

The Blue Carbon Triangle: A New Multi-regional Approach to Nature-based Climate Mitigation

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- I. What is Blue Carbon? Why is it important?
 - II. Why adopt a 'Blue Carbon Triangle'?
 - III. What are its advantages for the Asia-Pacific region?
 - IV. Summary & Important points to consider



BLACK (incomplete fuel combustion)



BROWN (nanoscale atmospheric aerosol)



GREEN (photosynthetic organisms in forests, pastures, soils)

& its sources

OF



BLUE (photosynthetic organisms in seagrass, mangroves, marshes)

The global initiative that first focused the world's attention to 'blue carbon'...



COP15 COPENHAGEN UNITED NATIONS CLIMATE CHANGE CONFERENCE 2009 "....when healthy, mangrove forests, saltwater marshlands & seagrass meadows are extremely effective at storing atmospheric CO₂, thereby mitigating climate change" **UNEP-IUCN 2009**

HOW?

The Blue Carbon Ecosystems sequester carbon from the atmosphere & lock them in their biomass & sediments for long periods, 😋 thereby mitigating climate change



Howard et al. (2017) Front Ecol Environ 2017; 15(1):42-50.



Asia-Pacific & Climate Change



Average annual temperatures - likely to increase across AP by ca. 1°C through 2030, & the rest of the 21st century.¹

Net precipitation rates - will increase across the region in the next 20 years, but with local decreases varying spatially & temporally.²

Sea level - continue to rise, but rates will vary across the region. By end of the 21st century, it is projected to rise by ca. 30-40 cm.⁴

AP countries are most vulnerable to CC due to their location & geo-physical features

CC can virtually derail the region's growth & economic development

AP is largely unprepared to cope with CC but has natural means to mitigate its impacts

AP is losing a natural resource that remains largely untapped to mitigate CC - the <u>Blue</u> <u>Carbon Ecosystems</u>

Highest diversity.....highest rates of loss

The coasts of ASEAN, & East & Southeast Asia have the highest generic richness & diversity of the coastal Blue Carbon **Ecosystems** seagrasses & mangroves...

...but these regions also have the highest rates of loss of these ecosystems

The regions may vary or differ in resources & strategies, but they have common goals against a common threat

"CALL UPON developed country Parties to provide the means of implementation to ASEAN Member States ...to adopt an ecosystem & landscape-based approach, to build climate resilience & enhance adaptation of ecosystems as well as communities & livelihoods to the adverse effects of climate change" (COP23 13 Nov 2017)

"...to increase capacities, & identify pathways & next steps for protecting & restoring blue carbon ecosystems in the CTI region.

<u>"...coming up with a regional framework, pitch, statement &</u> <u>communication materials on blue carbon</u>, university partnerships & Centers of Excellence to include blue carbon in its activities"

The regions may vary or differ in resources, strategies...con't

With a Vision of "Resilient Seas & Nations" <u>anchored, among</u> others, on adaptation to climate change & a blue economy

"...playing a catalytic role, among projects & programs, facilitating cooperation, & closing the gaps in science for the benefit of societies"

"...seeks to better understand the status of coastal BC ecosystems in East Asia & raise awareness to improve their management within climate mitigation & adaptation actions & commitments, including opportunities to access new forms of financing."

"...include BC ecosystems in coastal vulnerability assessments, national economic development plans, as a component of natural infrastructure, in MPAs & in spatial planning; correlate health of BC ecosystems with industry inputs & outputs of a blue economy" What is one most logical & pragmatic thing to do to mitigate & adapt to CC?

All 4 regional initiatives to adopt collectively:

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THE BLUE CARBON TRIANGLE

...a new multi-regional approach to nature-based climate mitigation

ASEAN Coral Triangle Initiative SIMSEA PEMSEA

Why only 12 of the 18 member countries/institutions?

The BCT is based on the following principles:

- 1. <u>SELF-HELP</u> 11 of the 12 are developing countries, the Paris Agreement highlights enhancing capacity of these countries to take effective CC action -by themselves;
- 2. <u>RESOURCE ABUNDANCE</u> They contain 2.7% & 40% of the world's seagrass & mangroves, respectively -the largest for mangroves, potentially largest for seagrass but most areas remain unstudied;
- 3. <u>PARTNERSHIP</u> Most of them are recipients of development funds from their more developed neighbors, which are encouraged to sustain the partnerships, but with more focus on climate change mitigation;
 - POLITICAL WILL Governments & institutions have commitments & pledges to adhere to CC conventions, treaties, & agreements. BCT poses the challenge for them to abide by their words & effect the actions needed.

Area and potential carbon stocks of the Blue Carbon Triangle

Country	Seagrass Area, ha	Mangrove Area, ha	Sg C stock, TgC	Mg C stock, PgC	Global rate of loss, ha/yr
Brunei Darussalam	150	18,000	0.02	0.02	Seagrass: 11,000 ¹ Mangroves: 150,000 ² Blue Carbon habitats: 50% of global extent over the last century & current losses of 800,000 ³
Cambodia	32,490	50,000	4.0	0.05	
Indonesia	881,290	3,301,847	105.3	3.15	
Malaysia	1,630	597,378	0.2	0.57	
Myanmar	430	299,000	0.05	0.29	
Papua New Guinea	450,000	550,000	53.8	0.53	
Philippines	27,262	356,000	3.3	0.34	
Singapore	30	1,000	0.01	0.001	
Solomon Islands	10,000	56,100	1.2	0.06	
Thailand	14,850	240,000	1.8	0.23	
Timor Leste	3,466	2,000	0.4	0.002	
Viet Nam	15,740	270,000	1.9	0.26	
TOTAL	1,437,338	5,741,325	171.98	5.503	
% OF GLOBAL	2.4 ⁴	40 ⁵	2.7 ⁶	28 ⁷	

Basal figures used from: ¹Waycott et al. 2009; ²FAO 2018; ³Davidson et al. 2018; ⁴Duarte et al. 2005; ⁵Spalding et al. 2010; ⁶Fourqurean et al 2012; ⁷Alongi et al. 2015

Within the framework of the SDGs ...

- To help decarbonize the regions' socioeconomic systems to mitigate global warming
- To help safeguard their natural coastal ecosystems
- To help enhance social resilience to future threats by building adaptive coastal governance systems
- By conducting basic research & applying its outputs in ways that engage diverse societal partners (science to action in Citizen Science)
- By encouraging debate, highlighting good practice & mobilizing capacities to solve problems
- Fostering collaboration to improve sharing of data & resources

Within the framework of SGDs...con't

What will Blue Carbon Triangle deliver?

- Science-based data, tools & resources to improve resilience of communities & economies
- New platforms to observe & monitor conditions & services of the coastal ecosystems
- Integrated models of coastal systems & human dynamics to underpin policies & strategies for sustainable development

Who will Blue Carbon Triangle be?

 New & inspired generation of scholars, scientists, influential practitioners & policy makers doing transdisciplinary research on coastal & marine ecosystem sustainability

In summary...

Asia-Pacific has cheaper, more sustainable sources for meeting their voluntary GHG emission reduction targets by 2020;

However, it also could add more CO_2 into the atmosphere if it does not manage well its coastal blue carbon ecosystems;

By collectively adopting the BCT, the 4 Asia-Pacific initiatives have greater potential to reverse the rapid loss of their coastal blue carbon ecosystems, thereby mitigating CC;

With BCT, an improved scientific & societal understanding of the underlying mechanisms that conserve coastal blue carbon ecosystems & their services can more easily be achieved;

The greatest challenge of BCT is for the 4 initiatives to translate their words into actions & combat CC through partnership, inclusive development, & science-based regional resilience.

The Blue Carbon Triangle may yet be the most pragmatic collective multi-regional effort to combat a common global threat (= CC) - technically, socially, economically & politically.