grassroots innovation.

Several regional insights are clear. First, geographic exposure to sea-level rise and climate volatility is universal, but the capacity to respond is not. While countries like India and Bangladesh have made strides in state-backed adaptation, smaller Pacific nations and marginalized island

communities remain under-resourced and politically sidelined. The contrast between planned relocation in Fiji and the self-funded, community-led moves in PNG exemplifies a broader issue of inequitable funding and institutional neglect.

Second, legislative and adaptation strategies must go beyond infrastructure. While levees and seawalls provide temporary defense, true resilience lies in fostering local agency, investing in education, supporting climate-resilient livelihoods, and integrating traditional knowledge systems with scientific solutions. Youth across the region are leading mangrove restoration, advocacy campaigns, and digital storytelling—yet they remain largely excluded from national decision-making forums.

Lastly, cross-national cooperation is not just desirable—it is necessary. The shared ecological and cultural dynamics across the Bay of Bengal and Pacific Ocean islands present a powerful opportunity for regional climate diplomacy. South-South collaboration, capacity exchange, and shared funding mechanisms can ensure no community is left behind due to size or visibility.

The road ahead demands more than climate pledges. It requires a fundamental shift in power: from donor-driven models to community-led planning, from isolated pilot projects to sustained, inclusive investment, and from reactive measures to transformative climate justice. Equity in financing, recognition of local expertise, and regional solidarity must anchor the next chapter of climate action in the Asia-Pacific. If the region’s most vulnerable can lead with courage, the world must respond with commitment.

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