Policy Brief - Implementing Nature-based Solutions for enhancing coastal resilience in Malaysia

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What is the problem?

In response to rising human populations, economic growth, and climate change (e.g. sea level rise, enhanced storminess), the coastline of Malaysia is becoming increasingly 'hardened' through large-scale land reclamation projects, artificial island construction, and coastal defence structures (Chee *et al.,* 2017, Fig 1). This coastal development is driving the modification and destruction of natural coastal habitats like mangrove forests, seagrass beds, and beaches - altering ecological connectivity and ecosystem functioning in myriad ways (Bishop et al. 2017).

Malaysia is recognised as a global biodiversity hotspot, but coastal development is eroding the valuable Ecosystem Services that are delivered by natural habitats such as fisheries, raw materials, oxygen production, water purification and natural coastal protection from storms and tsunamis (Hattam et al. 2015). Whilst some species will colonise hard artificial structures, such communities are typically less biologically diverse, support greater numbers of invasive species, and perform reduced ecosystem functions compared to natural habitats. Consequently, artificial structures cannot provide the same level of Ecosystem Services as natural habitats, which has detrimental impacts on coastal people and communities. As the population of coastal Malaysia grows, the hardening of the coast and consequent loss of critical Ecosystem Services such as coastal protection are likely to increase in the short to medium term, to support the housing and infrastructure that will be necessary to cope with increasing human populations.

Nature-based Solutions

Loss of natural coastal protection (provided by coral reefs, seagrass beds and mangroves) due to coastal development is a serious threat to Malaysia's human population. One powerful way of addressing the difficult balance between coastal development and conservation is to implement Nature-based Solutions (NbS). NbS are defined by the International Union for Conservation of Nature (IUCN) as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits". Nature-based Solutions, therefore, encompass the familiar traditional management practices of ecological restoration, rehabilitation, reconciliation, protection and ecological engineering, thereby increasing the resilience of coastal systems.

NbS can be applied to unaltered natural habitats (e.g., seagrass beds, mangrove forests, coral reefs) to highly degraded and even artificial habitats (e.g., hard artificial structures like seawalls and rock revetments, through to artificially created habitats such as wetlands and beaches). Examples include mangrove restoration, coral reef protection, and hybrid solutions involving a combination of artificial structures and natural habitats (Smith et al. 2018). One powerful illustration is mangroves provide over $65 million in flood protection and protect 15 million people from flooding each year, globally (Menéndez et al. 2020). Mangrove protection, therefore, is an example of a NbS to coastal flooding.

Co-Benefits of Nature-based Solutions

i. Adaptation to effects of climate change
ii. Safeguard biodiversity and ecosystems
iii. Provision of coastal defence to protect humans and property
iv. Carbon capture and storage
iv. Support economy through enhanced fisheries an tourism activities
v. Increased resilience to environmental disturbance

Nature-based Solutions can help Malaysia meet global policy goals

- Aichi Targets (e.g. Target 14: Restore Ecosystems)
- Sustainable Development Goals (e.g. SDG13: Climate Action; SDG14: Life Below Water)
- IUCN 30% by 2030 Goal for Marine Protected Areas
- Contribution towards UN Decade of Ocean Science for Sustainable Development

NATURE-BASED SOLUTIONS IN MALAYSIA

Sipadan Island Marine Park, Sabah

In 2009, Pulau Sipadan was recognised as a uniquely biodiverse, yet vulnerable, marine ecosystem and was designated a Marine Protected Area (a protection type of NbS). Use of the MPA is restricted, with only 120 visitors permits issued daily. Permitting only a limited number of visitors conserves the wildlife and habitats in the park, supports nearby fisheries through the 'spillover effect' where fish leave the MPA to be caught elsewhere, and sustains economically lucrative dive tourism in the surrounding area.

Sipadan Island Marine Park is home to a variety of birds, fish, mammals, sharks, and turtles, as well as near-pristine coral reefs. Source: Scuba Junkie.

Matang Mangrove Forest Reserve, Perak

The 40,000-ha mangrove was gazetted as a Permanent Forest Reserve in 1906. Mangroves within this reserve can only be harvested at small scales for domestic purposes (e.g., charcoal, piling poles and fuel wood). Areas within its protective zones include virgin and old growth forests and can only be used for educational, research and eco-tourism activities. Today, it is recognized as the best managed sustainable mangrove ecosystem in the world.

Matang Mangrove Forest Reserve is home to numerous mammals, bird and fish species. Photo credit: Aldrie A. Amir.

Policy recommendations

1. Promote education of importance of mangroves, coral reefs, and seagrass beds for fisheries, coastal protection, water filtration, climate change mitigation and adaptation, and biodiversity.
2. Enhance protection measures for existing mangroves, coral reefs, and seagrass beds, including establishment of Marine Protected Areas and Permanent Forest Reserves.
3. Address underlying causes of degradation in mangroves, coral reefs, and seagrass beds, such as pollution, coastal development, and overexploitation.
4. Meet Nationally Determined Contribution (NDCs) target of reducing greenhouse gases emission intensity of gross domestic products (GDP) by 45% relative to 2005 baseline.
5. Recognise links between protection and restoration of coastal and marine habitats and achievement of global policy goals (Aichi Targets, UN Sustainable Development Goals).

References: Bishop, M.J., Firth, L.B., Chee, S.Y. et al., 2017. Effects of ocean sprawl on ecological connectivity: impacts and solutions. *J Exp Mar Biol Ecol* 492:7-30. ● Chee, S.Y., Firth, L.B., et al., 2017. Land reclamation and artificial islands: Walking the tightrope between development and conservation. *Glob Ecol Conser*v 12:80-95. ● Hattam, C., et al., 2015. Marine ecosystem services: linking indicators to their classification. *Ecol Ind* 49:61-75. ● Menéndez, P., et al., 2020. The Global Flood Protection Benefits of Mangroves. *Sci Rep* 10:4404 ● Motamedi, S., et al., 2014. Long-Term Assessment of an Innovative Mangrove Rehabilitation Project: Case Study on Carey Island, Malaysia. *Sci World J*, 953830. ● Smith, C.S., et al., 2018. Living shorelines enhanced the resilience of saltmarshes to Hurricane Matthew (2016). *Ecol Appl*, 28:871-877.

ABOUT THIS POLICY BRIEF

This Policy Brief is part of a series aiming to inform policy-makers on the findings gained from the *Implementing Nature-Based Solutions (NBS) in Coastal Malaysia* workshop and provide recommendations to policy-makers based on workshop discussions. https://doi.org/10.24382/djrz-p707

DISCLAIMER: The policy recommendations made do not necessarily reflect the views of the institutions or its partners.

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