Received: 8 December 2021 | Accepted: 9 December 2021

DOI: 10.1111/1440-1703.12290

ECOLOGICAL RESEARCH WILEY

SPECIAL FEATURE (PREFACE)

Blue carbon dynamics in coastal habitats: their role in climate change mitigation and ecosystem function

Blue carbon studies in Asia-Pacific regions: Current status, gaps, and future perspectives

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KEYWORDS
Blue carbon, Asia Pacific region, gaps, current status, future perspective

The Conference of the Parties (COP) under climate change action has signed the UN Framework Convention of Climate Change (UNFCCC) to address the risk of global climate change. Recently, the United Kingdom in partnership with Italy hosted COP26 to discuss limit global warming to 1.5°C, and achieve 50% emission reduction and "net-zero" by 2030 and 2050, respectively. A recent study found that the restoration of blue carbon ecosystems (BCEs) could significantly reduce global emissions by 3% and recognized as nature-based solutions (Macreadie et al., 2021). The BCEs include mangrove forests, seagrass meadows and tidal salt marshes that have been thought to play an important role in climate change mitigation and adaptation (Nellemann & Corcoran, 2009) due to their high levels of productivity coupled with their anaerobic and waterlogged sediments that can store carbon for several millenia if left undisturbed (Alongi, 2012; Komiyama et al., 2008). Additional papers soon followed that continued to highlight the important role BCEs play in climate change mitigation and adaptation. These included "Mangroves among the most carbon-rich forests in the tropics" (Donato et al., 2011), "A blueprint for blue carbon: toward an improved understanding of the role of vegetated coastal habitats in sequestering CO_2" (Mcleod et al., 2011), "Seagrass ecosystems as a globally significant carbon stock" (Fourqurean et al., 2012), and "Estimating global 'blue carbon' emissions from conversion and degradation of vegetated coastal ecosystems" (Pendleton et al., 2012). Blue carbon quantification and assessment studies have since increased exponentially to better understand their role in climate change mitigation and adaptation (Sharma, 2018) as well as increase the awareness of policy makers to manage and conserve BCEs better. This information has also highlighted how the restoration and conservation of BCEs provide a critical nature based solution to climate change (Macreadie et al., 2021).

The BCEs are the highest carbon sinks per hectare as compared to other forested lands (Taillardat et al., 2018). However, a robust estimate of BCEs area cover, carbon storage, and sequestration estimates is needed to understand their role in global climate change. Macreadie et al. (2021) recently estimated there are ~36–185 million ha of BCE globally based on data from mangrove forest (Bunting et al., 2018), seagrass (Jayathilake & Costello, 2018; McKenzie et al., 2020), and tidal marshes (Mcowen et al., 2017) that could hold ~8970–32,650 Tg C in their sediments and vegetation biomass. Though blue carbon assessments have increased over the past few decades, baseline data is still missing from several countries, especially Island countries in the Asia-Pacific (AP) regions that are highly vulnerable to global climate change. With growing interest in resolving the BCEs carbon budget, the specific contribution of AP region BCEs has yet to be fully highlighted and reframed in the context of climate change mitigation or "blue carbon"

