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Identifying Policy and Management Measures on Coastal Blue Carbon: *The Malaysian Case*

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Blue carbon is becoming an increasingly important area in the efforts to address climate change mitigation efforts. The author delivered a poster presentation on the subject at the 2nd ASEAN Mangrove Congress in September 2017 in Manila, outlining the policy and management measures required towards prioritising coastal blue carbon at the national and regional levels.

INTRODUCTION

Coastal ecosystems are among the most productive habitats on earth providing essential ecosystem services and food security for human wellbeing. Mangroves, tidal salt marshes, and seagrasses provide numerous benefits such as coastal protection from storm surge, sea level rise and coastal erosions, regulating water quality and nutrient recycling, and supporting fisheries. Recent discussions highlight another important area i.e., sequestration and carbon storage from the atmosphere and oceans (termed as coastal blue carbon) towards mitigating impacts from climate change.

Coastal habitats contribute greater per unit long-term carbon sequestration compared to terrestrial forests due to their efficiency in trapping suspended matter and associated organic carbons during tidal inundation (Figure 1). Blue carbon is envisaged to be a cost-effective means to achieve positive climate change mitigation and adaptation outcomes, and hence frequently discussed in relation to carbon markets and climate finance opportunities. There is considerable interest in terms of scientific and policy development at the international level and it is important to highlight key details for further consideration in this region and at the national level.

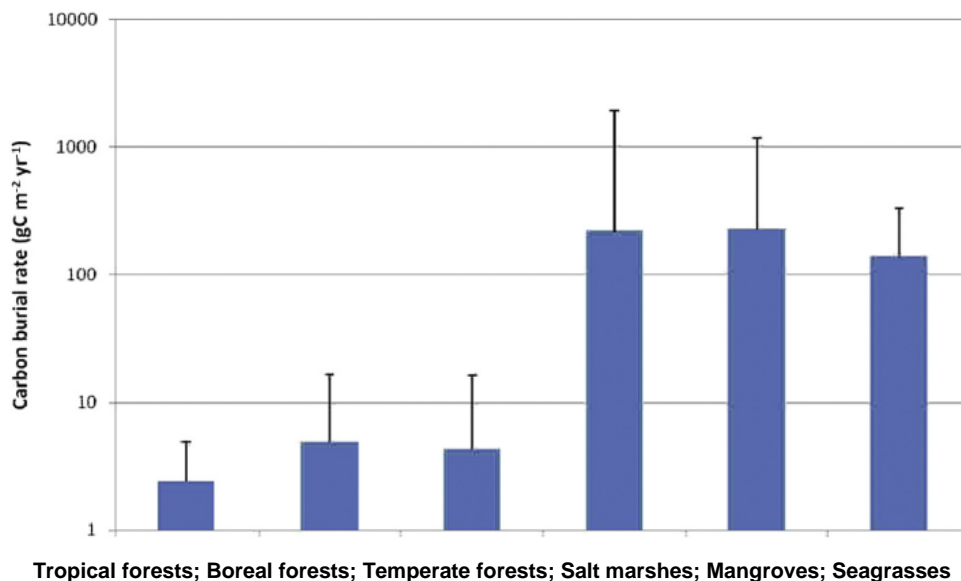


Figure 1. Mean long-term rates of carbon accumulation in sediment ($\text{g C m}^{-2} \text{y}^{-1}$) for forests and coastal vegetated ecosystems (Source: Mcleod et al., 2011).

DISCUSSION

Recent reports provide synthesised analyses of the science, economics and policies surrounding blue carbon, advancing knowledge and greatly increasing visibility of the issues concerning the subject area. They not only highlight the potential that coastal ecosystems present for climate change mitigation but also the gaps in present knowledge and how vulnerable they are to degradation by anthropogenic activities. More specific discussions are included in the following:

(i) A focus on the region: The Coral Triangle Initiative and actions on addressing climate change

Founded in 2007 by six countries in the region i.e., Indonesia, Malaysia, Papua New Guinea, the Philippines, Timor-Leste, and Solomon Islands, the Coral Triangle Initiative for Coral Reefs, Fisheries and Food Security (CTI-CFF) aims to address threats facing the coastal and marine resources in the region. Coastal populations in the region are highly dependent on coastal resources for their livelihoods and food security. The area is however already experiencing the impacts of climate change e.g., severe storms, coastal inundation, rising sea level and sea surface temperatures. To ensure sustainable management of the marine environment and resources, the programme commits to five over-arching goals i.e., Goal 1: *Priority seascapes (or large marine areas) designated and effectively managed*, Goal 2: *Ecosystem approach to*

management of fisheries (EAFM) and other marine resources fully applied, Goal 3: Marine protected areas (MPAs) established and effectively managed, Goal 4: Climate change adaptation measures achieved, and Goal 5: Threatened species status improved.

More specifically, Goal 4 on climate change adaptation under the CTI programme focuses on reducing the impacts of and adapting to climate change. For instance, a Region-wide Early Action Plan for Climate Change Adaptation (REAP) has been developed by CTI member countries to put in place effective adaptation measures for coastal communities, besides investing on conducting climate change vulnerability assessments and work towards improving resilience of the coastal communities. Although blue carbon is not explicitly spelled out in the plan, the protection and conservation of coastal habitats are however emphasised with a focus on natural and social resources adaptation actions.

(ii) Addressing key issues, gaps and challenges

Recent publications on blue carbon ecosystems emphasise the various aspects that should be considered as well as the gaps and challenges involved in realising the role and features for effective management of coastal habitats. One such area includes the need to quantify and record emissions and removals of carbon based on disturbed, degraded and revegetated blue carbon ecosystems. This aims at promoting protection and conservation of the ecosystems and supporting management and climate change mitigation plans. The need to improve scientific understanding concerning the blue carbon ecosystems in the region is crucial on a scale that would be meaningful for policy development. Any uncertainties vis-à-vis limitations in data on carbon sequestration and storage rates of blue carbon in the coastal ecosystems would contribute to a lack of priority on the area.

Achieving improved scientific understanding on carbon stocks and monitoring changes would require practical tools and guidance to enable the conduct of proper carbon analyses. This is particularly so with present gaps in data and the lack of technical and financial resources for the purpose. Despite the existence of new guidelines and methodologies developed and made public, there is however often a mention of the need for internationally accepted procedures for carbon accounting to provide standardised techniques for carbon measurement and monitoring to support the assessment and accounting of blue carbon for management purposes.

The necessary principal areas crucial for implementing effective blue carbon mechanism include economic values, regulatory framework, social and political systems, as well as effective management, in addition to scientific understanding and data to support the blue carbon mechanism. The literature on blue carbon is currently dominated by technical papers and some policy commentaries, with limited focus on private and public sector finance and instruments, as well as the general lack of priority on investment priorities, and risks considerations associated to blue carbon ecosystems; and mostly in case-specific investigations that presume viability in a local context.

(iii) The Malaysian case

Numerous initiatives on coastal management have been designed, adopted and implemented for the conservation and restoration of coastal ecosystems in Malaysia. Related mechanisms on climate change mitigation such as the blue carbon ecosystems may offer an additional route and support for effective coastal management. The potential for combining best practices on coastal management into climate change mitigation could also present the possibility of

mobilising additional funds into conservation endeavours and result in a win-win situation for both climate regulation and habitat conservation.

Against these, there is a need to strike a balance between the economic generation and conservation agenda of marine ecology as a part of climate change mitigation efforts by Malaysia through the identification and conservation of the viable potential of the marine ecosystems. There needs to be an overall increase in interest domestically in using the carbon services of coastal habitats (e.g., storage and sequestration of carbon) to help reduce coastal habitat loss by (1) considering these services along with other ecosystem services in federal agency decision-making, and (2) using these carbon services to incentivize private investment in habitat conservation.

Several things are needed for this to happen including developing procedures for incorporating carbon services into federal and state-level decision-making, and adopting protocols for private sector investments in coastal habitat carbon services. For this, several focus areas need addressing:

- i) Analyse coastal carbon potentials in Malaysia and within the region for developing national blue carbon action plans by identifying the opportunities, needs and limits. These include updating national data and inventories on coastal ecosystems distribution and the extent, assessment of existing coastal carbon stocks and emissions from converted ecosystems as well as assessing threats and causes of the degradation and loss of coastal carbon ecosystems.
- ii) Incorporate coastal blue carbon into existing coastal conservation initiatives, planning and management guidelines. This involves having a coordinated framework of cross-sector planning for implementation of related activities and plans on coastal and marine issues in the overall climate change mitigation efforts.
- iii) Developing policy measures and financial incentives to enhance climate change mitigation through conservation and restoration of coastal ecosystems as part of national climate change mitigation efforts. For this, there would be a need to update and include blue carbon initiatives into the national climate change mitigation/ control targets, strategies concerning low carbon actions, as well as national efforts concerning land use, land use change and forestry as a whole.
- iv) Identify priority areas and pilot projects for carbon in coastal ecosystems at the national and regional levels to demonstrate implementation. This could also be emphasised by integrating the blue carbon targets into Goal 4 of the CTI climate change adaptation/ mitigation programme towards ensuring streamlined initiatives and targets at the regional and national levels, and possibly also attract greater financial resources to support the implementation of related activities and initiatives.

WAY FORWARD

A general interest in the carbon stored in coastal ecosystems or blue carbon and threats to the sustainability of those ecosystems are highlighted. A number of efforts are emerging to use coastal ecosystems preservation or restoration in carbon offset programmes similar to the REDD+ initiative for tropical forests. However, a number of issues must first be addressed to determine if a site meets the requirements of these programmes. Emphasis needs to be placed on formulating a medium to long-term research agenda to prepare policy and management protocols for effective coastal ecosystems protection.

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