Strengthening International Cooperation on Blue Carbon under the Green Silk Road Initiative:

China's Practical Pathways

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The blue carbon reservoir plays a unique role in addressing climate change and holds significant importance for China's advancement in the "dual carbon" initiative. The mechanisms, carbon reduction potential, and potential economic value of blue carbon align with the goals of the Green Silk Road initiative. China's conceptual frameworks, strategies and practices provide strong impetus for enhancing international cooperation and supporting the high-quality development of the Belt and Road Initiative. Looking ahead, integrating blue carbon into the focal points of international cooperation will contribute China's wisdom and solutions to global sustainable development.

RESPONDING TO CLIMATE change and achieving sustainable development are pressing tasks that the international community needs to deal with. China

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has consistently been proactive in advancing international cooperation in various domains addressing climate change. The 19th National Congress of the Communist Party of China (CPC) proposed initiatives such as "actively and prudently promoting peak carbon emissions and carbon neutrality" and "actively participating in global governance to address climate change". These major decisions were made by the Party Central Committee with Xi Jinping at its core to strategically coordinate both domestic and international priorities. In 2020, China announced its new targets for national contributions. China aims to peak its carbon dioxide emissions before 2030 and strive for carbon neutrality by 2060. By 2030, China plans to reduce carbon dioxide emissions per unit of gross domestic product by over 65% compared to 2005 levels. Non-fossil energy will account for approximately 25% of primary energy consumption. Additionally, China aims to increase forest stock by six billion cubic metres compared to 2005 levels and achieve a total installed capacity of over 1.2 billion kilowatts for wind and solar power generation.[1]

Since the release of the guiding opinions on promoting the Green Belt and Road construction in 2017, the Green Silk Road, as China's approach to addressing global sustainable development and jointly tackling climate change, has seen increasingly refined top-level institutional designs and accelerated progress in pragmatic cooperation projects. This has propelled the high-quality development of jointly building the Belt and Road Initiative (BRI), thus yielding tangible results and garnering broad consensus among participating nations and stakeholders.

In the face of new challenges in global climate governance, there is a growing demand for green and low-carbon development among participating countries and regions, necessitating the expansion of the scope and collaboration areas within the construction of the Green Silk Road. Currently, international cooperation in blue carbon is progressively transitioning from scientific research to the realm of international climate governance. Deepening international collaboration in blue carbon represents a pragmatic measure to enhance the collective capacity of countries and regions to address climate change. It holds the potential to offer new impetus for the future construction of the Green Silk Road.

Blue carbon Cooperation as an Integral Component of the Green Silk Road Construction

The construction of the Green Silk Road is a powerful initiative in continuously achieving effective high-quality development within the BRI. It also serves as a significant vehicle and practical pathway to promote the construction of a community of shared future between humans and nature. Facilitating

[1] The State Council of the People's Republic of China (PRC), "China's Policies and Actions for Addressing Climate Change" (Zhongguo yingdui qihou bianhua de zhengce yu Xingdong), October 2021, <https://www.gov.cn/zhengce/2021-10/27/content_5646697.htm> (accessed 15 August 2023).

international cooperation for carbon peak and neutrality aligns inherently with the joint construction of the BRI. Leveraging the role of blue carbon reservoirs stands as a crucial approach to realising the dual carbon goals.

According to statistics, the oceans store approximately 93% of the Earth's carbon and represent the largest carbon reservoir globally. Annually, they eliminate over 30% of carbon dioxide emissions released into the atmosphere, playing a vital role in mitigating global climate change.[2] Blue carbon refers to the process, activities and mechanisms in which marine activities and organisms absorb carbon dioxide from the atmosphere, subsequently fixing and storing it within the ocean. In 2009, the United Nations Environment Programme (UNEP), the Intergovernmental Oceanographic Commission of UNESCO and the Food and Agriculture Organisation of the United Nations jointly released a report entitled "Blue Carbon: Assessment of the Role of Healthy Oceans in Carbon Sequestration", which first introduced the term "blue carbon". The report explicitly highlights the significant role of marine ecosystems in climate change and carbon cycling.[3] In September 2019, the Intergovernmental Panel on Climate Change released the "Special Report on the Ocean and Cryosphere in a Changing Climate", which further raised international awareness about the crucial role of the ocean in climate change. The report emphasises the significance of ocean carbon sinks (blue carbon) as natural mitigation measures and the potential of marine renewable energy as anthropogenic mitigation measures in addressing climate change. It categorises mangroves, seagrasses, saltmarshes and macroalgae as four types of coastal blue carbon ecosystems.

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Blue carbon, as a primary natural carbon sink within marine ecosystems, holds significant advantages over green carbon in terms of carbon capture and storage. International cooperation on blue carbon has become an essential aspect of China's efforts to promote the construction of the 21st-century Maritime Silk Road in a green manner.

Firstly, China has initiated the Blue Carbon proposal to drive the construction of the Green Silk Road. In August 2014, the Chinese Academy of Sciences and

[2] United Nations Environment Programme, "Blue Carbon: the Role of Healthy Oceans in Binding Carbon", September 2023, <https://wedocs.unep.org/handle/20.500.11822/7772;jsessionid=E675986B2461AF115D2A152ED4C23FE6> (accessed 15 October 2023).

[3] Christian Nellemann et al., eds, *Blue Carbon. A Rapid Response Assessment*, United Nations Environment Programme, GRID-Arendal, 2009, <https://www.grida.no/publications/145> (accessed 15 September 2023).

other research institutions jointly announced the establishment of the China Future Ocean Alliance, formally introducing the "China Blue Carbon Plan". This plan focuses on research areas such as integrated land-sea management, emission reduction and carbon sequestration, ecosystem health, and sustainable development of coastal economies and societies. In 2015, esteemed researchers in ocean carbon reservoirs advocated for the "China Blue Carbon Plan" to bolster the construction of the 21st-century Maritime Silk Road.[4]

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In June 2017, the National Development and Reform Commission and the State Oceanic Administration jointly issued the "Concept of Maritime Cooperation for Belt and Road Initiative".[5] This initiative launched the 21st-century Maritime Silk Road Blue Carbon Programme, collaborating with participating countries to conduct monitoring of blue carbon ecosystems in oceans and coastal zones, establish standards and regulations, and research carbon sequestration. Additionally, this effort involved the joint release of the Blue Carbon Report for the 21st-century Maritime Silk Road and aimed to promote the establishment of an international forum and cooperation mechanism for blue carbon.

Furthermore, in August 2018, the Ministry of Natural Resources, in collaboration with relevant departments in Shandong province, organised the International Conference on the "Blue Carbon Initiative". This conference aimed to advance scientific research on blue carbon in China and other Asia-Pacific countries to provide innovative ideas and insights to foster global development in blue carbon technologies and in greenhouse gas emission reduction.

Secondly, international cooperation in blue carbon constitutes a vital component in advancing the construction of the Green Silk Road. In March 2022, the National Development and Reform Commission, Ministry of Foreign Affairs, Ministry of Ecology and Environment, and Ministry of Commerce jointly released the "Opinions on Promoting Green Development in the Joint Construction of the Belt and Road". This document advocates for the continued

[4] "Academic Representatives Urge Utilising the 'China Blue Carbon Plan' to Promote Maritime Silk Road Construction" (Yuanshi daibiao huyu yi "Zhongguo lantan jihua" zhutui haisi jianshe), *People's Daily Online*, 11 March 2015, <http://politics.people.com.cn/n/2015/0311/c70731-26675254.html> (accessed 15 September 2023).

[5] "Idea of Maritime Cooperation in the 'Belt and Road' Initiative Construction" ("Yidai yilu" jianshe haishang hezuo shexiang), Xinhua News Agency, 20 June 2017, <https://www.xinhuanet.com/politics/2017-06/20/c_1121176798.htm> (accessed 15 September 2023).

implementation of the Belt and Road Initiative's South-South Cooperation Plan on climate change to promote the establishment of low-carbon demonstration zones and the implementation of projects focused on climate change mitigation and adaptation.

It is evident from the top-level strategic planning of the BRI that blue carbon holds significant importance in advancing the construction of the Green Silk Road. Particularly, it contributes to the formulation of guidelines for climate change response in Chinese investment projects, thus limiting investments in high-carbon projects, assisting in the green recovery of economies in participating countries and achieving sustainable development goals.

Thirdly, China has made significant progress in promoting the construction of the Green Silk Road in the realm of blue initiatives. In recent years, China had fostered partnerships with small island nations through government conferences, technical assistance, personnel training and industry support to jointly develop a blue partnership. Numerous agreements have been reached in areas such as marine blue carbon reservoirs and ecological conservation. In September 2017, China hosted the China–Small Island Countries Ministerial Roundtable Conference themed "Blue Economy, Ecological Islands". Representatives from 12 island nations attended and issued the "Pingtan Declaration", laying a vital foundation for China and small island countries to co-build blue partnerships and collectively address climate change.

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China has established the China–Pacific Island Countries Climate Change Cooperation Centre and organised forums such as the China–Pacific Island Countries Fisheries Cooperation Development Forum, establishing a solid groundwork for pragmatic cooperation between China and island economies in the Pacific region. These initiatives have provided a robust platform for promoting blue carbon cooperation.

Furthermore, China's collaboration with ASEAN (Association of Southeast Asian Nations) countries in blue carbon research and marine ecological conservation has accelerated in recent years, laying the groundwork for further collaboration. The inaugural China–ASEAN Blue Economy Forum held in September 2023 facilitated comprehensive discussions on topics like coastal ecosystem restoration and protection, promoting blue carbon cooperation, and led to the signing of significant cooperation agreements.

In summary, blue carbon aligns with China's proposal for constructing the Green Silk Road on numerous fronts. Effectively leveraging the role of blue carbon reservoirs will contribute to promoting the high-quality development of the BRI.

Currently, blue carbon is gradually evolving from the realm of scientific research into an important technical tool within the global climate governance system. It has become one of the focal points of climate change policies for countries worldwide. The international regulatory system related to blue carbon is accelerating its development. Developed countries like those in Europe and America are intensifying their strategic positioning through initiatives for collaboration, reinforcing technological research and drafting regulations. They aim to lead the establishment of global blue carbon regulations. To further enrich the collaboration within the Green Silk Road initiative and facilitate China's transition from a participant to a leader in global climate governance, there is a need to actively promote more practical international cooperation in blue carbon.

Continual Improvements to China's Blue Carbon Programme

Mangroves, salt marshes and seagrass beds have the capacity to capture and store significant amounts of carbon, permanently sequestering it in marine sediments. These three ecosystems are collectively referred to as coastal blue carbon ecosystems, with mangroves being one of the most efficient carbon-sequestering ecosystems on Earth. In recent years, there has been growing attention given to carbon sink fisheries and the marine microbial carbon pump, both of which are crucial forces driving the development of oceanic carbon sinks, harnessing the negative emissions potential and achieving dual carbon goals.

China, endowed with approximately three million square kilometres of territorial waters and a coastline extending 18,000 kilometres, is one of the few countries in the world that possesses all three major coastal blue carbon ecosystems—mangroves, seagrass beds and salt marshes. Additionally, China holds substantial potential for carbon sinks in marine aquaculture, presenting unique conditions for blue carbon development. According to statistics, China's coastal blue carbon ecosystems cover a total area of approximately 1.44 million hectares, with a carbon storage capacity of up to 118 teragrams (Tg). This includes approximately 6.9 Tg of carbon stored in mangroves, around 1.4 Tg in seagrass ecosystems and about 25 Tg in salt marshes. Additionally, China's unvegetated coastal mudflats cover a vast area, with a carbon storage capacity ranging from 27 to 85 Tg.[6] The protection, restoration and sustainable development of coastal wetlands and areas along the coast play an irreplaceable and vital role in advancing China's goals of achieving peak carbon emissions and carbon neutrality.

In recent years, China has increasingly emphasised the conservation and utilisation of blue carbon resources, dedicating significant efforts towards blue

[6] Wang Faming et al., "Coastal Blue Carbon in China as a Nature-based Solution towards Carbon Neutrality", *The Innovation*, vol. 4, no. 5, 2023, <https://doi.org/10.1016/j.xinn.2023.100481>.

carbon development. Notably, there has been a consistent focus on restoring important blue carbon resources such as coastal ecosystems and promoting new emerging models for blue carbon utilisation such as blue carbon trading, carbon sink enhancement projects, carbon sink fisheries, blue carbon technical services and eco-tourism. These initiatives have boosted the increment of carbon sinks within marine ecosystems, establishing a solid foundation for conducting international blue carbon cooperation.

Firstly, China continually enhances and improves the strategic planning of blue carbon. Since the 18th National Congress of the CPC, the Chinese government has placed significant emphasis on ecological civilisation, promoting the concept and goal of building a "Beautiful China" and integrating the construction of ecological civilisation into the comprehensive framework of political, economic, cultural and social development. The introduction of the "Beautiful China" concept and the high priority the Chinese government has attached to ecological civilisation have presented valuable opportunities for the initiation and development of China's blue carbon initiative.

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In 2013, the State Oceanic Administration incorporated the protection and restoration of vital marine ecosystems such as mangroves, coastal wetlands and salt marshes in its "12th Five-Year Plan for National Marine Development".[7] This has drawn widespread attention to the carbon sequestration function of coastal ecosystem systems, anchoring blue carbon as an indispensable concept within the framework of ecological civilisation.

In May 2015, the Central Committee of the CPC and the State Council issued the "Opinions on Accelerating the Construction of Ecological Civilization", advocating for the increase in marine carbon sinks to address global climate change. This has elevated blue carbon to an essential component of the country's ecological civilisation construction.[8]

[7] The State Council of the PRC, "National Ocean Industry Development '12th Five-Year Plan'" (Guojia haiyang shiye fazhan "shier wu" guihua), September 2014, <https://www.gov.cn/guoqing/2014-09/02/content_2744175.htm> (accessed 10 December 2023).

[8] The State Council of the PRC, "Opinions of the Communist Party of China Central Committee and the State Council on Accelerating the Development of Ecological Civilisation" (Zhonggong zhongyang guowuyuan guanyu jiakuai tuijin shengtai wenming jianshe de yijian), 25 May 2015, <https://www.gov.cn/xinwen/2015-05/05/content_2857363.htm> (accessed 10 December 2023).

Furthermore, in September 2015, the Central Committee of the CPC and the State Council issued the "Overall Plan for Ecological Civilisation Reform". This plan emphasises the importance of coastal ecosystem systems and proposes to "gradually establish a national system for controlling total carbon emissions and implementing a decomposition mechanism, establishing an effective mechanism to increase forest, grassland, wetland, and marine carbon sinks".[9]

In 2017, the "Vision for Maritime Cooperation under the Belt and Road Initiative" proposed the 21st-century Maritime Silk Road Blue Carbon Programme to establish an international mechanism for blue carbon cooperation.

In 2021, the Central Committee of the CPC and the State Council issued the "Opinions on Fully Implementing the New Development Concept and Achieving Peak Carbon Emissions and Carbon Neutrality". These opinions advocate for a comprehensive transformation of economic and social development towards comprehensive green development, with the aim of achieving the peak of carbon emissions by a designated time frame. The document also specifically proposes to aggregate and bolster the carbon sink capacity of ecosystems, and stabilise the carbon sequestration functions of existing wetlands, oceans and other ecosystems.[10]

Furthermore, in October 2021, the State Council issued the "Action Plan for Peak Carbon Emissions by 2030",[11] proposing a comprehensive strategy to advance the protection and restoration of marine ecosystems, enhance the carbon sequestration capabilities of mangroves, seagrass beds and salt marshes, and establish a monitoring and accounting system for ecosystem carbon sinks. It also recommends conducting background investigations, evaluating carbon reserves and potential, implementing monitoring and evaluation of carbon sequestration effects in ecological protection and restoration, and advancing research on the fundamental theory, methodologies and cutting-edge technologies related to marine ecosystem carbon sinks.

[9] The State Council of the PRC, "The Central Committee of the Communist Party of China and the State Council Issue 'Overall Plan for Ecological Civilisation System Reform'" (Zhonggong zhongyang guowuyuan yinfa "Shengtai wenming tizhi gaige zhongti fang'an"), 21 September 2015, <https://www.gov.cn/guowuyuan/2015-09/21/content_2936327.htm> (accessed 10 December 2023).

[10] The State Council of the PRC, "Opinions of the Central Committee of the Communist Party of China and the State Council on Thoroughly, Accurately, and Comprehensively Implementing the New Development Philosophy and Doing Well in Carbon Peaking and Carbon Neutrality Work", (Zhonggong zhongyang guowuyuan guanyu wanzheng zhunque quanmian guance xinfazhan linian zhuohao tan dafeng zhonghe gongzuo de yijian), 24 October 2021, <https://www.gov.cn/zhengce/2021-10/24/content_5644613.htm> (accessed 10 December 2023).

[11] The State Council of the PRC, "Action Plan for Carbon Peaking by 2030" (2023 nian qian tan dafeng xingdong fang'an), 24 October 2021, <https://www.gov.cn/zhengce/content/2021-10/26/content_5644984.htm> (accessed 10 December 2023).

With the concept of "Beautiful China" becoming deeply rooted, environmental protection has garnered widespread attention. The Chinese government is placing increasing emphasis on the role of blue carbon in addressing climate change and improving marine ecological environments. Recognising the significance of expanding oceanic carbon sinks as an essential means to achieve carbon neutrality and effectively mitigate global climate warming, the government has implemented a series of significant decisions and initiatives. An analysis of various policy documents reveals that the Chinese government's approach and policy perspectives towards blue carbon development encompass primarily two aspects. Firstly, from a domestic perspective, blue carbon development entails protecting and restoring blue ecosystems, alongside conducting relevant foundational research such as surveys, potential analysis and technological studies related to marine carbon sinks. Secondly, from an international standpoint, fostering international cooperation in blue carbon is considered a crucial approach to addressing global climate change and achieving carbon neutrality. The Chinese government encourages all parties to engage in substantive collaborations across various international mechanisms.

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Secondly, localities have actively promoted practical developments in blue carbon. Several coastal provinces, such as Zhejiang, Fujian, Shandong, Guangdong and Hainan, have introduced and enacted development plans for blue carbon. For instance, Guangdong province's "14th Five-Year Plan for Marine Economic Development" proposes to conduct in-depth research on oceanic carbon sinks, to build the blue carbon industry, and to position blue carbon as a crucial means to support sustainable development along the coast. The plan also involves conducting carbon-neutral trials and demonstration applications in cities such as Guangzhou, Shenzhen, Zhuhai and Zhanjiang. Similarly, Zhejiang province's "Guidance for Enhancing Marine Carbon Sink Capacity" has also clearly outlined actions, including scientific research on marine carbon sinks, ecological protection and restoration, integrated development of marine carbon sinks, diversification of their value, and the implementation of carbon sink trials. Shandong province's "14th Five-Year Plan to Address Climate Change" suggests implementing actions to strengthen the carbon sequestration of coastal wetlands and explore the establishment of blue carbon databases and regional carbon-inclusive mechanisms, and provide support to Weihai city in creating a blue carbon trading platform. Furthermore, Hainan province's "Work Plan for Marine Ecosystem Carbon Sink Pilot Projects

(2022–2024)" focuses on surveying, evaluating, conserving and restoring carbon sink resources within marine ecosystems to consolidate and enhance their carbon sink capacities.

Thirdly, methods and standards for accounting and value transformation related to blue carbon are continuously improving. In January 2023, China's first comprehensive standard for calculating marine carbon sinks was launched, with the official implementation of the "Marine Carbon Sink Accounting Methods". In May 2023, the issuance and implementation of the Blue Carbon Technical Procedures filled the gap in technical guidelines for commercial investigations and monitoring within blue carbon ecosystems. Regions like Shandong and Hainan have actively explored the integration of smart monitoring and energy-efficient management systems to promote the combination of marine ranching projects with blue carbon systems. Trading in blue carbon focuses primarily on three major categories of coastal ecosystems: mangroves, seagrasses and salt marshes. Among these, mangroves have gained significant attention due to their exceptional productivity and carbon sequestration capacity. In March 2023, Hainan conducted a technical review of the "Methodology for Red Mangrove Afforestation/ Reforestation Carbon Sink Projects". Subsequently, Guangdong introduced the "Carbon-inclusive Methodology for Mangroves in Guangdong Province", providing technical support for the implementation of carbon-inclusive mangrove projects and serving as a crucial reference for the nationwide transformation of blue carbon ecological products.

In February 2023, Ningbo conducted the country's first blue carbon auction, initiating a new pathway for the transformation of blue carbon value.

Fourthly, significant breakthroughs have been achieved in carbon sink market trading. In June 2021, the Zhanjiang Mangrove Afforestation Project—the first blue carbon trading project in China—signed the first carbon emissions reduction transfer agreement. In 2022, the Hainan International Carbon Emissions Rights Trading Centre was approved and it became China's first carbon market characterised by internationalisation, thereby facilitating market-oriented transactions of blue carbon products. In May of the same year, the first blue carbon ecological product transaction was completed in Hainan, marking a substantive breakthrough in the value transformation of Hainan's Free Trade Port leveraging blue carbon resources. In February 2023, Ningbo conducted the country's first blue carbon auction, initiating a new pathway for the transformation of blue carbon value. Regions such as Shandong, Fujian and Jiangsu have also innovated ocean carbon sink financing models, paving the way for a new approach to realising the value of marine ecological products.

Multiple Strategies to Promote International Cooperation on Blue Carbon

In the next decade of the development of the Green Silk Road, blue carbon will play a crucial role in preventing the degradation of marine ecosystems, ensuring the integrity of ecosystems in addressing climate change, enhancing natural carbon sequestration capacity, creating ecological industries, and aiding in achieving carbon neutrality. It can serve as a focal area of maritime cooperation in the BRI, continuously advancing the Blue Carbon Plan of the 21st-century Maritime Silk Road. This effort contributes Chinese wisdom and solutions to global sustainable development.

Firstly, the initiation of exemplary blue carbon accumulation projects will be driven. The total volume of blue carbon serves as the fundamental element for the development of the blue carbon industry and market transactions. For many developing countries, particularly island economies, the impacts of global climate change have exacerbated their security and development challenges. Issues such as rising sea levels and extreme weather pose threats to their economic and social security. Effectively addressing climate change and achieving sustainable ocean development are urgent priorities. Therefore, protecting blue carbon resources, developing blue carbon projects and fostering a blue carbon economy are crucial steps. Converting the abundant blue carbon resources of island economies into an advantage for addressing climate change aligns with their interests and the direction of global climate governance.

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China remains committed to advancing significant projects such as wetland preservation and mangrove restoration. The aim is to proactively plan international demonstration projects related to blue carbon, with a particular focus on coastal wetland and mangrove carbon accumulation, as well as ecological aquaculture cultivation to increase carbon accumulation. In addition, China will commit efforts to harness oceanic wind, temperature difference, wave and tidal energies to create innovative models for the integrated development of "blue" energy and industries. One such creative method is by leveraging the foundations of wind turbines as the base for fish and shellfish fixed cultivation nets to amplify the combined benefits of intensive sea use and blue carbon accumulation.

With a focus on augmenting the carbon sequestration capacity of marine ecosystems and magnifying the "spillover" effects generated by the blue carbon accumulation projects, efforts are made to drive the development of new, emerging marine industries such as marine ecological tourism, leisure fishing, blue carbon technology services and blue carbon finance.

Secondly, the establishment of an international platform for blue carbon exchange and cooperation is crucial. Leveraging forums such as the Boao Forum for Asia and the Belt and Road Green Development International Alliance, it is important to actively create a platform for policy dialogues and communication on green development within the BRI, by focusing on blue carbon cooperation topics, enhancing academic discussions, and fostering collaboration between China and participating countries in development initiatives.

Moreover, exploring the establishment of a new international platform for blue carbon exchanges, such as organising the "Global Blue Carbon Cooperation and Governance Conference" domestically can help establish mechanisms for academic exchanges, technological showcases and project releases. This platform offers opportunities to discuss new ideas, models and formats for future blue carbon development. Collaborating with participating countries to devise international regulations related to blue carbon governance that reflects everyone's interests and advocates for the "Blue Carbon Sustainable Development Initiative", has helped create an open, fair, just and non-discriminatory environment for blue carbon development.

In terms of strategic regional collaboration, the South China Sea region possesses the most abundant blue carbon resources globally. Countries such as the Philippines, Indonesia and Malaysia rank among the top in terms of mangrove areas. However, they may also encounter challenges such as the degradation of coastal ecosystems and the destruction of blue carbon resources, such as mangroves.

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There exists immense potential for blue carbon collaboration between China and ASEAN countries. Strengthening cooperation in various areas is of utmost importance, including the protection of marine biodiversity, technology for capturing and storing blue carbon, increasing carbon sequestration in coastal wetlands and mangroves, and through eco-friendly aquaculture and marine microorganisms, as well as exploring carbon sequestration by shellfish and algae.

In particular, addressing the shortcomings in blue carbon standards, accounting, engineering and technical services and conducting transaction assessments in some Southeast Asian countries through training programmes, specialised academic seminars, joint research initiatives and professional exchanges would elevate their capability in protecting, developing and utilising blue carbon resources. Additionally, strategic planning of collaborative blue carbon projects, such as increasing carbon sequestration in coastal wetlands and mangroves, and promoting carbon sequestration in eco-friendly aquaculture, should be prioritised.

For instance, the fishing industry is a crucial sector in many Southeast Asian countries. However, in recent years, there have been irreversible impacts on fishery resources caused by ocean pollution, frequent extreme weather events and illegal fishing, thus necessitating an urgent transformation and upgrading of the industry. China's practice has demonstrated that marine bivalve and seaweed aquaculture can significantly remove carbon dioxide, serving as effective carbon sinks. Exploring the feasibility of a "negative carbon emission" pathway through marine aquaculture has been observed in China. China can collaborate with Southeast Asian countries in the field of aquaculture technology, promoting the transition of traditional fisheries into "carbon sink fisheries".

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Thirdly, actively constructing a regional international blue carbon trading market is imperative. The global blue carbon trading market is still in its nascent stages, and China intends to actively participate and promote its development. The goal is to enhance China's influence and bargaining power within the global blue carbon market. Specifically, efforts will focus on constructing a high-level international carbon emission trading centre and actively integrating marine carbon sinks into the unified national carbon trading market. This aims to establish a mechanism for trading marine carbon sinks, initially through regional pilot projects and gradually expanding nationwide, thereby facilitating the value conversion and realisation of blue carbon ecological products.

It is also essential to support initiatives that aim to explore the establishment of measurement and evaluation indicator systems for blue carbon. This will help foster a price system and competitive mechanism within the blue carbon market that will, in turn, provide the necessary support for blue carbon trading. Such a framework will attract international customers and funds, creating connections between international and domestic carbon markets in China.

Fourthly, it is imperative to strengthen research cooperation in blue carbon technology, and in the formulation of policies and regulations. The international understanding of blue carbon-related theoretical foundations, methodological studies, monitoring technologies and policy management is continually evolving. It is thus essential to encourage domestic Chinese marine-related think tanks and research institutions to actively engage in practical exchanges and cooperation with international organisations, neighbouring Southeast Asian countries and international specialised research institutions. Such collaboration would expedite the clarification of assessment, monitoring and calculation standards for blue carbon.

Accelerating the development of established methodologies and standard systems related to mangrove, salt marsh, seagrass bed cultivation, restoration and protection is critical. Research exploration should also be conducted in areas such as microbial carbon pumps theory and fisheries carbon sinks. To tackle the challenges faced by some developing countries and island economies, such as delayed initiation and inadequate capabilities in blue carbon rules, technologies and standards, it is imperative to uphold the principles of collaboration and knowledge-sharing.

On a final note, China should also prioritise the active promotion of its research achievements, standards, technologies and experiences in developing blue carbon. This includes encouraging the internationalisation of domestic blue carbon standards, and promoting practical cooperation between China and countries in co-building the international ocean carbon sink field.