



Sustainable Fisheries as Strategic Assets in ASEAN Large Marine Ecosystems: Leveraging Marine Protected Area Networks for Ecological Resilience, Food Security, and Geopolitical Stability



Photo: Christian Gloor

The background of the page is a vibrant underwater scene. The top left shows a school of small blue fish swimming in clear blue water. The right side and bottom are dominated by a colorful coral reef with various species of coral in shades of red, orange, yellow, and blue. The overall lighting is bright and clear, typical of a healthy reef environment.

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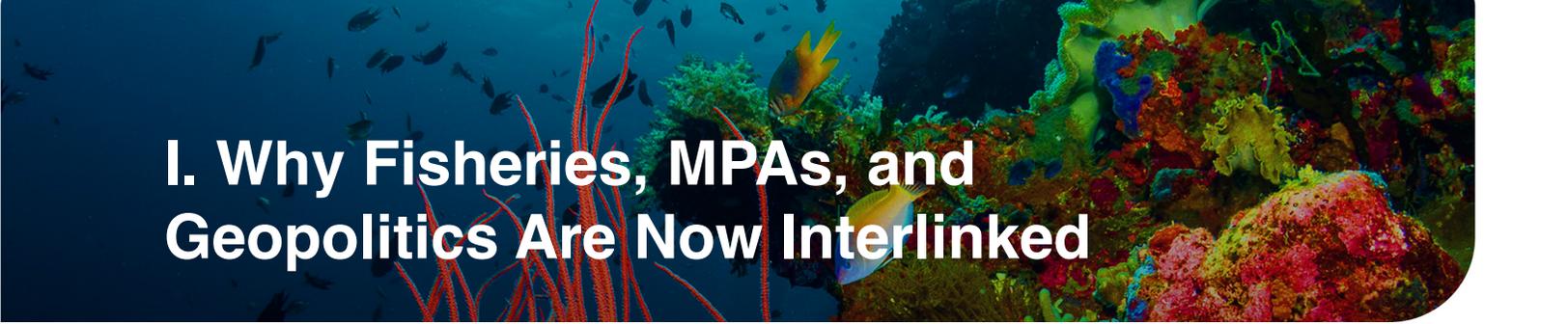
Executive Summary

Across Southeast Asia, fisheries are undergoing a quiet but profound transformation. Once viewed primarily as a sectoral concern—managed through catch limits, licensing systems, or local conservation measures—fisheries are now recognised as a strategic asset underpinning food security, coastal stability, national development, and regional cooperation. In maritime and archipelagic countries such as Indonesia, the Philippines, and Thailand, the condition of marine ecosystems increasingly shapes governance credibility and long-term economic resilience.

The ASEAN ENMAPS (*Effectively Managing Networks of Marine Protected Areas in Large Marine Ecosystems in the ASEAN Region*) project executed by the ASEAN Centre for Biodiversity operates within this evolving context. Its pilot sites are situated across four Large Marine Ecosystems (LMEs)—the Bay of Bengal, South China Sea, Sulu–Celebes Sea, and Indonesian Sea—that rank among the world’s most productive yet most pressured marine regions. These sites are not only ecologically significant; they also function as **testing grounds for governance**, where science, policy, and stakeholder engagement intersect.

This white paper advances a central proposition: **sustainable fisheries, coastal resilience, and geopolitical stability depend on the transition from isolated marine protected areas (MPAs) to functionally connected marine protected area networks (MPANs)**. Well-designed and effectively enforced MPANs provide the ecological foundation for fisheries recovery, the governance coherence needed for long-term management, and the strategic credibility required in shared and sensitive seascapes.

While ASEAN ENMAPS countries face broadly similar ecological and fisheries pressures, their governance systems, institutional capacities, and geopolitical contexts differ. These differences create distinct pathways—but also shared opportunities—for leveraging MPANs as instruments that align biodiversity conservation with national and regional interests.



I. Why Fisheries, MPAs, and Geopolitics Are Now Interlinked

From Conservation Tools to Strategic, Upgraded Marine Governance

MPAs were initially conceived as conservation instruments—spatial tools designed to protect habitats, species, and biodiversity hotspots from overexploitation. This original purpose remains essential, particularly in a region as biologically rich as Southeast Asia. However, over the past two decades, evidence from the ASEAN region and globally has demonstrated that this framing is no longer sufficient on its own. When properly designed and effectively managed, MPAs perform a far broader function: they operate as productive and strategic assets that support fisheries recovery, ecosystem stability, and long-term governance effectiveness well beyond their immediate boundaries.

Within MPAs, reduced fishing pressure allows fish to grow larger, live longer, and reproduce more successfully. Larger and older fish produce disproportionately more eggs, contributing significantly to larval supply. Dispersed larvae contribute to the replenishment of stocks once they develop into sub-adults and settle in surrounding fishing grounds. Spillover on the other hand, replenish fish stocks and benefit fisheries by way of adults leaving confines of MPA moving across boundaries into fished areas. At the same time, the protection of habitats within MPAs safeguards genetic diversity, which is increasingly critical for resilience under climate variability and environmental change, as well as attracts settling young adults from pools of fish recruits. When adult fish becomes crowded inside MPAs, many individuals spillover across MPA boundaries into adjacent fished areas and benefiting fisheries. These ecological functions are not abstract conservation gains. They translate directly into more stable catches, reduced vulnerability for coastal communities, and lower long-term management and enforcement costs.

As these benefits accumulate, MPAs take on strategic significance. They contribute to food security by stabilising fish supply, reduce incentives for illegal and destructive fishing by improving stock availability, and strengthen the legitimacy of fisheries regulations when communities observe tangible benefits. In heavily used or sensitive maritime spaces, effective MPA management also reinforces state presence and stewardship in a quiet but credible manner—through governance and sustainable use rather than confrontation.

MPA Networks as Upgraded Tool: From Sites to Networks

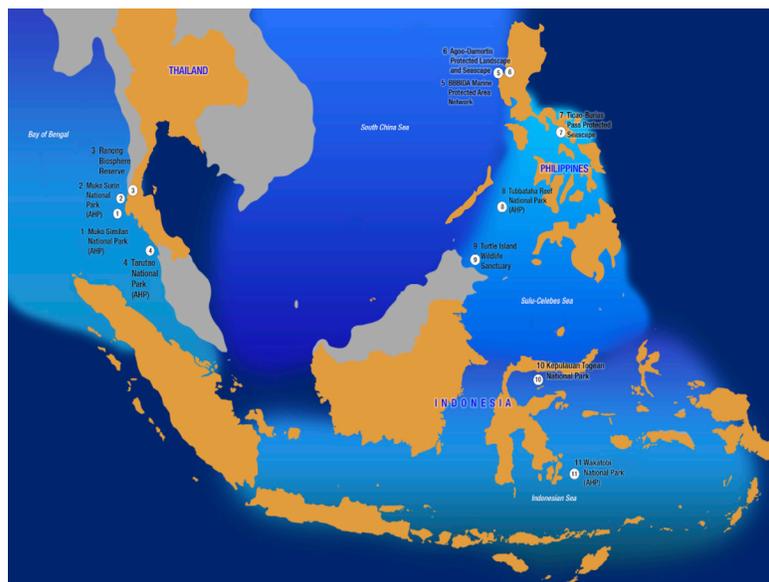
The need for an “upgrade” on how MPAs are conceived arises from a fundamental mismatch between how marine ecosystems function and how they are traditionally managed. Fish populations, larvae, and ecological processes do not operate within the fixed boundaries of individual MPAs. They move across seascapes, following currents, seasonal patterns, and life-history traits that often span tens to hundreds of kilometres. This reality means that even well-managed, stand-alone MPAs face structural limitations in sustaining fisheries over time.

MPANs represent this necessary upgrade. By linking MPAs into functionally connected systems aligned with oceanographic processes, MPANs protect not only sites, but processes—spawning, dispersal, recruitment, and migration. In doing so, they shift MPAs from being isolated conservation sites to becoming core infrastructure within fisheries systems. Networks amplify the benefits of individual MPAs, extend fisheries recovery across broader areas, and reduce the risk that local gains are undermined by pressures elsewhere.

This network-based approach is particularly important in ASEAN LMEs, where ecological connectivity is high and human use is intense. MPANs allow countries to move beyond reactive, site-by-site management toward anticipatory, system-scale governance capable of absorbing ecological shocks and social pressures.

Large Marine Ecosystems as Geopolitical Spaces

The four LMEs covered by ASEAN ENMAPS—the Bay of Bengal, South China Sea, Sulu–Celebes Sea, and Indonesian Sea—are not merely ecological units defined



ASEAN ENMAPS sites

by currents and productivity. They are also deeply geopolitical spaces. These seas host major international shipping lanes, sustain both industrial and small-scale fisheries of national importance, and support coastal populations whose livelihoods and food security are directly tied to marine resources. They are also arenas where cooperation, competition, and at times tension, intersect.

Decisions about fisheries management and spatial protection in these LMEs therefore resonate far beyond environmental policy. They influence trade, economic stability, diplomatic relations, and national security considerations. In this context, MPANs offer a governance approach that aligns ecological reality with political necessity. MPANs provide a defensible and evidence-based framework for managing shared and contested marine resources, reducing uncertainty and the risk of conflict and building on trust by making management intentions transparent and science-driven.

Sustainable Fisheries as a Source of Geopolitical Credibility

Sustainable fisheries are increasingly recognised as a source of geopolitical credibility. States that demonstrate the capacity to manage fish stocks responsibly, enforce rules fairly, and support coastal communities strengthen their standing both domestically and internationally. MPANs contribute directly to this credibility by showcasing coherent spatial planning, science-informed decision-making, and coordinated governance across sectors and jurisdictions.

Unlike purely enforcement- or security-driven approaches, MPANs reinforce state presence through use and stewardship. Fishers operating legally and sustainably within and around MPAs become daily expressions of governance on the water. This approach is particularly powerful in archipelagic and maritime states, where sustained civilian presence anchored in livelihoods can be more stabilising than episodic enforcement alone.

People at the Centre: Indigenous Knowledge, Women, and Youth

An upgraded understanding of MPAs and MPANs also requires recognising their role as social compacts, not just spatial boundaries. Across ASEAN ENMAPS sites, Indigenous peoples and traditional fishing communities hold deep ecological knowledge accumulated over generations. Seasonal fishing calendars, temporary closures, gear restrictions, and cultural norms around respect for resources often align closely with modern sustainability principles. However, these knowledge systems have been eroded by market pressures, modernisation, and exclusion from formal governance.

MPANs provide a platform to revive, legitimise, and operationalise traditional knowledge. When customary practices are integrated into zoning schemes, seasonal regulations, and management plans, MPANs become more culturally grounded and socially legitimate. This strengthens compliance, rebuilds trust, and reconnects conservation with lived experience.

Women and youth are central to this transformation. Women play critical roles in fisheries value chains, household decision-making, and compliance, while youth represent the future stewards of marine systems. By engaging youth in mapping, monitoring, and data analysis—while grounding these activities in traditional ecological knowledge—ASEAN ENMAPS creates pathways for intergenerational transfer of knowledge. Elders’ experience and youth innovation together ensure that sustainability is not only preserved, but adapted to contemporary challenges.

ASEAN ENMAPS as a Catalyst for the Upgrade

The ASEAN ENMAPS project embodies this upgraded approach to MPAs. By combining connectivity science, fisheries data, governance analysis, and inclusive stakeholder engagement, ASEAN ENMAPS demonstrates how MPAs can evolve from isolated conservation tools into strategic networks that support sustainable fisheries, resilient communities, and stable regional relations.

In doing so, the project reframes MPAs not as constraints on development, but as enablers of long-term prosperity and geopolitical stability. For national technical working groups and steering committees, this reframing is critical. It clarifies why investment in MPANs is not an optional enhancement, but a rational and necessary response to the interconnected ecological, social, and political realities shaping ASEAN seas today.

II. Shared Threats Across ASEAN ENMAPS Sites

Despite differences in national context, ASEAN ENMAPS sites across Indonesia, the Philippines, and Thailand face a set of converging threats that undermine fisheries sustainability.

Ecologically, overfishing and destructive practices continue to erode reef, seagrass, and mangrove systems that underpin fish productivity. These habitats are essential not only as living spaces for adult fish, but as spawning and nursery grounds critical to replenishment. Their degradation weakens the entire fisheries system.

These pressures are exacerbated by climate-driven changes. Rising sea temperatures, altered current patterns, and increasing frequency of extreme events affect larval survival, recruitment success, and connectivity pathways. Even well-managed MPAs struggle to deliver expected outcomes when climate stressors are not considered at system scale.



Destroyed corals due to dynamite fishing
Photo by Silke Baron



Polluted beach
Photo by Rey Perzoso

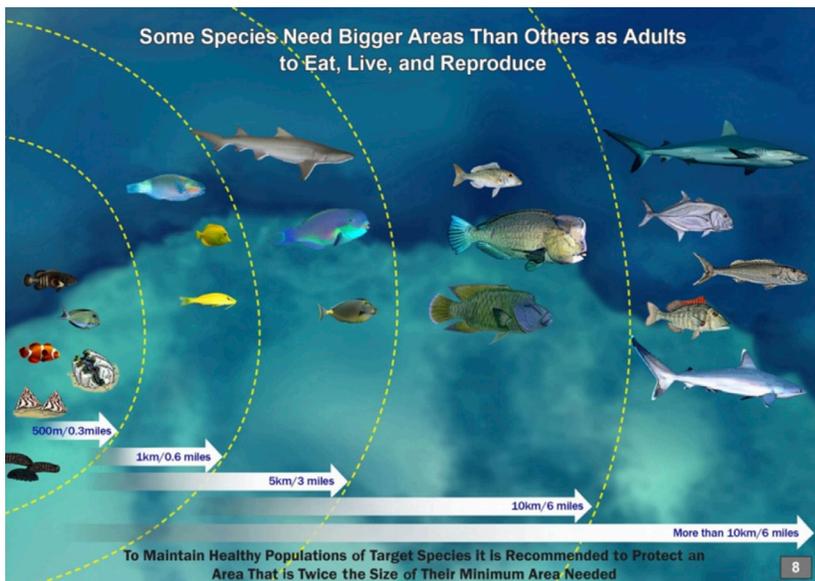
From a fisheries perspective, increasing effort relative to available biomass has led to declining or stagnating catch per unit effort (CPUE) in many areas. Fishers often respond by intensifying gear use or expanding fishing areas, further increasing pressure on stocks. Inadequate protection of spawning aggregations and juvenile habitats compounds the problem.

Governance challenges amplify these ecological and fisheries pressures. Responsibilities for fisheries, conservation, tourism, and coastal development are frequently fragmented across agencies and levels of government. Policies may be well designed in isolation but misaligned in practice. Enforcement capacity and accountability vary widely, leading to uneven compliance and reduced trust among

III. Connectivity as the Missing Strategic Layer

A central insight emerging from ASEAN ENMAPS science is that connectivity is not an optional consideration—it is the organising principle of marine ecosystems.

Connectivity studies demonstrate that larval dispersal for many reef and coastal species typically occurs over distances of 10-100 kilometres, often exceeding the boundaries of individual MPAs or local jurisdictions. While some populations exhibit strong self-recruitment, most depend to varying degrees on larvae originating elsewhere. Seasonal currents and life-history traits further shape these dynamics, creating shifting patterns of source and sink areas.



Distances that species of fish travel regularly. Some travel 10x these distances during spawning (e.g. groupers)

Source: Green et al. (2013)

These findings have direct implications for management. They explain why some MPAs show more rapid recovery than others, even under similar enforcement regimes. They also reveal how degradation in one area can undermine fisheries productivity in another.

For MPA design, the conclusion is unequivocal: single MPAs cannot sustain fisheries on their own. MPAs must be configured to align with currents, spawning seasons, and species life cycles. Failure to incorporate connectivity results in structurally weak protection that cannot deliver long-term fisheries sustainability, regardless of local effort.

IV. Monitoring, Control, and Surveillance: Reality on the Ground

Effective MPANs require credible monitoring, control, and surveillance (MCS) systems. Across ASEAN ENMAPS sites, however, common constraints persist. Patrol assets and operational budgets are often insufficient for the scale of waters involved. Fisheries data are inconsistently collected, analysed, or used in decision-making. Prosecution pipelines are weak, reducing deterrence.

In this context, **community-based monitoring**, particularly through CPUE tracking, has emerged as a practical and scalable force multiplier. CPUE monitoring provides early warning of stock decline, supports adaptive management, and builds trust between authorities and fishers. It also represents cost-effective science that can be sustained beyond project lifetimes.



ASEAN ENMAPS community-based training activity on fish catch monitoring in Wakatobi, Southeast Sulawesi, Indonesia

When CPUE data are systematically integrated with gear inventories and size-frequency information, they inform zoning decisions, seasonal closures, and species-specific rules. Monitoring thus becomes a governance instrument rather than a purely technical exercise.



V. Stakeholders as Strategic Actors, Not Beneficiaries

A consistent lesson from perception mapping across ASEAN ENMAPS sites is that stakeholders—especially fishers—are not passive beneficiaries of conservation. They are **strategic actors** whose daily decisions shape outcomes at sea.

Fishers generally recognise declining stocks and understand spatial dynamics. Resistance to MPAs often reflects governance failures—lack of clarity, inequitable enforcement, or exclusion from decision-making—rather than opposition to conservation itself. Women and youth, though frequently invisible in formal governance structures, play critical roles in fisheries value chains and community compliance.

Inclusive governance strengthens MPA legitimacy. Exclusion undermines presence and enforcement, while participation reinforces stewardship and sovereignty. Indigenous and customary practices, where recognised, often function as stabilising mechanisms within MPANs.



VI. Leveraging Fisheries Under Distinct National Contexts

Different Governance Systems, Shared Strategic Opportunity

While Indonesia, the Philippines, and Thailand share common ecological challenges and operate within interconnected LMEs, their fisheries governance systems have evolved under **very different political, institutional, and economic conditions**. These differences shape not only how MPAs are designed and managed, but also how fisheries can be leveraged as strategic assets within national development and regional diplomacy. Understanding these distinctions is essential for translating the concept of MPANs into practical, country-owned solutions.

Indonesia: Fisheries as State Authority and Maritime Presence

Indonesia's fisheries governance is anchored in a strong assertion of state authority over a vast archipelagic domain. National laws and policies clearly position fisheries and marine conservation as matters of national interest, reinforced by the country's role as a global maritime nation. The establishment of large national parks such as Kepulauan Togean and Wakatobi reflects this orientation, with MPAs functioning as **anchors of sovereignty, conservation, and tourism development**.

However, Indonesia's principal challenge lies not in the absence of policy, but in **alignment across governance levels**. National mandates are not often aligned with provincial and *kabupaten-level* development priorities, particularly where fisheries, coastal infrastructure, tourism, and extractive activities intersect. In practice, this results in fragmented enforcement, overlapping zoning regimes, and uneven integration of fisheries management into conservation planning. While national parks have strong legal standing, surrounding waters—often critical to connectivity and fisheries productivity—fall under different authorities with varying capacity and incentives.

At the local level, fishing communities frequently operate within customary systems that are not fully recognised or harmonised with formal regulations. This gap can weaken compliance and reduce the effectiveness of MPAs, even where enforcement is visible. At the same time, Indonesia has demonstrated that assertive fisheries governance—when aligned with clear political direction—can deter illegal fishing and signal state capacity.

MPANs offer Indonesia a way to **convert authority into coherence**. By embedding connectivity science and CPUE-based monitoring into national and provincial planning, MPANs can bridge jurisdictional gaps and align park-based conservation with fisheries sustainability objectives beyond park boundaries. Integrating customary practices into network governance, rather than treating them as exceptions, would further strengthen legitimacy.

From an economic perspective, MPANs can underpin a more sustainable marine-based economy by stabilising fisheries production, supporting high-value ecotourism, and reducing enforcement costs through predictability and cooperation. For Indonesia, leveraging fisheries through MPANs is ultimately about **governing systems rather than policing spaces**—a shift that reinforces both sustainability and maritime leadership. Relevant ministries of Indonesia also need to cooperate, coordinate, and compliment their efforts.

Philippines: Fisheries as Sovereignty, Law, and Livelihood

The Philippines presents a markedly different governance landscape. Fisheries and MPAs operate within a highly decentralised system, where local government units play a central role in coastal and marine management. National policies and environmental laws are generally strong and progressive, but implementation depends heavily on local political will, capacity, and resources.

This decentralisation has enabled the proliferation of community-based MPAs, many of which have delivered tangible ecological benefits at small scales. However, it has also resulted in **fragmentation**, with MPAs designed and managed in isolation from one another, often without reference to connectivity, fisheries dynamics, or broader seascape planning. In heavily fished and politically sensitive waters, this patchwork approach limits fisheries recovery and places a disproportionate burden on local communities for enforcement.

The political economy of fisheries in the Philippines is deeply intertwined with livelihoods. Millions depend directly or indirectly on small-scale fishing, making restrictive or poorly communicated conservation measures politically risky. Where fishers perceive MPAs as threats to income rather than investments in future productivity, compliance erodes and governance weakens. This dynamic is particularly acute in areas where enforcement is community-based but support systems—financing, data, legal backing—are insufficient.

At the same time, fisheries play a subtle but critical role in national sovereignty. In contested or strategically important waters, the continued presence of local fishers operating legally and sustainably constitutes **effective occupation and stewardship**. MPAs and MPANs, when aligned with fisheries livelihoods, reinforce this presence without militarisation.

MPANs provide a pathway to reconcile decentralisation with coherence. By using connectivity science to guide where MPAs should be linked, and by embedding community-based monitoring such as CPUE tracking into national fisheries information systems, the Philippines can scale up local successes into system-level outcomes. Strengthening vertical integration—linking action from the local government unit with national agencies responsible for fisheries, environment, and maritime security—is essential.

Economically, MPANs can support a transition toward a more sustainable marine economy by reducing boom-and-bust cycles in fisheries, enhancing value chains, and supporting diversified livelihoods such as eco-tourism and post-harvest enterprises—areas where women play a particularly important role. The central risk to avoid is marginalising fishers in the name of conservation, which would weaken both sustainability and geopolitical posture. The opportunity lies in **making fishers partners in governance and symbols of stewardship**.

Thailand: Fisheries Governance as Diplomatic Capital

Thailand's fisheries governance trajectory has been shaped by external pressure and internal reform. In response to international scrutiny over illegal, unreported, and unregulated fishing, Thailand invested heavily in regulatory frameworks, vessel monitoring systems, and enforcement capacity. As a result, it now possesses some of the most advanced fisheries monitoring and control systems in the region. This progress has strengthened Thailand's international credibility, but it has also revealed new challenges. Strong top-down enforcement, while effective in curbing illegal practices, can strain relationships with fishing communities if social dimensions are not adequately addressed. In many coastal areas, fisheries co-exist with high-value tourism, creating tensions between conservation objectives, economic interests, and community access.

Thailand's MPAs, particularly in the Andaman Sea, are often well-resourced and clearly delineated. However, like elsewhere in the region, they are frequently managed as discrete units rather than as components of an ecologically connected system. This limits their contribution to fisheries recovery and increases the risk that conservation gains are offset by pressure in adjacent areas.

MPANs provide Thailand with an opportunity to **consolidate reform and extend leadership**. By integrating connectivity science into spatial planning and aligning MPA objectives explicitly with fisheries sustainability, Thailand can demonstrate that compliance and productivity are not competing goals. MPANs also allow Thailand to position itself as a regional reference point for harmonised fisheries governance, particularly in shared ecosystems.

From a marine-based economy perspective, MPANs can help balance tourism and fisheries by clarifying zones of use, reducing conflict, and protecting the ecological assets on which both sectors depend. By incorporating participatory processes and recognising the role of local knowledge—particularly among small-scale fishers—Thailand can strengthen social license while maintaining regulatory credibility. In regional diplomacy, this positions Thailand as a country that not only enforces rules, but **models integrated, inclusive, and science-based marine governance**.

Converging Pathways, Distinct Strategies

Across all three countries, MPANs offer a common strategic opportunity: to move from fragmented, reactive management toward **system-scale governance** that supports sustainable fisheries and resilient marine economies. The pathways differ—centralised authority in Indonesia, decentralised stewardship in the Philippines, regulatory credibility in Thailand—but the destination is shared. By leveraging fisheries through MPANs, countries can stabilise food systems, reduce governance costs, strengthen stakeholder trust, and enhance their standing in regional and global arenas. The success of this transition depends not on copying models, but on **adapting the network concept to national realities**, while remaining anchored in the ecological logic that connects ASEAN seas into one living system.



VII. NGOs, Development Partners, and the Risk of Substitution

Non-governmental organisations (NGOs), academic institutions, and development partners play an essential role in advancing marine conservation and fisheries governance across ASEAN. Within the ASEAN ENMAPS context, these actors have been instrumental in generating scientific knowledge, facilitating community engagement, piloting innovative monitoring approaches, and supporting safeguards implementation. Their contributions are particularly valuable in complex coastal settings where government capacity is uneven or where trust between authorities and communities needs to be rebuilt.

However, experience across the region also highlights a persistent risk: **the substitution of state responsibility rather than its strengthening**. When NGOs or externally funded partners assume long-term operational roles—such as enforcement, routine monitoring, or decision-making—there is a danger that national and local institutions become dependent, fragmented, or disengaged. This can undermine sustainability once project support ends, and may weaken the legitimacy of governance arrangements in the eyes of communities.

For MPANs to endure, NGOs and partners must be positioned as **enablers rather than stand-ins**. Their comparative advantage lies in convening stakeholders, building capacity, supporting innovation, and ensuring safeguards compliance—not in replacing government authority. Clear mandates, defined exit or transition strategies, and co-implementation arrangements are, therefore, essential. When NGOs work alongside government agencies within clearly articulated roles, they reinforce institutional learning and accountability rather than dilute it.

Within ASEAN ENMAPS, this distinction is particularly important as countries transition from Component 1 to Component 2. The shift toward MPAN implementation demands stronger state coordination across sectors and levels of government. Development partners, including the United Nations Development Programme and implementing NGOs, can best support this transition by helping governments internalise tools, processes, and knowledge—ensuring that MPANs remain firmly embedded within national systems beyond the project lifecycle.



VIII. MPAs Designed *for* Fisheries, Not Against Them

A persistent misconception in marine governance is that MPAs and fisheries objectives are inherently in conflict. In practice, this perception often arises not from ecological reality, but from **poorly designed or weakly governed MPAs** that impose restrictions without delivering visible benefits. The ASEAN ENMAPS experience demonstrates that when MPAs are designed with fisheries in mind, they can become powerful instruments for stock recovery and livelihood stabilisation.

Science-anchored design is the first requirement. Connectivity-informed zoning ensures that MPAs protect not only biodiversity hotspots but also spawning aggregation sites, nursery areas, and migration corridors essential to fisheries productivity. Protecting these functional components of the life cycle increases recruitment success and enhances spillover to adjacent fishing grounds. Over time, this reduces pressure on fishers to expand effort or adopt destructive practices.

Equally important is governance readiness. Fisheries-friendly MPAs require clear, enforceable rules that are understood and accepted by users. Ambiguous regulations or overlapping mandates erode compliance and create enforcement challenges. Sustainable financing mechanisms, whether through national budgets, tourism revenues, or innovative financing models are necessary to maintain monitoring, enforcement, and adaptive management.

Tenure and access clarity is a further pillar of success. Where fishers understand who can fish, where, when, and under what conditions, MPAs become predictable systems rather than sources of conflict. In this sense, MPAs designed for fisheries do not diminish access; they **organise access in ways that sustain productivity over time**. When scaled up through networks, these benefits are magnified across seascapes rather than confined to individual sites.



IX. Fisheries as a Regional Geopolitical Asset

In the ASEAN region, fisheries are increasingly recognised as more than an economic sector; they are a **regional geopolitical asset**. Fish stocks cross boundaries, fishing fleets operate across jurisdictions, and fisheries-related disputes often reflect broader governance and security dynamics. In this context, how countries manage fisheries and MPAs sends important signals about stewardship, cooperation, and responsibility.

MPANs contribute to regional stability by reducing uncertainty. When MPAs are designed using transparent, science-based criteria and coordinated across borders or LMEs, they create a shared understanding of management intent. This reduces the risk of unilateral actions, overlapping claims, or competitive overexploitation. Shared scientific assessments, particularly on connectivity and stock dynamics, provide neutral ground for dialogue even in politically sensitive settings.

MPANs also function as confidence-building measures. Cooperative monitoring, data sharing, and joint learning initiatives demonstrate commitment to sustainable use rather than exclusionary control. For ASEAN Member States, this approach aligns well with principles of non-confrontation and consensus-building. It allows countries to advance national interests while contributing to collective regional goods.

ASEAN ENMAPS plays a critical role in this space by providing a platform where science, policy, and diplomacy intersect. By harmonising datasets, promoting compatible monitoring systems, and fostering dialogue among national agencies, the project helps translate ecological connectivity into **governance connectivity**. Over time, this strengthens ASEAN's collective capacity to manage shared marine resources in a stable and predictable manner.



X. Strategic Recommendations

The analysis presented in this white paper points to a set of strategic actions required to realise the full potential of MPANs.

At the **regional and LME level**, connectivity-based planning must be institutionalised as a standard practice rather than a project-specific exercise. This includes harmonising data standards, methodologies, and indicators for fisheries monitoring and MCS across countries. Regional learning platforms should be sustained to ensure continuous exchange of lessons and alignment of approaches.

At the **national level**, alignment among fisheries, conservation, maritime security, and development agencies is essential. MPANs cut across sectoral mandates, and therefore require explicit coordination mechanisms, whether through inter-agency committees, joint planning instruments, or integrated policy frameworks. Community-based monitoring systems such as CPUE tracking should be formally recognised and embedded within national fisheries information systems to ensure continuity and policy relevance.

At the **site level**, implementation success depends on protecting fisher presence and safety. Fishers who operate legally and sustainably are frontline stewards of marine space. Their continued presence reinforces governance and deters illegal activity. Women and youth must be elevated from peripheral participants to active governance actors, particularly in monitoring, compliance, and local decision-making processes. These investments are not ancillary; they are core to the durability of MPANs.



XI. Conclusion

Sustainable fisheries are increasingly understood as **hard infrastructure for stability**, comparable in importance to ports, transport corridors, or energy systems. They underpin food security, support coastal economies, and shape state credibility in marine spaces. When fisheries systems fail, the consequences extend far beyond the environment, affecting social cohesion, governance, and regional relations.

MPAs, when designed and managed in isolation, can only deliver partial solutions. When connected into MPANs, however, they become **strategic instruments** capable of aligning ecological processes with governance systems. MPANs translate the natural connectivity of marine ecosystems into coherent management frameworks that operate at the scale required for sustainability.

The ASEAN ENMAPS project provides a rare and timely opportunity to demonstrate this transition in practice. By linking science, policy, and stakeholder engagement across Indonesia, the Philippines, and Thailand, ASEAN ENMAPS shows how ecology, livelihoods, governance, and geopolitics can be aligned rather than treated as competing priorities. The challenge ahead is not conceptual, but institutional: to embed these approaches within national systems and carry them forward beyond the life of the project.



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Photo: Adiprayogo Liemera