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# Building Indigenous Youth Leadership in Marine Conservation: Strengthening Socio-Ecological Resilience in Semporna

Expert paper presenter

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## 1. Introduction

Semporna, nestled within the globally significant Coral Triangle on the east coast of Sabah, Malaysia, is home to rich coral reefs and a mosaic of Indigenous and island communities whose lives are intertwined with the sea. The seafaring Bajau Laut, the land-dwelling Bajau, and the Suluk people rely on marine resources not only for food and livelihood, but as the basis of culture, identity and mobility. However, these traditional lifeways are now under mounting pressure: over-exploitation of coral reefs, declining fish stocks, coastal development due to booming tourism, and climate stress are reshaping the future of this community. In response, a Community Marine Conservation Group CMCGs was established across four islands in Semporna Kulapuan, Larapan, Mabul and Selakan to build leadership, strengthen resilience and adapt traditions in a changing environment and situation in Semporna.

This paper, prepared for UNDESA, aims to explore how mobile Indigenous Peoples are navigating change, what adaptations, opportunities and governance strategies are emerging, and how youth-led marine conservation can reinforce cultural continuity alongside ecological stewardship or territorial ownership of their area.

## 2. The state of the marine environment in Semporna

Semporna boasts important marine biodiversity and a rich marine ecosystem, including coral reefs, seagrass beds, and mangroves. Semporna lies within the globally significant Coral Triangle and hosts one of Malaysia's richest reef systems. According to the state's biodiversity outlook, the east-coast reefs (including the Semporna reef complex) support "the highest number of coral species in Sabah, particularly in Semporna reef complex" (269 species) and are part of the country's largest concentration of reef ecosystems [1].

These reefs deliver multiple benefits to local populations: they act as nursery grounds for fish and invertebrates[2]; underpin local fisheries and subsistence catches; provide coastal protection from waves and storms; and support tourism and diving livelihoods [3]. However, the reef health is under mounting pressure. A survey by Reef Check Malaysia (RCM) showed a declining national trend in Live Coral Cover (LCC) from about 50% in 2022 to 44.7% in 2024[4]. Semporna's coral reef ecosystems continue to face multiple, interconnected threats that compromise their ecological health and the livelihoods of dependent coastal communities. Illegal and destructive fishing practices, including dynamite or fish-bombing, remain a recurring issue in the district despite ongoing enforcement efforts [5]. These destructive methods not only kill fish indiscriminately but also cause extensive and long-term damage to coral reef structures. Additionally, physical impacts from anchors, ghost nets, and unregulated tourism activities such as diving and snorkelling have contributed to the gradual erosion of reef integrity and habitat quality [6]. Climate-related pressures, particularly thermal stress and coral bleaching linked to rising sea surface temperatures, have also intensified in recent years, further reducing coral resilience and regeneration capacity [7]. Collectively, these threats lead to both aesthetic and structural degradation of coral reefs,

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diminishing biodiversity and undermining the cultural and economic well-being of local Indigenous communities that depend on healthy reef ecosystems for food security, ecotourism, and traditional livelihoods.

Seagrass meadows in the Semporna region play a vital ecological role. They occupy shallow coastal zones, lagoons and fringing reef flats, providing key habitats for species like sea turtles and dugongs, and stabilising sediment and water quality [8]. For example, WWF-Malaysia reported that nearly 1,500 seagrass beds in Semporna have been identified as foraging grounds for green turtles [9]. Benefits include: nursery habitat for commercial and subsistence fish species, carbon-sequestration ('blue carbon'), and sediment stabilisation, which indirectly helps reef health [10]. However, threats are emerging: seagrass beds are limited in coverage in some areas (e.g., survey found only ~3% cover in one sub-tidal zone at Semporna) and suffer from sedimentation, turbidity and coastal development [11]. Declines in water clarity, burial by sediment from land-based sources and physical damage (boat propellers, anchor-dragging) are key pressures [12].

Mangroves in the Semporna district are mainly fringe-type forests along coastlines and bays. They form an important buffer zone between terrestrial and marine ecosystems, offering shoreline protection, nursery habitat for juvenile marine species, and livelihood resources (e.g., shellfish, wood, fish traps) for local Indigenous and coastal communities [13]. Yet, mangrove condition and extent are under threat. The east-coast mangrove fringe is relatively narrow in some islands (e.g., fossil coral islands with steep shorelines), limiting their resilience [13]. Coastal development, land reclamation, upstream sedimentation and changes in salinity and tidal flow are cited as pressures [13].

Together, the interconnected habitats of reefs, seagrass beds and mangroves form an ecological foundation for marine life, fisheries, coastal resilience and Indigenous livelihood systems in Semporna. The decline in any one habitat (for example, reduced reef cover or seagrass loss) affects the others and reduces the cumulative ecosystem services that Indigenous communities (including the Bajau Laut/Sea-Nomads) rely upon. The mounting threats from climate change (bleaching, storms, sea-level rise), destructive fishing, unsustainable tourism, sedimentation and coastal development present direct risks to marine biodiversity, cultural lifeways and economic resilience. If no interventions are made, current scenarios will make the future of marine biodiversity and Indigenous communities uncertain.

## 3. Challenges faced by the Indigenous communities in Semporna

Indigenous communities in Semporna face a triad of interrelated challenges: marine biodiversity degradation, climate change impacts, and displacement exacerbated by development and tourism. These dynamics undermine both ecological resilience and the social fabric, threatening traditional livelihoods, food security, and cultural identity.

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### 3.1 Marine Biodiversity Degradation

Marine biodiversity around Semporna is under severe stress. Coral reef ecosystems, which provide habitat for reef fish and invertebrates that local communities rely on, are declining due to destructive fishing practices. While data specific to Semporna are locally limited, regional trends mirror global declines: coral reefs in East Asia, including Sabah, have degraded significantly under combined pressures of overfishing, sedimentation, and warming seas [14]. National Reef Check Surveys report high levels of human disturbance (discarded fish nets, anchor damage, fish bombing), which resulted in the continuing deterioration in coral reef health from 2023 into 2024. 63% of the islands/areas surveyed saw a decrease in Live Coral Cover (LCC). In Sabah, especially Semporna, 64% of the reefs recorded dynamite fishing damage, 83% are impacted by discarded fishing nets, and 56% are impacted by anchor damage [4]. For the Indigenous population, including gleaners, spearfishers, and users of fish traps or hook-and-line methods, reef decline translates directly into reduced catch, income, and food security. As biodiversity diminishes, there is a cascading effect: fewer reef fish and invertebrates lead to lower harvests, pushing families into poverty or forcing them to seek alternative (often precarious) livelihoods or to fish further offshore at greater risk.

### 3.2 Climate Change Impacts

Climate change compounds these ecosystem stresses. Semporna's islands are increasingly vulnerable to rising sea levels, shoreline erosion, and more frequent extreme weather events [10]. Moreover, coral bleaching has become more frequent and severe: Malaysia experienced a mass bleaching event in 2024, with over half of its marine park reefs affected [15]. Bleaching reduces coral cover, compromises reef structure, and limits the reefs' capacity to support fish and invertebrate populations. These impacts threaten the long-term resilience of Semporna's marine ecosystems. Without concerted action to bolster reef recovery, traditional fishing grounds may become unviable, undermining both the ecological base and cultural practices of Indigenous communities, including sea nomad communities.

### 3.3 Displacement due to tourism

Tourism growth and development in Semporna pose a further threat. The natural beauty of islands such as Mabul, Larapan, and Omadal has attracted rapid tourism expansion, especially diving tourism. While this has created economic opportunities, it has also generated conflicts over resource access, land use, and equity[16]. Statelessness exacerbates vulnerability. The Sea Gypsies, many of whom lack legal citizenship, often have limited rights and protections, which increases their risk of exploitation [17]. Development pressures have resulted in displacement: legal restrictions, evictions, and exclusion from decision-making processes undermine the integrity of Indigenous livelihoods and culture [17].

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In summary, there are challenges faced by our Indigenous communities; however, given these interconnected challenges, we understand that there is a need to

- Empower Indigenous communities with information about current environmental trends and future climate scenarios. By understanding trajectory risks (e.g., increased bleaching, sea-level rise), communities can better participate in, plan, and lead adaptation strategies.
- Build technical and institutional capacity within Indigenous communities so they can actively steward their marine territories. Training in reef monitoring, coral nursery establishment, sustainable fishing practices, and participatory governance strengthens their agency and environmental stewardship.
- Promote models of resource governance that centre customary rights and community participation. Recognizing and formalizing Indigenous tenure over marine areas can enhance ecological protection, improve resource justice, and sustain traditional livelihoods. The development of community-based marine use plans aligned with conservation and climate resilience would bolster both social and ecological resilience.

Addressing these challenges requires integrating ecological science, climate adaptation, and social justice. Empowered and capacitated Indigenous communities, with full participation in managing their marine territories, are pivotal for building long-term resilience both of Semporna's ecosystems and of the people whose lives are inseparable from the sea.

## 4. Study Case - Building Indigenous Youth Leadership Through Community Marine Conservation Group CMCGs Semporna

Reef Check Malaysia has established four Community Marine Conservation Groups (CMCGs) across Semporna. Through its work, Reef Check Malaysia recognises that one of the most effective ways to strengthen coral reef resilience is by empowering the primary resource users the local island communities themselves. When communities are equipped with knowledge, skills, and ownership over their marine areas, the health of coral reefs improves, ultimately supporting livelihoods and food security for many families. These four CMCGs are composed of Indigenous youth from various tribes, including the Bajau, Bajau Laut, and Suluk, who reside on the islands of Larapan, Mabul, Kulapuan, and Selakan. Their leadership and participation reflect a growing movement of local stewards driving community-led marine conservation in Semporna.

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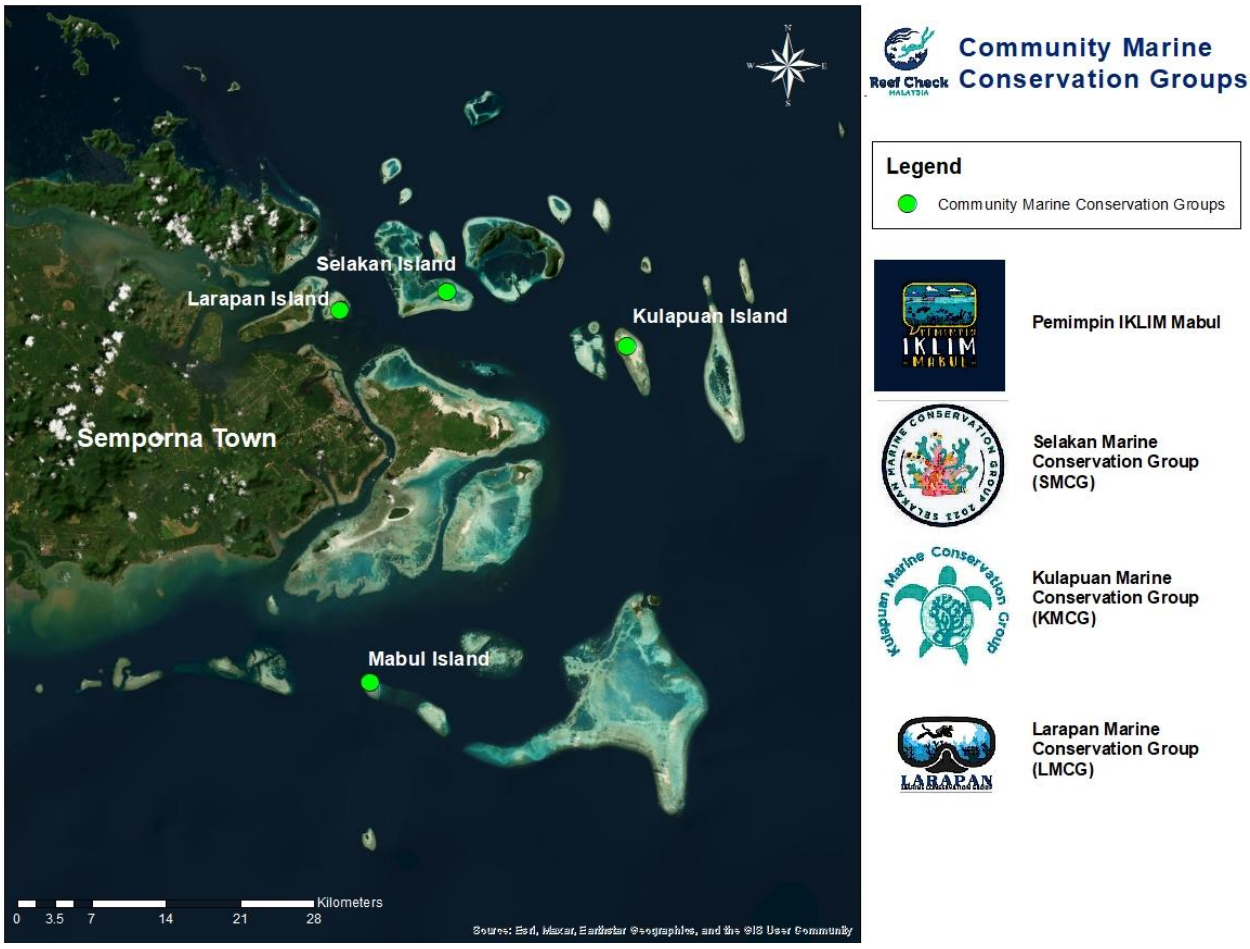


4.1 Efforts being made

The CMCGs are managing a community-based coral rehabilitation initiative in Semporna that has empowered over 60 local youths from Selakan, Mabul, Kulapuan, and Larapan to take the lead in marine conservation. Through four island-based conservation groups, CMCG oversees the deployment of 997 restoration structures and the successful transplantation of over 16,358 coral fragments using various rehabilitation methods. Under CMCG's management, the programme has recorded an impressive average survival rate of over 70% across all restoration sites. This reflects the effectiveness of youth training, regular maintenance, and active monitoring, including predator removal and algae management, demonstrating that locally led efforts can significantly enhance coral recovery and reef resilience [18].

The communities in Selakan and Mabul have been trained and mobilised to conduct their own sea patrolling, with 15 local patrollers equipped to use drones, binoculars, GPS, and reporting templates. Across August and September, they completed over 33 patrol days, detecting and deterring several encroaching fishing boats, including a cyanide compressor-diving case, and

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reporting one fish bombing incident. The initiative strengthened youth capacity particularly through Pemimpin Belia IKLIM Mabul and improved collaboration with Sabah Parks, which appointed Selakan patrollers as Honorary Park Rangers, marking a strong step toward community-led marine protection

Our CMCGs are also actively involved in island waste management efforts, particularly in Larapan and Mabul. In Larapan Island, the CMCG, together with Reef Check Malaysia, established a community-based waste management programme in 2023. The system has continued to operate successfully, preventing an estimated 500–600 kg of waste from entering the sea every month. This initiative is now supported by WWF-Malaysia. On Selakan Island, the waste management improvement programme began in March 2025, and it currently diverts approximately 300–400 kg of waste each month from polluting the marine environment.

Most remote islands in Semporna lack formal waste management systems, which often results in the direct disposal of rubbish onto beaches or into the sea. Such practices pose significant harm to marine ecosystems. According to Reef Check Malaysia, unmanaged waste could have severe long-term economic implications: over a 20-year period, the estimated cost of managing marine debris is RM184 million, while the economic losses from failing to prevent waste-related biodiversity decline could range between RM1.6 billion and RM5.5 billion.

CMCGs mostly work as snorkelling or tour guides, and to promote and improve sustainable tourism practices, they are trained as Eco-Friendly Snorkelling Guides (EFSG). According to the *MetLife Sabah Final Report*, a total of 54 snorkel guides across Sabah including CMCG members completed the EFSG certification, gaining skills in reef etiquette, marine ecosystem awareness, safe snorkelling management, and responsible tourism practices. This training strengthens both professional operators and community groups in reducing tourism-related impacts on reefs while supporting safer, more sustainable visitor experiences [19].

Our CMCGs were trained in the Bleaching Monitoring Protocol, a citizen science approach to support data collection and monitoring. This effort has helped Reef Check Malaysia to produce The *2024 Coral Bleaching Impact Report Malaysia,* which highlights widespread bleaching across multiple reef sites and underscores the need for strengthened local resilience measures, noting that community engagement and consistent monitoring are essential to detect changes in reef health and respond to thermal stress events effectively [20]. Complementing this, the *Rainwater Harvesting Project in Mabul Island 2023* demonstrates strong youth and community participation in addressing essential climate-related challenges on land, where improved access to clean water reduces household vulnerability and strengthens the overall capacity of coastal communities to withstand environmental pressures, an important factor that indirectly supports marine conservation and reef recovery efforts [21].

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The CMCGs have been trained to conduct their own environmental awareness and education programmes under the CEPA CMCG Training conducted by Reef Check Malaysia and supported by KePKAS. A total of 18 participants from four CMCGs in Semporna were equipped with skills in communication, public speaking, educational module development, and strategic planning. Through hands-on sessions in designing island-specific modules focused on coral reefs, turtles, and seagrass and practising interactive CEPA activities, the training strengthened their capacity to deliver effective conservation outreach within their communities independently. By the end of the workshop, each CMCG had developed a structured CEPA plan for their community, marking a significant step toward community-led environmental education and stewardship [22].

Reef Check Malaysia, together with the CMCG in Larapan Island, is also working with the island community to develop a Community Protocol (CP). This protocol aims to secure government recognition of their customary rights over their marine territory, enabling the community better to regulate unsustainable tourism activities and destructive fishing practices, particularly those carried out by outsiders. Through this process, the community is now working closely with Reef Check Malaysia and the Sabah Biodiversity Council, a state government agency, to formalise and implement the Community Protocol on the island.

Reef Check Malaysia's CMCG database shows strong community-led marine conservation efforts across Semporna, with two coastal and underwater cleanups conducted that successfully removed over 80 tonnes of trash from the marine environment. In addition, community teams have cleared 300 kg of ghost nets, preventing further damage to corals and marine life. The CMCGs also play a major role in controlling coral predators, having removed nearly 4,000 Crown-of-Thorns starfish (COTs) to reduce pressure on already vulnerable reef ecosystems. These efforts highlight the growing capacity, awareness as well as ownership of local communities to protect and restore their own marine resources.

## 5. Conclusion and Recommendation

Indigenous communities in Semporna face multiple challenges, particularly the growing scarcity of marine resources driven by various environmental pressures, as well as increasing risks of displacement and exploitation linked to rapid tourism development. In response, Reef Check Malaysia's initiative to empower Indigenous youth from the four islands of Mabul, Kulapuan, Selakan, and Larapan serves as a critical effort to acknowledge these challenges and support communities in adapting to changing conditions.

Our approach focuses on building trust, strengthening motivation, and equipping local youth with the skills needed to safeguard their marine resources. By doing so, Indigenous communities are better positioned to continue protecting and managing their coastal ecosystems, which in turn helps secure food sources for their families and future generations. Most importantly, we aim to elevate

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and formalize the conservation work led by these communities so that their contributions and their customary marine territories are eventually recognised and respected by the government.

Drawing on the adaptive strategies demonstrated by Indigenous communities in Semporna, particularly through the leadership of the Community Marine Conservation Groups (CMCGs) on Mabul, Larapan, Kulapuan, and Selakan; this paper presents three key recommendations to strengthen policy, conservation outcomes, and climate resilience for mobile Indigenous Peoples.

### 5.1 Institutionalise Community-Led Marine Governance and Customary Marine Tenure

Indigenous stewardship has proven effective in restoring reefs, reducing destructive fishing, and safeguarding local marine territories. The experiences of CMCGs show that community leadership is essential for ecological recovery and sustainable resource governance. Governments should formally recognise customary marine tenure and institutionalise community-led governance through legally supported co-management frameworks. This includes integrating CMCGs and Indigenous representatives into enforcement bodies, marine spatial planning committees, and tourism regulatory platforms. Community-generated data or findings from the ground should be incorporated into official decision-making processes to ensure policies reflect on-the-ground realities.

### 5.2 Strengthen Multi-Sector Support Systems for Indigenous Adaptation and Livelihood Resilience

Adaptive practices implemented by Indigenous youth, such as coral restoration, waste management, sea patrolling, and water security systems, demonstrate the potential of community-led solutions. However, these efforts require ongoing support to remain effective in the face of rapid climate and economic pressures. Establish long-term, multisector support mechanisms tailored to the needs of mobile Indigenous communities. This includes sustained financing, training in conservation and climate adaptation, livelihood diversification, access to basic services, and climate-resilient infrastructure. Particular attention should be given to mobility-dependent groups such as the Bajau Laut, ensuring that adaptation support does not compromise cultural identity, movement patterns, or traditional knowledge systems.

### 5.3 Integrate Indigenous Knowledge and Youth-Led Adaptation Models into Climate and Conservation Policy

The work of CMCGs demonstrates how Indigenous and youth leadership can effectively complement scientific approaches to conservation and climate adaptation. Their practices of reef rehabilitation, predator control, CEPA programmes, and local monitoring offer scalable models for other coastal regions. National and state climate strategies should embed Indigenous knowledge, youth-led conservation practices, and community-generated data into planning and policy frameworks. Collaboration between CMCGs, government agencies, and research institutions

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should be strengthened to co-produce adaptation tools, vulnerability assessments, and environmental education materials. This ensures that climate and conservation policies are culturally grounded, locally informed, and responsive to the lived experiences of mobile Indigenous Peoples.

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