China Council for International Cooperation on Environment and Development

SPECIAL POLICY REPORT

Governance System for a Harmonious Coexistence between Humans and Nature

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China Council for International Cooperation on Environment and Development

Special Policy Studies on

Governance System for a Harmonious Coexistence Between Humans and Nature

Executive Summary

The traditional Chinese concept of Unity of Nature and Man is repurposed and case studies and examples from China and around the world are used to illustrate conservation and sustainable development in the context of: (i) implementing the Kunming-Montreal Global Biodiversity Framework (GBF) and the role of China's Ecological Red Lines (ECR) in meeting GBF Target 3 (30x30); (ii) cross-cutting themes in a range of multilateral environmental conventions and how benefits can be optimised; and (iii) promoting synergies between sustainable use and biodiversity conservation. Key recommendations for advancing implementation of the Kunming-Montreal Global Biodiversity Framework are made throughout, with five overarching policy changes outlined:

Policy Recommendations

1. Strengthen scientific and technological support for biodiversity by launching a National Major Science and Technology Project on Biodiversity Conservation based on the 'Unity of Nature and Man', and accelerate the formation of an integrated 'Unity of Nature and Man' governance framework.

Carry out scientific research on multidimensional biodiversity monitoring and assessment, sustainable and equitable use of biological resources, and options to enhance the resilience of biodiversity to adapt to and mitigate climate change, so as to: (i) provide theoretical, data and modeling support for biodiversity conservation that promotes the harmonious coexistence of humans and nature, (ii) continue to push for the effective implementation of the Kunming-Montreal Global Biodiversity Framework（KMGBF), and (iii) support the establishment of a new scientific data-driven system of global environmental governance.

2. Announce the Ecological Conservation Redline (ECR) delineation results as China's contribution to the KMGBF including the 30x30 Target; and promote the ECR model extensively to the global community, demonstrating China's image as a major country, serving global biodiversity conservation responsibly.

ECRs represent a new model and pathway pioneered by China, widely recognized by the international community as beneficial for achieving the global 30x30 KMGBF target. They offer unique advantages for biodiversity conservation, including: expanding protected area coverage, increasing species' protection rates, and enhancing habitat connectivity, while also creating opportunities to support local communities, safeguard livelihoods, and ensure fair participation in conservation planning. As such, China should formally announce its ECR delineation results to the world as its contribution to targets 1 and 3 of the KMGBF. This action demonstrates China's leadership and exemplary role in implementing the KMGBF, showcasing its image as a responsible country. Meanwhile, aiming to align with international standards and the KMGBF goals, China will further optimize and refine its ECR system. It will actively promote cooperation globally, with a particular focus on Belt and Road countries, highlighting the contribution of the ECR model and its potential application and

adaptation to differing national systems and conditions. It is recommended to establish an International ECR Promotion Expert Group, led by CCICED and comprised of multidisciplinary experts.

3. Adopt Nature-based Synergistic Solutions on Biodiversity and Climate Change to realize the Nationally Determined Contributions identified in the Paris Agreement and the KMGBF.

Integrate biodiversity and climate change solutions in line with the concept of 'Unity of Nature and Man by adopting and scaling up measures that provide cost-effective climate mitigation options while enhancing climate resilience and biodiversity co-benefits. Priority should be given to high-potential, cost-effective Nature-based solutions and Nationally Determined Contributions (Nbs/NDCs) - such as sustainable forest management, farmland nutrient management, and grassland and peatland conservation—to synergistically tackle climate change and biodiversity loss.

4. Promote the establishment of a mechanism and agency to synergize exchange and collaboration for China's biodiversity-related multi-conventions.

Based on China's 'National Biodiversity Coordination Mechanism', establish a communication mechanism for China's biodiversity-related national focal points of multiple conventions to promote exchanges and collaboration among the national focal points of multiple conventions, including CBD, UNFCCC, UNCCD, CITES, RAMSAR, etc., and to realize mutual support to cross-cutting issues, sharing of information and data on related issues and sharing of reports on convention compliance.

5. Build a synergized conservation mechanism that relates to the Whole-of-Government and Whole-of-Society approach, and strengthen Government-led public conservation engagement and the sustainable use of biodiversity.

Construct a government-led, multi-stakeholder biodiversity conservation system with clear incentives, rights, and responsibilities. Support community-based sustainable use models by ensuring fair benefit-sharing and decision-making power to align ecological protection with community livelihoods. Strengthen market competitiveness of eco-products through coordinated policy and technical support, while diversifying funding sources to enhance long-term resilience of conservation initiatives.

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I: INTRODUCTION

Since the dawn of civilization, humanity has reflected on and explored its relationship with nature. China has long espoused respecting nature in classical texts, **'树木以时伐焉' (Trees are logged by time)** and **'禽兽以时杀焉' (Birds and beasts are hunted by time)**, guiding rational natural resources use according to biological cycles. The concept of **'天人合一' (Unity of Nature and Man, UNM)** in Daoist culture is important. It advocates aligning holistic societal development with natural laws, forming China's classical view of nature. This resonates with cultures such as "Mother Earth," "Gaia" in South America, and "Brahman" in India. Internationally, Nature-based Solutions (NbS) are gaining prominence as an approach to managing human-nature relationships. By emphasizing ecosystem-based methods that harness natural functions and services, NbS resonates deeply with the concept of UNM. This approach prioritizes respecting, adapting to, and conserving nature to achieve harmonious coexistence. However, the modern dichotomy between humans and the rest of nature emphasizes nature's material attributes, leading us to modify and exploit nature for our own demands. Nature's need to maintain ecological processes and evolutionary potential is neglected. This threatens fundamental human needs, such as access to clean air and drinking water.

Humans and nature engage in complex, dynamic interactions. To combat escalating ecological crises, the global community established multilateral agreements, such as the **2030 Agenda for Sustainable Development (SDGs)**, the **UN Framework Convention on Climate Change (UNFCCC)** and the **Convention on Biological Diversity (CBD).** These aim to achieve sustainable human development. However, most environmental and developmental goals have either gone unmet or progressed more slowly than anticipated. Nature continues to decline at an alarming rate, threatening human survival.

Past failures reveal that a siloed approach by environmental agencies, which ignores linkages and trade-offs, will fail to achieve its full potential. Therefore, Nature-based Solutions (NbS) are gaining prominence as an approach to managing human-nature relationships. By emphasizing ecosystem-based methods that harness natural functions and services, NbS resonates deeply with the concept of UNM. Only by mainstreaming the concept that "humans and nature form an organic whole," and establishing an integrated governance framework based on UNM-based solutions**,** can we achieve the vision of harmonious coexistence between humanity and nature**.**

China is one of the world's most biodiverse countries, yet it is severely threatened by biodiversity loss. China regards building an ecological civilization as a crucial strategy for the nation itself, and a key step in building a global ecological civilization. As the Presidency, China led the 15th Conference of the Parties to the CBD, which adopted the Kunming-Montreal Global Biodiversity Framework (KMGBF). This establishes four goals and 23 clear, quantifiable targets. Compared to previous plans, the KMGBF focuses on reducing threats to biodiversity; meeting human needs by sustainable use and benefit-sharing; and developing effective implementation and mainstreaming solutions. Xi Jinping's "*Thought on Ecological Civilization*" recognizes "Lucid waters and lush mountains are invaluable assets," the "Integrated conservation and restoration of mountains, rivers, forests, farmland, lakes, grasslands, deserts, glaciers and snow mountains,"

multistakeholder co-governance, and tools such as the Ecological Conservation Redline (ECR). These provide Chinese wisdom for implementing relevant KMGBF targets, including compelling case studies for a UNM-based governance framework.

Many challenges persist: The Ecology Conservation Redline (**referring to areas within ecological spaces that possess particularly important ecological functions and require mandatory strict protection)** concept demonstrates significant potential in supporting the KMGBF's "**30x30**" global target, along with other KMGBF targets, including particularly Target 1 on spatial planning. It represents a whole-territory solution with distinct Chinese characteristics. However, there is a lack of systematic analysis regarding the advantages and gaps of these measures. Furthermore, conservation outside protected areas has yet to gain widespread recognition. While there is consensus on the need to address climate change and biodiversity loss together, environmental issues possess characteristics such as externalities, uncertainty, transboundary nature, and cross-sectoral impacts. Many global environmental conventions, and the closely related **SDGs,** suffer from poor communication on overlapping issues. Tension between biodiversity conservation and socio-economic development remains one of China's primary environmental and developmental challenges. Exploring pathways for synergistic enhancement between biodiversity conservation and economic development is crucial for improving people's livelihoods, promoting development, enabling sustainable utilization of biodiversity, and stimulating proactive engagement in biodiversity protection.

Against this background, the **China Council for International Cooperation on Environment and Development (CCICED)** launched a dedicated policy study titled "**Governance System for Harmonious Coexistence between Humanity and Nature**" under its "**Innovations in Global Environmental Governance**" project on February 18, 2025. This has three core components:
(1) The Realization of the 30x30 Global Target of the KMGBF; (2) Enhancing the Synergies among the CBD and other biodiversity-related conventions, including UNFCCC; and (3) Sustainable Use of Biodiversity and Benefit-Sharing to Promote Socio-economic Development and Conservation. The project established a joint Chinese-international research team to provide policy recommendations for China and to some extent the world in advancing implementation of the Kunming-Montreal Global Biodiversity Framework.

II: CHINA'S Implementation Status, Challenges, and Policy Recommendations for the Kunming-Montreal Framework's "30x30" Targets

2.1 Importance and Specific Requirements of the "30x30" Goal of the Kunming-Montreal Biodiversity Framework

2.1.1. The background and purpose of the KMGBF, including its Target 3

(1) Accelerating Biodiversity Loss. In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) warned that 75% of terrestrial ecosystems are significantly altered; 66% of marine ecosystems have increasing cumulative impacts; over 85% of wetlands have been lost; and 25% of assessed plant and animal species are threatened.**Error! Reference source not found.** Without action, the global rate of extinction will accelerate. According to the fifth edition of the *Global Biodiversity Outlook*, the global trend of biodiversity loss has not been fundamentally reversed.**Error! Reference source not found.**

(2) High-Level Political Support. In 2019, at the 74th UN General Assembly, a number of countries proposed a "Coalition for Nature" calling for the conservation of 30% of land and sea by 2030. Subsequently, Costa Rica and France, as co-chairs, promoted the "High Ambition Coalition for Nature and People (HAC)" during UNFCCC COP 25. In September 2020, at the United Nations Summit on Biodiversity, leaders from 93 countries signed the Leaders' Pledge for Nature, committing to reverse the trend of biodiversity loss by 2030 and expand nature-based terrestrial and marine conservation programs. In 2021, the G7 endorsed the HAC, pledging to mobilize finance and leverage innovative approaches to achieve the goal of "conserving or protecting at least 30% of global land and ocean by 2030 to halt and reverse biodiversity loss."[3]

(3) Actions launched by global conservation organizations and governments prior to the 15th Conference of the Parties (COP15) of the Convention on Biological Diversity (CBD) created political momentum for including the "30x30" target in the Kunming-Montreal Global Biodiversity Framework (hereafter the Kunming-Montreal Framework or KMGBF). In 2022, COP 15 adopted the KMGBF, an ambitious plan for global biodiversity. Particularly crucial is Target 3 ("30x30").

> KMGBF Target 3: "*Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories...*"

Its core content is illustrated in Figure 1, encompassing key elements such as protected area coverage, conservation targets, conservation quality, and human rights.[4]

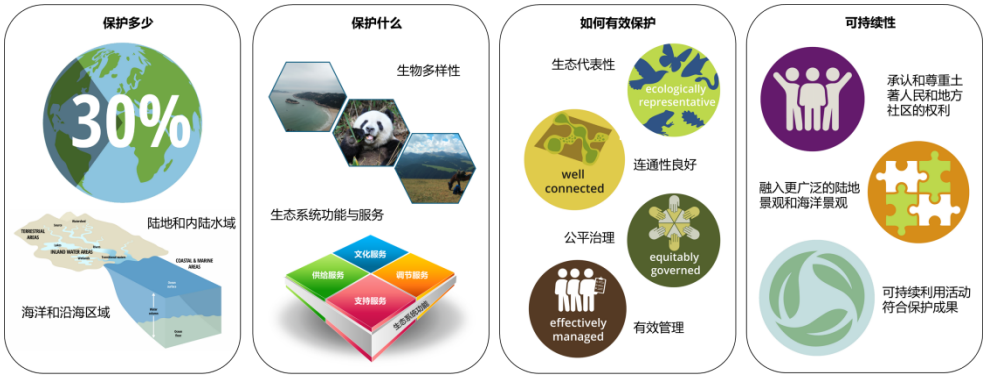

Figure 1. Core Content of the "30x30" Goal

Building on lessons learned, the Kunming-Montreal Framework's "30x30" target inherits and expands upon the CBD Aichi Biodiversity Target 11 regarding protected area coverage and quality and implementation pathways. It proposes clear, measurable, and actionable targets, marking a global shift from "slowing loss" to "actively reversing" it, if applied with other KMGBF targets.

2.1.2. The Importance of the KMGBF 30x30 Goal

(1) Human overexploitation is the primary driver of loss, which threatens ecosystem stability, food security, water supply, health, and well-being. Conservation efforts are insufficient. Reversing the decline to achieve conservation, restoration, and use of nature is an urgent global challenge.

(2) Scientific Foundation. Research supports protecting 25%–75% of Earth's surface to conserve biodiversity, with 30% by 2030 seen as a necessary benchmark, increasing to 50% by 2050.[5-6] Ecological representativeness and inclusive governance are keys to the effectiveness of biodiversity conservation.

(3) Ecosystem Services. The "30x30" goal helps secure and enhance critical ecosystem services, such as water retention, climate regulation, soil conservation, and biodiversity maintenance.

(4) Social equity and inclusion: The target highlights respecting and safeguarding the rights of Indigenous Peoples and local communities, emphasizing social equity and inclusivity. Equitable conservation benefits people and nature, reinforcing the long-term sustainability of conservation efforts.

2.1.3 Components of the "30 x 30" Goal

Protected Area Coverage: Target 3 addresses gaps in the current area-based conservation network (currently covering only approx. 17.53% land and 9.85% ocean) and prioritizes spatial planning based on biodiversity risk and ecosystem value, such as the tropics and high-altitude ecosystems.

Conservation Priorities: Protected and conserved area selection must be science-based, prioritizing areas with high ecological integrity and diversity, which also provide critical ecosystem services. The target emphasizes the role of Indigenous Peoples and Local Communities (IP&LCs), integrating traditional territories, knowledge systems and cultural landscapes into conservation planning. Other effective area-based conservation mechanisms (OECMs) complement protected areas by broadening conservation to areas useful to conservation but where this is not necessarily a priority.

Conservation Quality: 30x30 requires protected areas to be ecologically representative and effectively managed. Tools like Key Biodiversity Areas (KBAs) identify conservation gaps and

priority areas for conservation. The target stresses connectivity, requiring inclusion of ecological corridors and buffer zones to reduce habitat fragmentation and support species dispersal, and climate change adaptation. The KMGBF requires countries to establish monitoring systems to regularly assess conservation outcomes, management effectiveness and social impacts of protected areas.

Inclusiveness-equity: The"30x30" target requires recognition and respect of the rights of Indigenous Peoples and Local Communities (IP&LCs), encouraging community governance and rights-based approaches while acknowledging their traditional territories and contributions to biodiversity conservation and sustainable use.

2.1.4. Challenges to the 30x30 Goal of the Kunming-Montreal Biodiversity Framework

Despite the strength of political commitment, current global progress toward protected area goals is unsatisfactory. Conflict between rapid national economic and population growth, demand for raw materials, and badly sited infrastructure intensifies pressures on conservation. Management effectiveness is also lacking; approximately 40% of protected areas had significant management deficiencies in 2010.**Error! Reference source not found.** Establishment and management often require substantial resources. Some areas cannot be designated as protected areas due to ecological or social factors.

2.2. Advantages and Gaps of China's Biodiversity Conservation System in Achieving the "30×30" Target

2.2.1. Comparative Analysis of China's Ecological Conservation System and International Protection Systems

2.2.1.1 China's Ecological Protection System

Since the founding of the People's Republic of China, nature conservation areas have undergone a remarkable transformation—from nonexistence to establishment, from small-scale sites to large areas, from single-type protected zones to a diverse range of types, and from individual protected areas to a comprehensive regional ecological security framework. [8] China established its first nature reserve in 1956. After more than six decades, a multi-tiered system has developed, comprising nature reserves, scenic and historic interest areas, forest parks, geological parks, natural and cultural heritage sites, wetland parks, aquatic germplasm resource conservation zones, marine special protected areas, and specially protected islands.[9-12] Building on this, China further designated key ecological function zones[1] (2011) and ecologically fragile areas[2] (2008) to strengthen conservation, enhancing the national ecological security barrier system.[13] In 2011, China introduced the concept of Ecological Conservation Redline (ECR).[14-15] In 2015, the reform of the national park system was officially launched. These two major initiatives have significantly enriched China's protected areas framework and national ecological security.[16]

[1] Key ecological function zones refer to fragile or ecologically significant ecosystems, with low capacity to bear environmental and resource pressure, and which are not suitable for large-scale, high-intensity industrial or urban development.

[2] Ecologically fragile zones, also known as ecological transition zones, are areas located at the boundaries between two distinct ecological systems.

(1) China's System of Nature Protected Areas

In 2019, the General Office of the CPC Central Committee and the General Office of the State Council issued the "Guiding Opinions on Establishing a System of Protected Areas with National Parks as the Mainstay," which defined nature protected areas as terrestrial or marine regions designated or confirmed by governments at various levels in accordance with the law. These areas are intended for long-term conservation of important natural ecosystems, natural relics, natural landscapes, and the associated natural resources, ecological functions, and cultural values. In 2023, the "Opinions of the CPC Central Committee and the State Council on Comprehensively Promoting the Construction of a Beautiful China" proposed that by 2035, terrestrial protected areas should cover at least 18% of China's land.[17]

(2) Priority Areas for Biodiversity Conservation

To implement the provisions of the Convention on Biological Diversity, strengthen biodiversity conservation in China, and effectively address new challenges in this field, the former Ministry of Environmental Protection, in collaboration with over 20 departments and institutions, formulated the China Biodiversity Conservation Strategy and Action Plan (2011–2030). This plan sets out the overarching goals, strategic tasks, and priority actions for biodiversity conservation over the next two decades. It identifies 35 priority areas for biodiversity conservation, including 32 terrestrial and inland water priority areas—such as the Greater Khingan Mountains, Sanjiang Plain, Qilian Mountains, and Qinling Mountains—as well as three marine and coastal priority areas: the Yellow Sea and Bohai Sea Conservation Area, the East China Sea and Taiwan Strait Conservation Area, and the South China Sea Conservation Area. [18-20]

(3) Ecological Conservation Redline (ECR)

The concept of Ecological Conservation Redline (ECR), first introduced by Chinese scholars, evolved from local-level experiments into a national strategy and legislative framework, driven by economic growth and rising environmental awareness.**Error! Reference source not found.** Introduced officially by the State Council in 2011, the delineation of ECR was completed by July 2023. [ECR built upon the zonation work for Key Ecological Function Zones and Fragile Zones.]

ECR refers to ecologically critical areas requiring strict protection due to their vital functions—such as water conservation, biodiversity preservation, soil and water retention, sand stabilization, and coastal ecosystem stability—or their vulnerability to erosion, desertification, and degradation. ECRs are scientifically designated ecological spaces essential for maintaining national ecological security. Industrial and urban development is banned, resource extraction is limited, and strong protection and restoration measures are enforced.**Error! Reference source not found.**

ECRs fall into three main categories: **key ecological function zones** (e.g., water conservation, soil retention, sand fixation), **ecological barrier zones** (e.g., areas controlling erosion, desertification, riparian zones), and **zones protecting species' habitats and natural landscapes** (e.g., national parks, nature reserves). This classification ensures comprehensive coverage and enables targeted, differentiated management of critical ecological areas. Compared to traditional IUCN protected area approaches, the ECR model not only achieves comprehensive coverage of conservation types and functions but also enables targeted and differentiated management of key ecological areas, thereby better balancing ecological protection with production and living activities. Its main features are as follows:

- **Integrating Biodiversity and Human Habitat Protection to Achieve Harmonious Human-Nature Development**

The ECR model adopts a holistic and full-function conservation approach. While focusing on critical ecosystems and biodiversity hotspots, it also protects important ecological functional zones and ecologically fragile areas from the perspective of safeguarding human habitats.

- **Effectively Expanding Ecological Protection Area to Fulfill "30×30" and Higher Conservation Targets**

The ECR system includes three types of areas: key plant habitats and animal ranges, major ecological function zones, and ecologically vulnerable regions. It encompasses both IUCN protected area categories and Other Effective Area-based Conservation Measures (OECMs), achieving the principle of "conserving all that should be conserved." By expanding the extent of ecological protection, it can effectively contribute to achieving the global "30×30" target and even more ambitious conservation goals.

- **Enhancing Ecosystem Integrity and Climate Resilience of Species**

The ECR model emphasizes the connectivity and integrity of ecosystems, avoiding fragmentation of protected zones during the identification of priority areas and maintaining regional ecological communities. On one hand, the expansion of protected areas improves species mobility and interaction; on the other hand, the designation of ecological corridors provides pathways for species movement, significantly enhancing resilience to climate change.

- **Transforming Management Mode: From Land-Based Protection to Ecological Spatial Governance**

The ECR model shifts from single-ecosystem conservation to integrated ecological and socio-economic planning, emphasizing scientifically informed spatial plans. In terms of conservation methods, it does not impose rigid restrictions on local development but aims to build a national ecological security pattern. It holistically considers ecological protection needs and socio-economic development layouts, allowing appropriate development and utilization under the precondition that the "total area under conservation does not decrease, nature does not alter, and function does not decline," thereby ensuring the continuity of ecological space and function. The Ministry of Natural Resources, together with the Ministry of Ecology and Environment and the National Forestry and Grassland Administration, issued the Notice on Strengthening the Management of Ecological Conservation Redline (for Trial Implementation), which standardizes the specific types and management requirements of limited human activities permitted within the ECR areas, as well as the explicit conditions and approval procedures for the occupation of such areas by national major projects. It also delineates the supervisory responsibilities of the relevant authorities. Furthermore, China has established a comprehensive dynamic monitoring and evaluation system to ensure that reasonable development needs are accommodated without breaching the ecological and environmental security bottom line, thereby achieving a long-term balance and synergy between conservation and development.

2.2.1.2. International Ecological Conservation Systems

The international system of protected areas is a multi-level and diversified conservation framework designed to effectively safeguard global biodiversity through different management objectives and approaches. It primarily revolves around two major area-based conservation categories: Protected Areas (PAs), Other Effective Area-based Conservation Measures (OECMs), and a framework for identifying priority areas for conservation, Key Biodiversity Areas (KBAs).

Together, these form the core framework of global biodiversity conservation.

Conservation System	Main Objective	Management Approach and Characteristics
Protected Areas（PAs）	Primarily aimed at biodiversity conservation	Managed through legal or other effective means, with a strict classification system (e.g., IUCN's six categories)
OECMs	Not necessarily focused primarily on biodiversity, but deliver positive long-term in situ conservation outcomes	Results-oriented, diverse governance models (e.g., community, private, corporate)

Table 1. Comparison of Global Protected Areas and OECMs in Terms of Objectives and Management

(1) International System of Protected Areas

The practice of establishing international protected areas originated in the United States in the 19th century. The International Union for Conservation of Nature (IUCN) has been committed to promoting the development of protected areas worldwide, defining a Protected Area (PA) as: "*A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*."

The IUCN Protected Area Management Categories system is the most widely applied framework for protected areas globally. It classifies protected areas into six main categories based on management objectives: Strict Nature Reserve (Ia), Wilderness Area (Ib), National Park (II), Natural Monument or Feature (III), Habitat/Species Management Area (IV), Protected Landscape/Seascape (V), and Protected Area with Sustainable Use of Natural Resources (VI).

(2) OECMs

OECMs represent a form of spatial conservation that coexists with protected areas, serving as complementary zones. They are defined as: "A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services, and where applicable, cultural, spiritual, socio-economic, and other locally relevant values." In essence, OECMs are areas where biodiversity conservation is often not the primary goal but where management and governance practices result in effective long-term conservation outcomes. Their core lies in being results-oriented, involving communities, private enterprises, Indigenous groups, and others. Common examples of OECMs include military restricted zones (e.g., the DMZ in South Korea), sacred natural sites, sustainably managed fisheries, water conservation forests, areas indirectly protected due to cultural heritage conservation, and some community-conserved areas (such as the over 180 established by the China Biodiversity Conservation and Green Development Foundation). The significance of OECMs lies in their ability to engage societal actors beyond formal protected areas, identifying and recognizing the conservation value of these zones, thereby enhancing connectivity between fragmented habitats and improving ecosystem integrity. As of August 2025, the number of terrestrial and marine OECMs globally reached 6,374 and 219, respectively, covering 1.10% of terrestrial and 0.24% of marine areas worldwide (https://www.protectedplanet.net/en).

（3）Key Biodiversity Areas (KBAs)

With advancing research on biodiversity and growing international attention on conservation, the need emerged for a comprehensive and globally unified standard for identifying areas of particular importance for biodiversity. In 2016, building on earlier work such as Important Bird and Biodiversity Areas (IBAs) and Biodiversity Hotspots, IUCN formally introduced the concept of Key Biodiversity Areas (KBAs) and established a standardized set of criteria for their identification. KBAs are sites critical for the persistence of biodiversity, encompassing species, habitat integrity, ecological processes, and human interactions. They are typically identified based on species distributions and ecological functions (http://www.keybiodiversityareas.org)—for example, key species habitats or ecological corridors—and are used to guide the delineation of conservation priorities. In response to the global environmental crisis and biodiversity loss, it is essential to focus efforts on conserving these key areas, which are scientifically identified based on factors such as species richness, endemism, and threat level. The KBA initiative is a priority-setting exercise that supports the identification, delimitation, monitoring, and protection of key biodiversity areas. It does not specify management requirements. It aims to address the fragmentation of traditional protected areas by improving regional connectivity and conservation outcomes and has been integrated into indicators for the Global Biodiversity Framework and the Sustainable Development Goals (SDGs).

2.2.2 Analysis of China's Ecological Conservation Redline and Its Role in Biodiversity Protection

2.2.2.1 Innovation in the Ecological Conservation Red Line Model

Compared with the traditional IUCN protected area model, the Ecological Conservation Redline (ECR) approach both ensures full coverage of protection types and seeks to balance ecological protection with economic and social development. Its key innovations include:

(1) **A New Model of Ecological Protection**

The ECR system integrates existing protected areas, supplements highly important or fragile zones, improves spatial layout and ecological function, and introduces stricter controls—representing a major innovation over the existing international systems.

(2) **Scientific Delineation Method**

China developed a system that combines ecological function assessment, environmental vulnerability analysis, habitat evaluation, conservation gap analysis, threshold determination, and spatial analysis. The result links national-scale assessments with local-level precision. The Ministry of Ecology and Environment issued the widely applied *Guidelines for Delineating ECR*.

(3) **A Strict Management System**

ECRs have been integrated into key institutional reforms, such as territorial spatial planning, the national park system, ecological compensation, and protected area systems. Through coordination with these reforms, a cohesive management framework has been formed.

In 2023, relevant ministries jointly issued a Notice on Strengthening ECR Management (Trial), outlining a full-process system: strict prevention, strict control, and post-event accountability. The Ministry of Ecology and Environment also released the Trial Measures for ECR Environmental Supervision, establishing systems across law, finance, standards, and enforcement.

2.2.2.2 Analysis of the Role of Ecological Conservation Redline in Biodiversity Protection

ECRs cover a total area of approximately 3.19 million km^2, encompassing 3.04 million km^2 or 31.7% of China's land area and 150,000 km^2 or about 5% of marine areas. Their coverage of protected wild species has been assessed, using data from the Global Biodiversity Information Facility, scientific literature, and field surveys: ECRs cover critical ecosystems such as forests, grasslands, deserts, wetlands, mangrove forests, coral reefs, and seagrass beds, effectively protecting 90% of terrestrial ecosystem types and 74% of nationally key protected wildlife species. Specifically, since ECRs cover key areas of biodiversity distribution across the country, they safeguard the vast majority of rare, endangered species and their habitats. As a result, in terms of the count of distinct species, ECRs ensure the conservation of over 70% of endangered rare plant species, more than 50% of endemic plant species, and over 90% of endangered rare and endemic animal species. This effort has significantly reduced the risk of biodiversity loss and contributed to maintaining ecosystem stability (see Appendix 2 for further details).

2.2.2.3 Analysis of the Relationship Between Ecological Conservation Redline and OECMs Potential Types of OECMs in China

OECMs, or Other Effective Area-based Conservation Measures, were first introduced in Target 11 of the Aichi Biodiversity Targets under the Convention on Biological Diversity (CBD, 2010). The IUCN later drafted the "*Guidelines on Other Effective Area-based Conservation Measures (OECMs)*,"**Error! Reference source not found.** and the CBD formally adopted a definition in 2018, closely modelled on IUCN's proposal.

Unlike protected areas, OECMs can have additional objectives beyond conservation, as long as conservation is also achieved. They are divided into three types: places that achieve conservation, although this is not an objective (*ancillary conservation*); places that consider but do not prioritize conservation (*secondary conservation*); and sites that do prioritize biodiversity conservation but where PA status is not suitable or not wanted by the governing body (*primary conservation*).

OECMs complement protected areas by enhancing coverage, creating ecological corridors or buffer zones, and helping maintain biodiversity integrity at the landscape or ecosystem level. OECMs are especially suitable for China's heavily populated eastern and southern regions and have been identified as essential for achieving the KMGBF's "30x30" target.

China has clear needs for OECMs and is exploring several practical options:

Non-protected areas within ecological space: China has advanced in land-use planning by establishing the "three zones and three lines" system: ecological, agricultural, and urban spaces, aligned with Ecological Redline, permanent farmland protection, and urban development boundaries. While 18% of land is formally protected, significant areas within ecological zones remain outside formal protection. These include natural forest areas, ecological public forests, water source protection zones, and key habitats, which often receive financial support (e.g., ecological compensation) and are managed by local authorities and monitored by community-based rangers.

Community-conserved areas: In biodiversity-rich but fragmented areas, particularly in eastern and southern China, critical habitats such as migratory bird routes or habitats of species with extremely small populations need protection. These areas are often collectively owned and managed by local communities. Indigenous and Community-Conserved Areas (ICCAs) are defined as ecosystems voluntarily conserved by Indigenous Peoples or local communities using customary laws or other effective means. They can be protected areas, OECMs, or neither. [24]

Other public-interest conservation areas: These are initiated by NGOs or enterprises that sign conservation agreements with landowners or users. Typically managed by public-interest organizations and supported by philanthropic or corporate funding. One example is the Laohegou Nature Reserve in Pingwu County, Sichuan, managed under agreement by the Paradise Foundation.

Biodiversity conservation outside ecological space: Urban green spaces and farmland: Urban residents and institutions have a growing interest in wildlife watching and conservation. Peking University's Yan Yuan campus, a century-old traditional garden using native plants, has been monitored by faculty and students since 2003. Over 300 animal and 600 plant species have been recorded, including 237 bird species—more than one-seventh of China's total—on a campus of just over 1 km² with over 50,000 people. In 2018, the university approved the establishment of a participatory management zone for conservation. Similar initiatives, including "rewilding" urban parks, are emerging in cities like Beijing, Shanghai, and Shenzhen. Though small in size, these urban green spaces can serve as vital habitats for plants, insects, birds, and small mammals, and could significantly enhance biodiversity if recognized as OECMs. Additionally, China possesses a rich agricultural heritage with high ecological and cultural value. Traditional systems such as southern rice terraces and rice-fish farming in Qingtian not only ensure food diversity and health but also support biodiversity, soil, and water conservation, and sustainable use. These conservation measures are of significant importance for biodiversity protection, as they can contribute to achieving KMGBF Target 12 (enhancing urban blue-green space planning) and Target 10 (sustainable agricultural management).

Comparative Analysis of Ecological Conservation Redline and OECMs

ECRs and OECMs may differ in terms of their objectives, spatial coverage, and governance. While ECRs are established with biodiversity and ecological conservation as their primary goal, OECMs have conservation as primary, secondary, and ancillary objectives. Further, ECRs fall within designated ecological space as defined under China's "three zones and three lines" framework—ecological, agricultural, and urban areas, with corresponding regulatory boundaries. They focus on regions critical for ecosystem services or that are ecologically fragile. These include national parks and nature reserves, which form the formal protected area (PA) system. However, any area achieving sustained biodiversity protection, whether or not it falls within official boundaries, may be recognized as a potential OECM through stakeholder consultation.

OECMs often cover discrete conservation patches—such as sacred lakes and mountains on the Qinghai-Tibet Plateau—or critical but fragmented habitats in eastern and southern China, including migration routes and habitats of narrowly distributed species. They fill essential gaps where formal PAs are infeasible and can thus provide complementary protection within China's ECR framework.

Governance Differences: Government-led vs. diversified governance actors. Currently, the Chinese government has issued several policy documents that establish a governance system for managing ECR through legal frameworks, fiscal and tax policies, standard-setting, and enforcement. Both the delineation and management of ECR are led by the government. This is different from many other countries and from IUCN guidance, where both protected areas and OECMs can be governed by four types of actors: government agencies, private entities or individuals, Indigenous Peoples or local communities, and multistakeholder collaborations.

The ECR process provides a tool for planning and implementing area-based conservation. Many ECR sites are equivalent to IUCN protected areas; it is likely that a growing number will also

be similar to OECMs, and some ECR sites will probably fit into neither of these types. In China, decisions are made by the government, although in other countries, governance is more pluralistic.

2.2.3 Analysis of the Strengths and Gaps in China's Ecological Conservation System for Achieving the "30×30" Target

2.2.3.1 Strengths of China's Ecological Conservation System

Nature Reserves as a Foundation for Implementing the Kunming-Montreal Global Biodiversity Framework

Since the establishment of Dinghushan Nature Reserve in 1956, China has set up over 11,800 nature reserves, covering 18% of the land and 4.1% of the marine area. Many sites have also joined international conservation networks. China has 18 World Natural Heritage sites (including mixed natural and cultural sites), making it one of the countries with the most listings. It has 34 Biosphere Reserves, 39 Global Geoparks, 57 Ramsar Wetlands, and 6 included in the IUCN Green List.

Ecological Conservation Redline as an Effective Tool for Achieving the "30×30" Target

China's terrestrial Ecological Conservation Redline (ECR) covers 3.04 million km², or 31.7% of land area—exceeding the 30% goal if proven effective in the long term. Marine ECRs cover 150,000 km², about 5% of the marine jurisdiction. The ECR encompasses four major ecological function zones and 23 types of ecologically sensitive or fragile areas. They include representatives of over 90% of nationally key protected wild animal species and more than 80% of nationally key protected wild plant species, over 90% of high-quality ecosystems and landscapes, and include 210 headwaters of major rivers. They contribute to air purification, water quality, and ecosystem service provision. As a unified spatial map, ECR delineates the most ecologically significant areas for in situ biodiversity conservation.

In terms of management, China adopts the principle of "no reduction in function, no decrease in area, and no change in nature" for ECR—moving beyond traditional protected area approaches that focus on size or specific ecological elements. An integrated monitoring system helps to ensure long-term, effective conservation within the ECR boundaries.

ECRs also serve to integrate existing protected areas while incorporating critical ecosystem service zones and ecologically vulnerable regions not previously protected. By aligning with both the IUCN's protected area framework and OECM concepts, ECRs expand conservation coverage and improve protection comprehensiveness. As a systemic innovation in global conservation practice, ECR can be a key mechanism for China to fulfill multiple targets of the KMGBF and may also support global progress toward even more ambitious goals. [25]

Mainstreaming Biodiversity Conservation into National Policy in China

As one of the first signatories and ratifiers of the Convention on Biological Diversity (CBD), China places great importance on biodiversity conservation. To fulfill the CBD targets and address new challenges in biodiversity conservation, the Chinese government has continuously improved its institutional and governance systems. Biodiversity conservation has been integrated into the broader framework of ecological civilization through ecological redline, reform of the protected

areas system, and implementation of ecological compensation and diversified economic incentives to ensure effective protection and sustainable use of biological resources. Through the Belt and Road Initiative (BRI), China also seeks to share its conservation practices with other participating countries. More details of the measures applied in China can be found in Appendix 3.

2.3.3.2 Gaps in China's Ecological Conservation System for Achieving the 30×30 Goal

Small-Scale and Slow Development of Marine Protected Areas

Since 2018, China has not added new marine protected areas (MPAs). Existing MPAs are mainly nearshore or island-based, with no large-scale marine protected areas in offshore waters and no proposals for Antarctic MPAs. By 2018, China had designated 271 MPAs, covering around 124,000 km², accounting for only 4.1% of jurisdictional waters. There are also 51 marine aquatic germplasm resource reserves, totalling 74,600 km². Combined with those under the National Forestry and Grassland Administration, marine protection areas do not exceed 200,000 km². Due to overlapping jurisdiction and differing management objectives, spatial duplication may exist. This figure lags behind the Asia-Pacific average of 19.06%, and far less than Target 3 of the KMGBF.

Moreover, China's current national park model does not align well with marine conservation needs. Most remote islands are uninhabited, with only seasonal visits by fishers. These traditional fishing activities reflect longstanding cultural and economic practices and are key to maritime rights. Polar regions play vital roles in carbon absorption and freshwater storage, highlighting the global importance of marine and cryosphere conservation. Internationally, mature frameworks for MPAs have emerged, but differ from China's existing national park governance model.

Deficiencies in Representativeness, Effectiveness, and Connectivity of Current Protected Areas

China's nature reserves currently include over 80% of native vegetation communities and 85% of wildlife species, with strong coverage for orchids and mammals. This still falls short of meeting biodiversity and ecosystem service needs. Large predators like leopards, wolves, and dholes are in decline. Gaps remain in priority biodiversity conservation areas. Of 32 priority freshwater zones, only 7 have over 30% protection; most with lower coverage are located in densely populated areas.

In terms of effectiveness, evaluations of 394 national-level nature reserves from 2007–2016 found widespread problems such as unclear boundaries, weak institutions, a shortage of technical staff, and funding constraints. Assessments from 2017–2018 in the Yangtze River Economic Belt reported similar issues. Many reserves also lack effective community participation, treating local residents as passive subjects rather than stakeholders, which exacerbates conflicts.

Connectivity between reserves also requires significant improvement. Ecological corridors are limited, and a fully connected national protected area network has yet to be established.

Furthermore, greater emphasis on integrating restoration (KMGBF Target 2) into the system is needed to address past degradation within sites now inside the ECR.

In Situ Conservation Outside Formal Protected Areas Still in Early Stages

OECMs enhance conservation outcomes through greater representativeness and connectivity. In China, research on OECMs has only gained attention in recent years, mostly from the perspective of implementing the Convention on Biological Diversity. Scholars have identified potential OECM types within China's current conservation system, but definitions and criteria still vary widely.

For instance, whether some Ecological Conservation Redline areas qualify as OECMs remains debated. Many community-managed lands may also be classified as social or public-interest conservation areas and overlap with the Ecological Redline. Clear information on the interpretation of OECM boundaries, responsible actors, and effectiveness is still lacking. Additionally, many OECMs are initiated by grassroots or civil organizations, but the governance systems and regulatory frameworks that recognize and strengthen their contributions in China remain underdeveloped.

2.3 The Potential and Promotion Models of Internationalizing ECR for Implementing the "30x30" Target of the Kunming-Montreal Framework

2.3.1. Analysis of the Potential of ECR in Implementing the 30x30 Target of KMGBF

Protected areas cover only 15%–20% of the territory in most countries worldwide, falling far short of the 30x30 target. China's practical experience demonstrates that the ECR model can effectively expand the coverage of area-based conservation, surpassing the 30% conservation target. Moreover, many countries, especially developing ones, face conflicts between ecological conservation and economic development. The ECR model, by holistically integrating ecological needs with socio-economic development priorities and emphasizing ecosystem connectivity and integrity, not only expands conservation areas but also enhances conservation effectiveness.

(1) The **ECR model is highly aligned with the goals of the Kunming-Montreal Framework. In terms of coverage, the ECR has already allowed China to fully meet the "30×30" target.** With regard to conservation targets and outcomes, the ECR encompasses not only species habitats but also key ecological functional zones and ecologically vulnerable areas, thereby achieving integrated protection for both wildlife and human communities. The ECR system is consistent with the Kunming-Montreal Framework's emphasis on critical ecological functions and services, offering new insights for global biodiversity conservation. Because ECR is still a fairly new concept, monitoring is required to ensure that they are effective over time.

(2) **The ECR model adopts a holistic approach that protects all life forms and ecosystem functions.** "All life forms" refers to the protection not only of animals and plants but also to the harmonious coexistence between humans and nature. "All functions" means conserving not only biodiversity but also vital ecosystem services such as water retention, carbon sequestration, and windbreak and sand fixation, which are essential for human well-being.

(3) **The ECR model incorporates not only nature reserves and key ecological functional zones but also the vast majority of Other Effective Area-based Conservation Measures (OECMs).** Examples include ecological public welfare forests, habitats of extremely small populations, key wetlands, and sacred alpine lakes. The primary objective of these areas is to maintain critical ecological functions, and development or productive construction activities are prohibited, resulting in tangible biodiversity benefits that qualify them as OECMs. By also safeguarding human living environments, the ECR model protects nature while balancing ecological conservation with production and livelihood needs.

(4) **China has completed the demarcation of ECR at the national level, designating areas to meet the 30% land conservation target set by the Kunming-Montreal Framework.** The terrestrial ECR network covers approximately 3.04 million square kilometres, accounting for over 30% of the country's land area. They protect examples of more than 90% of nationally key protected

species, over 90% of well-functioning ecosystems and natural landscapes, the headwaters of 210 major rivers, and 23 ecologically sensitive and vulnerable regions, thereby enabling large-scale and holistic conservation of critical natural resources, ecological spaces, and rare and endangered species with their habitats. Thus, through the ECR, China has achieved the 30% land conservation target under the Kunming-Montreal Framework. In comparison, protected areas cover only 16.43% of the global terrestrial area and 9.61% of the marine area worldwide.

(5) **The ECR model has received significant international recognition and is well-positioned for global promotion.** In 2020, the case titled "Ecological Redline: Institutional Innovation for Biodiversity Conservation in China" was selected as a Specially Recommended Case under the UN's "Biodiversity 100+ Global Flagship Cases." In the same year, eight international organizations, including the Sustainable Development Alliance, jointly sent a letter to the then Minister of Ecology and Environment Li Ganjie, emphasizing the global significance of promoting the ECR model as an important tool for biodiversity conservation worldwide. In 2021, Chinese experts collaborated with IUCN specialists to explore the potential for global application of the ECR and developed a technical toolkit for its demarcation. Furthermore, China has applied for support from the Kunming Fund to promote the ECR model in Brazil and Pakistan.

2.3.2 Promotion Models of ECR for International Application Scenarios

China is willing to promote the ECR approach globally to support the conservation of critical ecosystems. Through initiatives such as the Belt and Road Initiative (BRI), the Green Silk Road Envoys Program, and South-South cooperation mechanisms, China has already been sharing its biodiversity governance experience with developing countries. Based on the ECR theory, the following promotion models are proposed for international application scenarios:

(1) Establishing a pilot national ecological conservation system based on the ECR model to identify key conservation areas and advance the global 30x30 target of the KMGBF

First, constructing a new ecological conservation system based on the ECR model. Based on the national conditions of the pilot country, clarify the conservation objectives, types, and areas of the national ecological conservation framework under the ECR model, identify priority protection zones for each objective, and integrate the ECR with existing protected areas to form an innovative biodiversity conservation framework. **Second,** delineating the scope and boundaries of biodiversity conservation in the pilot country. Begin by utilizing remote sensing data to assist in assessing the importance of ecological functions and ecologically sensitive areas in the pilot country, based on evaluations of resource environmental carrying capacity and land development suitability. Then, based on the assessment results of ecological functional zones and ecologically sensitive areas, combined with biodiversity and endemism hotspots and existing protected areas, clarify the scope of biodiversity conservation. **Third,** scientifically defining development and conservation boundaries. Systematically analyze the relationship between development and ecological conservation and, based on actual economic development conditions, scientifically determine development and conservation boundaries to enhance the rationality and operability of boundary delineation. During boundary demarcation, enhance ecosystem integrity by planning ecological corridors through newly added protected areas, improving species (especially migratory species)

mobility and connectivity, and ultimately generating outputs such as ECR boundaries and protection levels.

(2) Formulating strategic plans for the new conservation system, promoting government approval and implementation, and mainstreaming biodiversity conservation.

First, developing strategic plans for the new conservation system. Establish an expert group on ecological conservation composed of domestic and international biodiversity conservation experts. The group should include multinational and multidisciplinary experts covering all aspects of conservation planning and implementation to provide feasibility recommendations for integrating the new conservation plans and biodiversity objectives into broader policy frameworks. **Second,** integrating biodiversity into the pilot country's policies and regional development plans. Review relevant policies to identify areas where biodiversity has not been fully integrated into national and regional development planning, and incorporate biodiversity into socio-economic development plans, territorial spatial planning, and other policy systems to advance conservation mainstreaming.

(3) Establishing a new monitoring system and data-sharing platform for protected areas.

First, constructing a multi-scale (national-regional-site) hierarchical monitoring indicator framework for biodiversity and protected areas. Integrate existing biodiversity observation networks, ecological monitoring stations, sampling points, and remote sensing monitoring to establish a comprehensive multi-scale biodiversity and protected area observation framework for the pilot country. Establish continuous monitoring and regular evaluation mechanisms to track changes in protected areas and biodiversity and promptly identify and respond to threats. **Second,** developing an interactive data-sharing platform for protected areas and other key biodiversity areas. Build a data interaction and integration platform to enable real-time data sharing for key ecological protection zones and dynamically optimize the delineation outcomes of critical ecological protection areas. **Third,** formulating management and control regulations for key ecological protection areas. Based on integrated data, evaluate the effectiveness of the pilot country's ecological conservation system in ensuring ecological service functions, human habitat security, biodiversity conservation, and socio-economic development. Develop management and control regulations for key ecological protection areas, clarifying biodiversity conservation objectives, protection types, and management strategies.

(4) Enhancing biodiversity conservation awareness, expanding stakeholder participation, and strengthening conservation impact.

First, conducting targeted capacity building for local communities and stakeholders. Provide training for Indigenous Peoples, communities, and stakeholders on sustainable land use, biodiversity conservation techniques, and ecosystem management strategies, with particular emphasis on gender equality, strengthening women's participation, and recognizing their critical roles in project implementation. **Second,** implementing participatory planning, benefit-sharing mechanisms, and innovative ecological conservation models to promote community involvement in ECR delineation and advance equitable benefit-sharing.

2.4 Recommendations for Optimizing the Global Promotion of the ECR Model

(1) Establish and Improve the Coordination and Dynamic Adjustment System for ECR

First, establish an interregional coordination mechanism for ECR that links national and local plans within the territorial spatial planning system. It is recommended that, based on the need to construct an ecological security pattern and considering the integrity of regional or watershed ecosystems, emphasis be placed on dovetailing and coordinating adjacent administrative areas during demarcation to ensure the continuity and integrity of redline spaces, thereby achieving holistic protection of regional ecosystems. Within the territorial spatial planning system, clarify cross-administrative unit ecological management mechanisms, identify protection areas at provincial and municipal levels, incorporate them into county-level ECR delineation, and strictly implement them in township-level territorial spatial plans in terms of plot location, area, and control indicators. **Second,** integrate the ECR system into the protected area management system. Following the implementation of the integrated optimization plan for protected areas, coordinate the interactions between different ecosystem types and anthropogenic factors, further optimize the spatial layout of the protected area system with national parks at its core, promote effective linkage between ECR and national parks, nature reserves, and other protected areas, enhance the effectiveness of protection management, and ensure the effective conservation of various ecosystems, wildlife species, and their habitats. **Third,** carry out dynamic adjustments of ECR in a timely manner. If legally protected areas within ECRs, such as nature reserves, are newly established, abolished, or have their boundaries adjusted in accordance with laws and regulations, the boundaries of the ECR should be updated accordingly, and adjustment information should be shared promptly. Where regional ecological quality has significantly improved through conservation and restoration projects and meets relevant standards, such areas should be incorporated into the ECR for strict management.

(2) Improve China's Biodiversity Conservation System to Fulfill the "30×30" Target of the KMGBF

While the ECR identifies the spatial extent of China's "30x30" target, full attainment of the target will require several additional components. Fulfilling the "30×30" target of the KMGBF is a valuable opportunity for China to enhance its biodiversity conservation system. **First,** strengthen financing and investment in protected areas through multiple channels, promote integrated development models combining protected areas and green industries, and accelerate the construction of a protected area system with national parks as the mainstay. **Second,** improve the identification and management mechanisms for Other Effective Area-based Conservation Measures (OECMs). Leverage the existing ECR system to advance the standards, governance, and management systems for OECMs, achieving systematic integration of resource conservation and sustainable use. **Third,** central and local governments should formulate supporting policy systems to ensure the implementation and supervision of ECR, including ecological compensation mechanisms, green development performance incentives, and tailored ecological security standards. **Fourth,** establish a marine protected area policy aligned with the goals of the KMGBF, including accelerating the construction of marine protected areas, improving their management systems, optimizing and integrating offshore protected areas, and establishing aquatic germplasm resource conservation zones. **Fifth**, strengthen the protection of key species and ecosystems, focusing on

endangered, endemic, and flagship species and their critical habitats and incorporating relevant ecosystem restoration. Analysis should include whether populations within ECRs are large enough to provide viable conservation in the long term. **Sixth**, improve monitoring, evaluation, and enforcement of ECRs, which are still too new for long-term results to be known, making effective monitoring an essential component of future success.

(3) Optimization Recommendations for Global Promotion of the ECR Model

First, enhance the complementarity between ECR and IUCN protected areas as well as OECMs. Strengthen convergence with the IUCN protected area system, clearly define the distinctions between ECR, protected areas, and OECMs, and gradually develop a series of technical support documents—such as opinions, plans, standards, guidelines, and manuals—for ECR demarcation and management that align with international practices. Formulate the International Technical Guidelines for Demarcating Ecological Redline to make the concept and methods of ECR more accessible and adoptable for the international community, thereby better supporting the achievement of the KMGBF targets, particularly 1, 2, 3, 10, 11 and 12. **Second,** expedite the development of an integrated technical package for global ECR demarcation. Summarize China's successful experiences in ECR demarcation, management, and monitoring to create guidelines for demarcation and management. Comprehensively demonstrate the conservation effectiveness and technical approach of ECR at multilateral dialogues and cooperation opportunities, such as the Conference of the Parties to the Convention on Biological Diversity, the United Nations Development Programme, and the United Nations Environment Programme. Share China's biodiversity governance experience based on ECR with other countries (especially developing countries) and foster international understanding of the ECR concept and its role in achieving the KMGBF goals. **Third,** launch pilot programs for the application and promotion of ECR in other countries. It is recommended that—leveraging mechanisms such as the Belt and Road Initiative, the Green Silk Road Envoys Program, and South-South cooperation—an ECR expert committee and technical exchange mechanism be established to assist other countries in context-appropriate planning and conservation models, including, where appropriate, carrying out ECR demarcation. Additionally, fully utilize the roles of the Kunming Fund and the Global Environment Facility (GEF) to allocate special funding supporting national actions to achieve the KMGBF goals, with particular attention to ECR-related practices in developing countries, helping other countries achieve the "30x30" target as soon as possible.

III: Synergies Between Multi-Environmental Conventions to Promote the Efficient Implementation of Biodiversity, Climate, and Related Goals

3.1 International Level: Current Status of Cross-cutting Themes in Multi-Environmental Conventions

3.1.1 Overview of Global Environmental Conventions and China's Participation

According to the UN InforMEA platform,[Error! Reference source not found.] there are 41 global and 57 regional multilateral environmental agreements (MEAs). Among them, 14 global MEAs are directly related to biodiversity: the Convention on Biological Diversity (CBD), the Cartagena Protocol and

its Nagoya–Kuala Lumpur Supplementary Protocol, the Nagoya Protocol, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on the Conservation of Migratory Species of Wild Animals (CMS), the Convention on Wetlands (Ramsar Convention), the United Nations Convention to Combat Desertification (UNCCD), the World Heritage Convention (WHC), the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the International Plant Protection Convention (IPPC), the International Convention for the Regulation of Whaling (IWC), the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), and the Agreement on the Conservation of Albatrosses and Petrels (ACAP).

China has joined 10 of these 14 conventions. The four not yet ratified by China are: CMS, ITPGRFA, the Water Convention, and ACAP. In addition, other MEAs not officially listed as biodiversity related under InforMEA also directly contribute to biodiversity conservation and sustainable use—most notably: The United Nations Framework Convention on Climate Change (UNFCCC), the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ). Considering BBNJ is not yet in force, this study focuses on synergies between biodiversity conservation and sustainable use and selects six conventions for further analysis: CBD, UNFCCC, UNCCD, CITES, CMS, and Ramsar.

3.1.2 Shared Themes Among CBD, UNFCCC, UNCCD, CITES, CMS, and Ramsar

An analysis of the resolutions or decisions of the past five Conferences of the Parties (COPs) of these six conventions shows recurring cross-cutting themes: Financial mechanisms are prioritized in CBD, CITES, UNFCCC, CMS, and Ramsar; capacity building is emphasized in CITES, CBD, UNFCCC, and Ramsar. Climate change is addressed in the CBD, UNFCCC, CMS, and Ramsar. Gender issues are highlighted in CBD, CITES, UNFCCC, and Ramsar. Indigenous Peoples are recognized in the CBD, UNFCCC, and Ramsar. Youth engagement is discussed in CITES, UNFCCC, and Ramsar. Synergies and collaboration feature in the CBD (note the recent "Bern process"), CITES, CMS, and Ramsar. Resource mobilization is emphasized in the CBD and Ramsar. Beyond these common COP themes, other topics, such as marine protection, health, and cooperation with other MEAs, also appear frequently across the conventions.

3.1.3 Contributions of Different Conventions to the SDGs and the Kunming-Montreal Global Biodiversity Framework (GBF)

Many MEAs strongly support both the goals of the KMGBF and the UN Sustainable Development Goals (SDGs), which indeed was a design feature of the KMGBF, providing a solid foundation for coordinated implementation and policy integration. To advance the dialogue, coordination, and cooperation among biodiversity-related conventions for the better development and implementation of the Global Biodiversity Framework, the Bern I, II, and III Conferences were convened in 2019, 2021, and 2024 respectively under the organization of the United Nations Environment Programme. At the Bern III Conference, the environmental agreements also completed a mapping exercise against the KMGBF to facilitate its effective implementation. [27]

Table 1: Indicative cross-mapping of targets and MEAs

	CMS				Ramsar								
Target 1 (spatial planning)		✓✓		✓✓		✓✓✓		✓✓					
Target 2 (restoration)						✓✓✓		✓✓					
Target 3 (protected areas)		✓✓				✓✓✓	✓✓✓	✓✓					
Target 4 (species conservation)	✓✓	✓✓✓		✓✓✓	✓✓✓	✓✓	✓✓						
Target 5 (sustainable use of species)	✓✓✓	✓✓✓		✓✓									
Target 6 (invasive alien species)			✓✓✓			✓✓							
Target 7 (pollution)										✓✓✓	✓✓✓	✓✓✓	✓✓✓
Target 8 (climate change)						✓✓			✓✓✓				
Target 9 (species management)	✓✓	✓✓✓		✓✓	✓✓								
Target 10 (other key sectors)				✓✓✓		✓✓							
Target 11 (nature's contributions to people)						✓✓	✓✓		✓✓✓				
Target 12 (urban nature)													
Target 13 (access and benefit sharing)				✓✓✓									
Target 14 (mainstreaming)		✓✓											
Target 15 (business and biodiversity)				✓✓✓									
Target 16 (sustainable consumption)										✓✓			
Target 17 (biosafety)													
Target 18 (incentives and subsidies)													
Target 19 (financial resources)				✓✓✓									
Target 20 (capacity-building)				✓✓						✓✓	✓✓		
Target 21 (data, information, knowledge)				✓✓									
Target 22 (IPLCs)								✓✓				✓✓	
Target 23 (gender equality)								✓✓				✓✓	

✓✓✓ Potential 'champion' or partner | ✓✓ Contributing 'champion' or partner | Also relevant to the MEA

Figure 2. Support of Multi-Environmental Conventions for the Goals of the KMGBF**Error! Reference source not found.**

	CBD	CITES	CMS	Ramsar	ITPGRFA	WHC	IPCC	UNFCCC	UNCCD
	√								√
	√			√	√			√	√
	√								
									
									
	√			√					
									
	√								
	√							√	
									
	√					√		√	
	√	√	√	√	√	√	√	√	√
	√		√	√	√	√	√	√	√
	√	√	√					√	
	√	√	√	√	√	√	√	√	√
	√	√	√	√	√	√	√	√	√
	√	√	√	√	√	√	√	√	√

Figure 3. Support of Multi-Environmental Conventions for the SDGs**Error! Reference source not found.**

3.1.4 Policy Recommendations

There is significant thematic overlap among biodiversity-related international conventions, particularly between CBD, CITES, CMS, and Ramsar. At the secretariat level, coordination platforms such as the Collaborative Partnership on Sustainable Wildlife Management (CPW) and the Biodiversity Liaison Group (BLG) already exist. However, effective implementation requires the establishment of communication platforms at the national level.

Many conventions strongly support the Kunming-Montreal Global Biodiversity Framework and the SDGs, providing a solid foundation for synergies between multi-environmental conventions. Countries should leverage the political momentum of these frameworks to promote coordinated implementation. When formulating National Biodiversity Strategies and Action Plans (NBSAPs), countries should integrate elements such as the UNFCCC's Nationally Determined Contributions (NDCs) and National Adaptation Plan (NAPs), sustainable management under CITES, migratory species protection under CMS, and wetland targets under Ramsar.

Although China is not a party to the CMS, it serves as a key flyway for migratory birds globally. Given the importance of migratory species conservation to both CBD and CITES implementation, China should closely monitor CMS developments, attend relevant meetings as an observer, and produce reports to inform other national convention bodies. It is also advisable to learn from CMS to improve migratory species conservation domestically.

3.2 Policy Planning and Synergetic Implementation Mechanism

3.2.1 Logic of Coordination Between Conventions

Synergies in the implementation of multi-environmental conventions can help reduce

fragmentation and trade-offs. Developing NDCs, NAPs, and NBSAPs in isolation risks duplication or maladaptation, for example, agricultural practices described as "climate-smart" that harm biodiversity. Climate actions must be biodiversity-safe, and biodiversity actions should maximize climate co-benefits. Having a unified or coordinating department responsible for climate and biodiversity policies can reduce cross-departmental duplication and optimize resource allocation.

Coordinated efforts should also uphold principles like equity, gender equality, social inclusion, stakeholder engagement, and cross-referencing of diverse knowledge systems. Having a unified or coordinating agency overseeing both climate and biodiversity policy can streamline interdepartmental work and optimize resource allocation.

3.2.2 Institutional Landscape in Representative Countries

We analyzed national focal points for CBD, UNFCCC, UNCCD, CITES, Ramsar, and CMS in the top 10 economies (as of 2024): the United States, China, Germany, Japan, India, the United Kingdom, France, Brazil, Italy, and Canada. In most cases, focal points span multiple agencies, with only India concentrating all responsibilities in its Ministry of Environment, Forest and Climate Change. Environmental and foreign affairs ministries are the most common players: seven countries involve their foreign ministries, and nine involve their environmental agencies.

3.2.3 Policy Recommendations

Challenges to synergies include fragmented mechanisms, scattered funding, and policy misalignments. The CBD, as an umbrella convention, provides the overall goals for biodiversity conservation and sustainable use, while CITES, CMS, and Ramsar focus on specific implementation measures. While some coordination exists at the secretariat level, much more is needed nationally.

Legal and policy alignment among conventions must be improved, along with diversified financing and long-term strategies for greater synergy. In China, the CBD focal point is housed in the Ministry of Ecology and Environment. While the implementation of the CBD has led to the establishment of the China National Committee for Biodiversity Conservation (the national coordination mechanism for biodiversity protection), and the National Forestry and Grassland Administration (NFGA) is a member unit, communication and coordination among different conventions still need to be strengthened.

We recommend the establishment of a mechanism and agency that synergizes exchange and collaboration for China's multiple biodiversity-related conventions. Based on China's "National Biodiversity Coordination Mechanism", the Ministry of Foreign Affairs should lead and collaborate with the Ministry of Ecology and Environment, and the National Forestry and Grassland Administration or the Ministry of Natural Resources to establish a communication mechanism for China to promote exchanges and collaboration among the national focal points of multiple conventions, including CBD, UNFCCC, UNCCD, CITES, Ramsar, etc., Through the establishment of synergistic mechanisms for the formulation, monitoring, reporting, and verification (MRV) of multiple conventions via collaborative workflows and tools, the integration of unified scientific assessments and evidence-based policies, cross-cutting issues will mutually reinforce one another. This will facilitate the sharing of information and data on related topics, the coordination of convention financing strategies with resource allocation, and the sharing of compliance reports. An expert committee composed of specialists in biodiversity conservation, sustainable use, foreign policy, and multilateral implementation should be formed to provide technical and policy support.

3.3 Nature-based Solutions (NbS) for Achieving Multiple Objectives

3.3.1 NbS Has Become an Internationally Preferred Option for Convention Synergy

The CBD, as an "umbrella convention" for biodiversity conservation, shares overlapping issues with multiple environmental conventions. However, coordination and synergy remain challenging due to differing priorities and segregated implementation mechanisms across conventions. Particularly, how to synergize actions between the CBD and climate change conventions has long been a focus of attention. The 2021 workshop report co-organized by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) [29] emphasized that biodiversity loss and climate change are both driven by human economic activities and reinforce each other; neither challenge can be effectively addressed without simultaneously tackling the other. Based on this understanding, integrated solutions provide a new perspective for implementing the objectives of biodiversity and climate conventions, with NbS, as a comprehensive approach, gaining prominence in convention goals, regional, and national policies. IUCN defines NbS as "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits."

At the convention target level, NbS has been incorporated into the Kunming-Montreal Global Biodiversity Framework (KMGBF). Target 8 emphasizes NbS and/or ecosystem-based approaches to mitigate, adapt, and reduce disaster risks, diminish the impacts of climate change and ocean acidification on biodiversity, and enhance resilience. Target 11 highlights restoring, maintaining, and enhancing nature's contributions to people through NbS and/or ecosystem-based approaches, including ecosystem functions and services such as air, water, and climate regulation, soil health, pollination, disease risk reduction, and disaster prevention, for the benefit of all people and nature.

At the regional and national policy level, NbS is a key component of the European Green Deal, reflected in policies related to biodiversity and climate change. The EU Biodiversity Strategy for 2030 (BDS2030), the EU Climate Adaptation Strategy, and the European Climate Law all prioritize NbS to address climate mitigation, adaptation, and biodiversity conservation.[30] China has also included "exploring NbS and ecosystem-based approaches (EbA) to enhance ecosystem climate resilience and carbon sequestration" in Priority Action 14 of the China Biodiversity Conservation Strategy and Action Plan (2023–2030): Synergistic Governance of Biodiversity and Climate Change. The China National Climate Adaptation Strategy 2035 proposes integrating NbS with climate adaptation, strengthening ecosystem protection, restoration, and sustainable management to effectively leverage ecosystem services and enhance comprehensive climate adaptation capabilities.

3.3.2 NbS Pathways and Potential for Synergizing Biodiversity Conservation and Climate Response

NbS focuses on biodiversity and ecosystems. Criterion 3 of the IUCN Global Standard for NbS explicitly requires that "*NbS must result in a net gain for biodiversity and ecosystem integrity.*" The Nature Conservancy (TNC) also emphasizes that NbS must deliver net benefits to nature while meeting one or more societal needs.

The significant potential of NbS in addressing climate change has become an international consensus. Studies [31] indicate that 20 NbS/Natural Climate Solutions (NCS) pathways are projected

to contribute up to 37% of the mitigation potential needed to meet the Paris Agreement's goal of limiting global warming to below 2°C by 2030, while simultaneously improving soil productivity, purifying air and water, safeguarding biodiversity, and advancing the UN Sustainable Development Goals (SDGs). Afforestation, avoiding forest conversion, and natural forest management rank among the top three most promising pathways and have attracted considerable attention. Chinese researchers have also projected the climate mitigation potential of various NbS pathways by 2060, highlighting the importance of natural forest management, farmland nutrient management, avoiding grassland conversion, and preventing peatland degradation in forestry, farmland, grassland, and wetland ecosystems. [32]

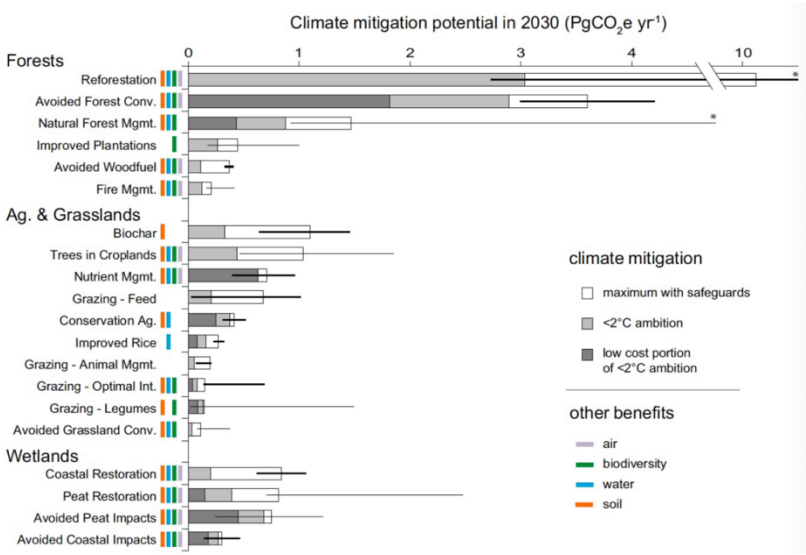

Fig. 4. Climate Mitigation Potential of NbS Pathways by 2030

Furthermore, the role of NbS in climate adaptation is increasingly recognized. By protecting, restoring, and sustainably managing ecosystems, NbS enhances the buffering capacity of natural systems against climate change and reduces the negative impacts of extreme weather events. For example, healthy wetlands and floodplains can absorb excess rainfall, mitigating flood threats; mangroves and coral reefs reduce storm surge erosion along coastlines; urban green spaces and forests help alleviate heat island effects and improve local climate conditions. These measures not only enhance community resilience to climate shocks but also safeguard water security, food production, and public health, particularly benefiting vulnerable regions and populations. Thus, promoting NbS is not only a core element of climate adaptation strategies but also a critical pathway to achieving the SDGs. Several thematic policy studies on climate adaptation conducted by the China Council for International Cooperation on Environment and Development (CCICED) during 2022–2024 emphasized the role of NbS, proposing to integrate NbS with traditional infrastructure to build "resilient urban and rural settlements" that reduce damages from extreme weather events while delivering multiple benefits.

In fact, China has long adopted NbS-like concepts and actions in its ecological conservation projects over the past four decades. These include the Three-North Shelterbelt Forest Program launched in 1978, the Natural Forest Protection Program, the Grain for Green Program, wetland

conservation and restoration projects, and integrated conservation and restoration projects for mountains, waters, forests, farmlands, lakes, grasslands, and deserts. These initiatives remain actively promoted and are planned for updates and expansion. In 2020, China released the Master Plan for Major Projects of National Ecosystem Conservation and Restoration (2021–2035), which leads globally in terms of scale and investment.

3.3.3 Prioritizing High-Potential and Cost-Effective NbS Pathways for Synergistic Benefits

To achieve the long-term visions and goals of building a Beautiful China where humanity and nature coexist in harmony by 2050 and peaking carbon emissions before 2060, China must consider the synergy between biodiversity conservation and climate change response from a long-term perspective. This requires selecting and designing key NbS action pathways. For natural and semi-natural ecosystems—forests (natural and planted), farmlands, grasslands, and wetlands—priority should be given to high-potential, cost-effective NbS pathways, including natural forest management, farmland nutrient management, and grassland and peatland conservation.

Forests are a core application area for NbS to achieve synergistic effects. For instance, China's afforestation and natural forest protection programs over the past 40 years have resulted in over 10 billion mu (67 million hectares) of afforestation since the 18th National Congress of the Communist Party of China, contributing approximately one-quarter of the world's new forest area.[33] China now leads globally in planted forest area, with a total forest coverage of 247 million hectares and a forest stock volume exceeding 20 billion cubic metres (natural forests account for over 80% of the total national forest stock).[34] Consequently, carbon storage in ecosystems has significantly increased. However, the space available for new afforestation is gradually diminishing. Multiple studies indicate that over 90% of the potential growth in China's forest stock volume over the next 30–40 years could come from the management of existing forests, with natural forest management holding the greatest potential. Sustainable natural forest management is projected to become the most impactful pathway among the 20 NbS pathways, accounting for 77% of the total forest NbS management contribution by 2030 and 54% [32] by 2060. If proactive, sustainable natural forest management policies are implemented, China's forest stock volume could reach 26–26.5 billion cubic metres by 2035, an increase of approximately 6 billion cubic metres from 2025, significantly enhancing forest carbon sinks while greatly improving biodiversity in forest ecosystems and delivering synergistic benefits. [35]

Due to China's history of natural forest conservation and large-scale land greening, along with ambitious plans, forest management has received increasing attention from the Chinese government and has been placed on the action agenda. Policies such as the National Forest Management Plan (2016–2050) and the Guidelines on Comprehensively Strengthening Forest Management and a series of technical standards have been issued. Additionally, 368 national pilot sites for sustainable forest management have been established to summarize models for broader replication. Strong support for sustainable forest (natural and planted) management NbS pathways with significant potential and cost-effectiveness should become a key strategic direction for achieving synergy between biodiversity conservation and climate change response.

3.3.4 Policy Recommendations

Adopt nature-based solutions for biodiversity and climate synergy to fulfill national contributions under the Paris Agreement and the KMGBF. Integrate biodiversity solutions inspired

by the concept of harmony between nature and humanity with nature-based climate solutions. Promote measures that deliver cost-effective climate mitigation while enhancing climate adaptation and generating co-benefits for biodiversity. Leverage NbS/NCS, with a focus on high-potential, cost-effective pathways, such as sustainable forest management, farmland nutrient management, and grassland and peatland conservation, to address climate change and biodiversity loss synergistically.

3.4 Case Studies of Synergies in Representative Countries

Latin American countries such as Panama and Colombia are pioneers in coordinating multi-environmental conventions. Panama has launched its "Nature Commitment" strategy to systematically align its NDC, NBSAP, and Land Degradation Neutrality targets. By upgrading goals, guiding smart investments, and optimizing funding flows, the country is building a cross-sectoral ecological governance system.

Colombia's updated NBSAP is closely aligned with its NDC and is supported by Sistema Nacional de Cambio Climático (SISCLIMA), the national climate change system. The plan proposes 13 cross-cutting actions that integrate biodiversity and climate agendas while emphasizing Indigenous participation and local implementation.

3.4.1 Panama's Nature Pledge

Panama is working on a strategic framework called the "Nature Pledge" that aims to integrate the targets contained in its NDC, its NBSAP, and its Land Neutrality Strategy (LNS) with the view of maximizing synergies between actions to combat climate change, biodiversity loss and land degradation. As part of the Nature Pledge, Panama is looking to update and strengthen its national commitments contained in the three instruments, identify synergies, facilitate their joint implementation, identify intelligent investments, enhance understanding, and align finance flows with climate and environmental goals. The Nature Pledge has been officially included in Panama's Government Strategic Plan.

3.4.2 Coherence between NDCs and NBSAPs: Colombia's revised NBSAP

At COP16, Colombia submitted its revised NBSAP (Ministerio de Ambiente y Desarrollo Sostenible, 2024), prepared in 2024 through a participatory process involving more than 23,000 people and 15 ministries. Many recommendations come from the regional level. Four of the six national targets are aligned with the NDC, and ambition was raised in three of them. For example, the target to reduce deforestation went from 50,000 hectares per year by 2030 in the NDC to 33,000 per year by 2030 in the NBSAP; the NBSAP maintained the NDC target of almost 1 million hectares of ecological restoration by 2030, but extended its scope to include 3 million hectares of productive reconversion; the NBSAP maintained the NDC target of increasing up to 68% the amount of treated wastewater by 2030; finally, while the NDC contained activities related to planning and management of protected areas but did not define a target, the NBSAP defined a target of 34% of Colombia's terrestrial zones, continental waters and coastal and marine zones under a conservation scheme by 2030. Colombia's updated NBSAP also subsumed biodiversity governance with climate change governance through the National Climate Change System. The NBSAP explicitly mentions 13 concrete actions for integrating the biodiversity and climate agendas, including with the participation of Indigenous Peoples and local communities, and affirms the hope that the next NDC

builds on the NBSAP's proposals so that Colombia can position itself as a regional leader in the integration of biodiversity as a pillar of climate action.

Case studies from other countries are in Appendix 4.

IV. Sustainable Use of Biodiversity and Benefit-Sharing: Promoting Synergies Between Socio-economic Development and Nature Conservation

4.1 Analysis of the Situation

A major challenge for both China and the international community is how to systematically reconcile biodiversity conservation with socio-economic development. This issue is pronounced in China's biodiversity hotspots, which are often located in remote, underdeveloped areas. Around 76% of counties in China's ecologically fragile zones were formerly designated as national poverty-stricken counties. Due to the high dependence of livelihoods on natural resources and the lack of effective development models, these areas are at risk of falling into a vicious cycle of biodiversity loss and deepening poverty.[36] Therefore, exploring development paths that align conservation with economic and social justice needs is crucial for improving livelihoods, supporting vulnerable groups, ensuring sustainable biodiversity use, and stimulating broader participation in conservation.

In building ecological civilization and advancing Chinese-style modernization, China has promoted the concept of harmony between people and nature, offering new opportunities for practising sustainable use and benefit-sharing. To embed green transformation into national development strategies, recent key policies—including the 2021 Opinions on Strengthening Biodiversity Conservation,[37] the 2024 National Biodiversity Conservation Strategy and Action Plan (2023–2030),[38] and the forthcoming 2025 Major Projects Implementation Plan for Biodiversity Conservation,[39]—have laid out top-level designs and guidance for practice.

Some local governments have made progress in integrating biodiversity and development. However, due to differences in funding, cultures, and natural resource conditions, many regions face gaps in incentive mechanisms and policy safeguards. Based on practical cases, we propose policy and institutional recommendations to the Chinese government for improving participation in the sustainable use of biodiversity and benefit-sharing.

4.2 Government-Led Efforts to Promote Sustainable Use of Biodiversity and Benefit-Sharing

4.2.1 Support and Safeguard Mechanisms

In practice, local governments have integrated top-level policy design with grassroots implementation, promoting synergy between biodiversity-related policies and local ecological conditions, cultural practices, and distinctive industries.

In Panan County, Zhejiang Province, a pilot program for biodiversity-friendly cities introduced plans, guidelines, and action frameworks that combined international approaches with local characteristics, forming a robust and scientific index system.[40] In Suichuan County, Ji'an City, Jiangxi Province—located along the ancient "bird migration corridor"—local ecological civilization plans incorporated wildlife conservation, particularly for birds, by designating no-hunting zones to ensure long-term ecological and economic benefits.[41] In Zhenning County, Guizhou, an industrial

development centre was established for the local agricultural product "Fengtang Li" (honey plum), which supports disaster prevention, industry standards, and regulatory mechanisms.[42] In Nanping City, Fujian, a government task force coordinated the Wuyi Mountain tea industry's sustainable development while implementing ecological compensation to incentivize eco-friendly tea farming.[43]

These efforts demonstrate a shift toward collaborative biodiversity governance. However, key gaps remain, especially in public science training and talent retention. Though NGOs and research institutions receive policy support, the lack of talent evaluation and career development systems limits their long-term capacity.

4.2.2 Return on Investment and Risk Management Mechanisms

While local governments have made notable progress in creating mechanisms for return on investment and risk control, challenges remain. The legal framework for biodiversity-related property rights is still evolving, particularly regarding ownership, conservation responsibilities, and benefit-sharing. Government-led models offer stability and continuity—for example, Zhenning County's establishment of two mother-tree conservation orchards for honey plums ensures genetic purity.[42] In Wuyuan County, Jiangxi, community-level conservation zones protect ancient trees and species like the blue-crowned laughingthrush.[44] In contrast, corporate-led conservation can suffer from exclusivity and financial fragility; rare tea varieties managed by companies face the risk of loss if operations fail.[45]

Balancing ecological protection with tourism or resource development remains a challenge, particularly in regions with rich natural heritage but lacking formal governance beyond national parks. Development of ecotourism in such areas often relies on ad hoc agreements between local governments and businesses, with limited systemic oversight.[46]

To address financing needs, some regions combine policy incentives with market mechanisms. For example, Zhenning County uses reforestation subsidies and cooperative-based credit loans to scale honey plum cultivation.[47] Separately, The Nature Conservancy, Alibaba Foundation, Wanxiang Trust, and Qing Shan Village in Hangzhou co-created China's first water fund trust, "Shanshui Fund No.1," which formalizes benefit-sharing and compensation via trust agreements.[48]

Nonetheless, risks remain. Markets for ecological products fluctuate; natural disasters and policy changes threaten returns. Zhenning County mitigates fraud with regional branding, traceability systems, and partnerships with major retailers like Pagoda and Freshippo.[47] Still, traditional crop insurance offers limited coverage, and no effective buyback mechanism exists to protect farmers. Ecotourism developers also face liquidity pressure, with no standard exit guarantee mechanisms, increasing project delay and discontinuity risks. Many risk-sharing frameworks rely on closed-door negotiations, limiting transparency and investor confidence. Furthermore, leadership turnover and shifting policies can weaken long-term participation across sectors.

4.3 Public Participation in the Sustainable Use of Biodiversity and Benefit-Sharing

4.3.1 Models of Public Participation

In building an inclusive model for the sustainable use of biodiversity and benefit-sharing, local governments in China have promoted the modernization of grassroots governance by fostering a

government–society co-governance system. This enables effective collaboration among diverse actors, including government, enterprises, financial institutions, research bodies, NGOs, and local communities. The multistakeholder participation model in sustainable use of biodiversity and benefit-sharing also contributes to optimizing the permanent population structure and employment patterns at the township level. In this process, further efforts should be made to promote equal employment, safeguard the rights and interests of female workers, support women's participation in social organizations, and enhance the engagement of women, children, and youth in local decision making.**Error! Reference source not found.**

Local governments, serving as the central pillar of the public governance system, guide and coordinate the active participation of stakeholders in biodiversity conservation and benefit sharing by constructing policy frameworks and incentive mechanisms through integrated planning and institutional innovation. From a practical perspective, government-led sustainable utilization of biodiversity and benefit-sharing has two main mechanisms. The policy system linkage mechanism builds on top-level design documents (such as implementation plans and guidance manuals). Leveraging local ecological resources, cultural characteristics, and industrial features, it is implemented through specialized institutions, like industrial development centres and task forces. Its strength lies in its systematic nature, enabling the coordination of resources to ensure policies align with local realities. Examples include the Biodiversity-Friendly City Index established in Pan'an County, Zhejiang, and the Honey-Sweet Plum Industrial Development Center set up in Zhenning County, Guizhou. However, its effectiveness relies on local fiscal capacity and administrative capabilities, and regional disparities occur. The "ecological compensation and collaborative governance mechanism" comprises ecological compensation policies, multistakeholder participation (including government, enterprises, and communities), and benefit-distribution rules. Its core value lies in balancing ecological protection and economic development, fostering a model of "joint contribution, shared governance, and mutual benefits." A prime example is Nanping City, Fujian's "Three Teas" Task Force and its ecological compensation mechanism. Nonetheless, this mechanism faces challenges such as difficulties in standardizing compensation criteria and insufficient motivation for NGOs to participate due to the lack of systems for building capacity.[43]

As the backbone of public governance, local governments lead with strategic planning and institutional innovation to build policy frameworks and incentive systems that mobilize participation in biodiversity conservation and benefit sharing.

Enterprises, as key market players and drivers of innovation, contribute with their agility and resource integration. For example, Zhejiang Unihome Decoration Technology Co., Ltd., originally focused on exporting biodiversity-related products, adapted its operations under the support of Pan'an County to develop eco-friendly practices and innovative biodiversity-friendly products for the domestic market.[50] In Wuyishan, Fujian Province, Wuyistar Tea Co. integrates smart agriculture, biological pest control, and traditional tea farming techniques to enhance yield and quality. Through industry–academia collaboration, it has strengthened germplasm conservation and innovation, earning four domestic and international organic certifications.[51]

Financial institutions play a crucial role in supporting green development. The "Shanshui Fund No.1," China's first water fund trust based in Qingshan Village, pools resources from finance, government, NGOs, farmers, water companies, and donors. It supports source water protection projects and ecological restoration through financial instruments and risk management expertise.[48]

Research institutions provide essential knowledge and technological backing. In Pan'an County, partnerships with scientific institutes have led to comprehensive biodiversity surveys, with data collection of species supporting the development of a monitoring network and platforms for disease surveillance and other research and industrial applications. Similarly, experts from Fujian Agriculture and Forestry University developed intercropping plans with green manure to improve soil and tea quality.[52] Technologies like integrated pest control by academician Chen Zongmao and biological control methods by Zhang Yanxuan at the Fujian Academy of Agricultural Sciences contribute to sustainable tea farming.[53]

NGOs are instrumental in public engagement and oversight. In Wuyuan, Jiangxi, the Linnaeus Lab reinvests revenue from science education into biodiversity advocacy. Tailored to local concerns, it offers public education on biodiversity. A 2022 lecture on the ecological threat of apple snails (*Pomacea canaliculata*) to local rivers led to coordinated public action involving nearly a thousand participants in snail removal.[54]

Lastly, communities serve as the direct implementers of conservation outcomes. Residents are both beneficiaries and protectors of biodiversity. In Suichuan County, villagers and volunteers form bird patrol teams for daily monitoring and anti-poaching efforts.[55] In Yongxiu County near Poyang Lake, residents relocated from island habitats in support of wetland and migratory bird protection. These efforts addressed conflicts between local livelihoods and bird conservation, such as competition over food resources between people and wintering birds.[56]

From the perspective of social force participation models, the market-driven industrial model centres on enterprises. It combines market demand with ecological technologies like organic farming and biological control to promote eco-products and cultural tourism. Its strength lies in high flexibility—market revenues can feed back into conservation efforts, enhancing sustainability. Examples such as Unija's optimized eco-production model in Zhejiang and Wuyi Star Tea's organic certification embody this approach. However, this model is vulnerable to market fluctuations, and small-to-medium enterprises often lack resilience against risks. It is also susceptible to policy changes. Conversely, the public trust and cooperation model is led by non-profit organizations and financial institutions. It integrates social capital and operates through trust contracts that stipulate benefit distribution and ecological compensation, supported by research. This mobilizes social resources for ecological governance, as seen in Zhejiang's Qingshan Village with its "Good Water Fund No. 1." Nevertheless, this model tends to be relatively closed in structure, lacks systematic oversight, and relies on negotiation to protect corporate rights, which can lead to project delays.

4.3.2 Roles, Responsibilities, and Benefits of Stakeholders

In the process of public participation in the sustainable use of biodiversity and benefit-sharing, the distribution of rights and responsibilities among stakeholders varies significantly depending on the mode of cooperation.

Under government-led participation models, local governments play a leading and coordinating role, responsible for policy formulation, institutional development, financial support, and multistakeholder coordination. In cases such as Pan'an County, Suichuan County, Zhenning County, and Yongxiu County, governments ensured effective alignment between ecological protection and locally led sustainable development through rigorous implementation plans, regulatory frameworks, and evaluation systems. These governments guided enterprises, research

institutions, financial bodies, NGOs, and communities to contribute based on their respective strengths, promoting a unified approach to environmental conservation, sustainable resource use, and equitable benefit-sharing. In return, governments have gained improved governance capacity, increased fiscal revenues through sustainable growth, progress toward SDGs, and enhanced international recognition. Notably, several local initiatives have been featured as exemplary practices at national and global levels, further motivating authorities to deepen efforts on biodiversity-related agendas.

By contrast, in civil society-driven models, actors such as research organizations, NGOs, and local communities become the primary forces behind conservation efforts. Enterprises engaged in ecological monitoring products, organic farming, ecotourism, or environmental education not only benefit from brand enhancement, innovation opportunities, and market competitiveness but also advance high-quality green development. Environmental responsibility and eco-certification often lead to supportive policies, particularly in taxation, and foster a positive public image and stronger market reputation. Increasingly, businesses are scaling up green investments, developing eco-friendly products and services, and building sustainable supply chains.

Financial institutions benefit from enhanced investment stability and the expansion of green finance. Through sustainable investment funds and green lending, they identify new growth areas while channelling long-term funding toward biodiversity protection and sustainable use.

Research institutions benefit through the application of research outputs, resource mobilization, and increased academic influence. Their participation in biodiversity monitoring, ecological restoration, and technological innovation translates theoretical research into practical solutions, enriches data access, and enhances the precision and efficiency of conservation actions. This scientific input provides a strong technical foundation for policy-making and industrial development.

NGOs gain wider social visibility, increased public engagement, and influence in shaping ecological governance mechanisms. Through environmental education, grassroots campaigns, and policy monitoring, they raise biodiversity awareness and mobilize action across society.

Local communities benefit from improved ecological resources, increased employment and income, and a better living environment. Under improved governance models, women get a greater share in decision making and thus play an increasingly important role in not only the practice of agriculture and other rural livelihoods, but also in shaping how rural life develops. The conservation and sustainable use of biodiversity not only improve the natural quality of life but also create new livelihood opportunities through green industries. This fosters strong community engagement in conservation and enhances local capacity for ecological governance.

4.4 Feedback and Contribution of Sustainable Use to Biodiversity Conservation

4.4.1 Economic Gains and Lifestyle Transformation

In the mutually reinforcing relationship between biodiversity conservation and sustainable use, increased income and the shift toward eco-friendly lifestyles support conservation and strengthen the long-term stability of biodiversity protection.

Rising incomes channel more resources into biodiversity-related efforts such as ecological restoration, protected area construction, and species monitoring. For example, from 2014 to 2024, Yongxiu County invested nearly 50 million yuan in 95 projects, restoring and improving over 4,000 mu of wetlands.[57] Simultaneously, the shift toward green agriculture, sustainable fisheries, and ecotourism has reduced environmental damage while promoting biodiversity-friendly industries. In

Pan'an County, the digital demonstration park has hosted over 5,000 visitors, trained more than 300 professionals in traditional Chinese medicine (TCM), supported over 1,000 growers and processors, expanded planting by 7,400 mu, and reached an annual market turnover of 6 billion yuan.[58] In Yongxiu's Wucheng Town, the development of a "migratory bird town" attracted private investment in birdwatching platforms and tourism facilities. Local fishers transitioned to restaurant operations, drawing over 300,000 visitors annually and boosting related sectors.[59] Economic growth encourages enterprises to collaborate with research institutions in environmental technology development, such as eco-friendly manufacturing processes and pollution control, which enhance habitat quality and ecosystem health.

Income growth and production upgrades also indirectly increase demand for eco-certified products. With rising market recognition of sustainably produced goods, more enterprises adopt green production methods, forming an economic mechanism that supports biodiversity conservation. In Zhenning, Guizhou, the honey-sweet plum exemplifies successful eco-product value transformation through its unique germplasm resources and eco-friendly cultivation, which significantly enhance its quality and brand reputation. While ordinary plums typically have a sweetness level of around 12° Brix, Zhenning's honey-sweet plums reach up to 20° Brix. This exceptional quality has helped build a strong brand: it was recognized as a National Geographical Indication (GI) Product in 2017, included in China's Agricultural Brand Catalog in 2019, ranked among Guizhou's Top 10 Regional Public Agricultural Brands in 2023, and cited as a National Biodiversity Excellence Case in 2024. Additionally, 16 producers have obtained green or organic certifications. The use of traceability anti-counterfeit codes further ensures consumer trust. This "high quality + strong brand" strategy has not only spurred industrial development but also translated into market recognition—reflected in both price and demand. Previously, local ordinary plums struggled to sell even at ¥5/jin, while the honey-sweet plum now sells for up to ¥80/jin and still remains in short supply. [42]

Compared with international practices, significant gaps persist in China's domestic implementation of these approaches. Regarding community agency and rights protection, communities in China typically serve as participants rather than resource owners or primary managers—as seen in Yongxiu County, where fishermen transitioned into catering. Their benefits rely on industrial income growth rather than institutionalized distribution, contrasting sharply with international models where communities are absolute stakeholders (e.g., 60% of carbon credit revenues in Kenyan projects directly fund community development). Meanwhile, domestic eco-product revenue streams remain heavily dependent on policy guidance—such as government investment and social capital mobilization—lacking the mature international chain of "eco-certification + brand premium + financial instruments." For instance, Mexico's Chakay lobster achieves premium pricing through ecological labelling, whereas carbon credit applications remain limited in scale domestically. Risks like market volatility and natural disasters faced by enterprises and communities predominantly rely on government safety nets (e.g., Yongxiu County's traditional insurance pilots), rather than "community-enterprise-NGO-government" actors forming a multistakeholder risk-sharing mechanism. This diverges from models like India's Aadhimalai, where enterprises bear market risks while NGOs provide seed funding.[60]

4.4.2 Knowledge, Skills, and Experience Enhancement

The promotion of biodiversity conservation and sustainable use has enhanced local knowledge,

skills, and experience, strengthening implementation of conservation and supporting ecological product development and ecotourism.

In ecological products, as local communities gain a deeper understanding of biodiversity, they can plan resource use more sustainably. Eco-friendly farming reduces chemical pollution and supports biodiversity. In Wuyishan, intercropping soybeans in summer and rapeseed in winter increased high-grade tea output by 80% and doubled the purchase price, driving the tea industry's total output value to 15 billion yuan in 2024.[52] Locally developed high-value ecological products—such as traditional Chinese medicine herbs, green foods, and natural health products—link income to high-quality ecosystem services, encouraging protective development models that both increase income and reduce biodiversity threats.

In ecotourism, improved knowledge enables communities to better manage visitor capacity, design ecological experiences, and implement restoration strategies. In Wuyuan County, nature reserves and birdwatching tourism routes attracted over 2 million visitors to Poyang Lake, engaged 3,000 local residents in the county's eco-birdwatching industry, generating an annual comprehensive revenue of 300 million yuan.[61] Skilled tourism workers now promote ecological awareness, offering lectures and restoration activities that reinforce biodiversity-friendly behaviours.

Ecotourism has also improved local livelihoods, deepening public support for conservation. In Jingdezhen's Changjiang District, villagers replaced bird nets with bird deterrents after awareness campaigns during "Bird-Loving Week," destroying 17 nets in 2023 and reducing habitat disruption.[62] Similarly, in Nanchang's Yangzi River area, former fishers became conservation volunteers after the 10-year fishing ban was promoted, contributing to the protection of Yangtze finless porpoises.[63] Working in ecotourism also builds social networks, as shown among female residents in Wulingyuan, where social relationships expanded and diversified as a result of tourist activities.**Error! Reference source not found.**

Compared with international practices, significant gaps exist in China's capacity building. Local capacity-building initiatives are predominantly short-term and project-based—such as birdwatching tourism training in Wuyuan and Jingdezhen's "Bird-Loving Week" activities, lacking the systematic 8–10+ year training programs seen internationally. For example, Peru's Posada Amazonas Lodge has conducted continuous 20-year training for community members covering end-to-end skills from operations to management. Meanwhile, domestic training focuses primarily on technical aspects (e.g., farming techniques, environmental knowledge) with insufficient development of community governance and market operation capabilities. This contrasts with international cases like Brazil's Cooperostra Oyster Cooperative, which emphasizes comprehensive skills, including cooperative management and production-marketing linkage. Furthermore, community participation domestically remains heavily reliant on policy guidance (e.g., fishermen transitioned into volunteer roles), failing to establish institutionalized integration of traditional knowledge as seen globally. Illustratively, Tanzanian communities have formally incorporated traditional pastoral knowledge into grassland management planning.[60]

4.5 Policy Recommendations

The following recommendations aim to improve China's policy and institutional framework and to create key safeguards for whole-of-society participation in the sustainable use of biodiversity

and benefit-sharing:

4.5.1 Strengthening the Support System for Social Participation

China faces challenges in building support for social participation: unclear definition of rights and responsibilities; lack of stakeholder engagement, including local communities, women and groups in vulnerable situations; poor dissemination of lessons from pilot projects; lack of capacity building for NGOs; and the need to optimize scientific cooperation. We recommend:

First, establishing a clear framework to define roles and responsibilities across different participation models, with incentive and accountability mechanisms, and ensuring full participation of all societal groups, with an emphasis on women and youth;

Second, increasing support for pilot projects through dedicated funding and policy incentives. Experiences should be disseminated through multiple channels;

Third, accelerating the development of capacity-building and evaluation systems for NGOs, promoting academia-industry-government collaboration, and enhancing their technical support in biodiversity conservation;

Fourth, leveraging digital technologies to build an integrated biodiversity monitoring and data-sharing platform that connects government, research institutions, enterprises, and civil society, thus laying a solid foundation for the whole-of-government and whole-of-society approach.

4.5.2 Innovating Incentive Mechanisms to Engage Social Actors

Current policy incentive mechanisms guiding social participation have two major issues： first, incentives for mobilizing social participation remain limited. Most rely on foundation-based funding, while small and medium-sized enterprises (SMEs) and individuals face financing difficulties and lack resilience to risk. Second, support for eco-friendly products needs to be strengthened. We suggest:

First, diversifying investment for social capital by encouraging financial institutions to develop biodiversity-related instruments such as sustainable use bonds, green credit, and ecological insurance that are accessible to a broad range of actors. Establishing risk-sharing and incentive mechanisms can better meet real-world enterprise needs;

Second, establishing supporting reward and incentive policies for eco-friendly products, including specific measures such as tax reductions and exemptions, simplified market access, and public recognition and awards. Through market-based and policy-based dual incentives, social forces will be guided to value ecological protection while pursuing economic benefits.

4.5.3 Enhancing Safeguards for Social Capital

Challenges in protecting the rights and interests of social capital include underdeveloped resource tenure systems, which pose risks of species loss for enterprises holding biological resources, and opaque guarantee mechanisms that limit corporate security and regulatory effectiveness. We recommend:

First, refining resource tenure definitions and establishing a clear registration and oversight framework that recognizes and protects the rights of all stakeholders. Clarify the rules for utilization

and conservation obligations for biological resources held by all parties, establish a system for resource ownership confirmation, registration, and supervision, and leverage third-party evaluations to ensure secure management throughout the entire life cycle of biological resources.

Second, creating an open, transparent guarantee mechanism with multistakeholder oversight and regular audits, including involvement of women and youth, to ensure protection of enterprise interests in ecotourism and other projects, reduce risk, and encourage sustained social capital engagement.

V: Policy Recommendations

The following overarching policy recommendations come from the report; more detailed recommendations are contained in each section.

1. Strengthen scientific and technological support for biodiversity by launching a National Major Science and Technology Project on Biodiversity Conservation based on the 'Unity of Nature and Man', and accelerate the formation of an integrated 'Unity of Nature and Man' governance framework.

Carry out scientific research on multidimensional biodiversity monitoring and assessment, sustainable and equitable use of biological resources, and options to enhance the resilience of biodiversity to adapt to and mitigate climate change, so as to: (i) provide theoretical, data and modeling support for biodiversity conservation that promotes the harmonious coexistence of humans and nature, (ii) continue to push for the effective implementation of the Kunming-Montreal Global Biodiversity Framework（KMGBF), and (iii) support the establishment of a new scientific data-driven system of global environmental governance.

2. Announce the Ecological Conservation Redline (ECR) delineation results as China's contribution to the KMGBF, including the 30x30 Target; and promote the ECR model extensively to the global community, demonstrating China's image as a major country, serving global biodiversity conservation responsibly.

ECRs represent a new model and pathway pioneered by China, widely recognized by the international community as beneficial for achieving the global 30x30 KMGBF target. They offer unique advantages for biodiversity conservation, including expanding protected area coverage, increasing species' protection rates, and enhancing habitat connectivity, while also creating opportunities to support local communities, safeguard livelihoods, and ensure fair participation in conservation planning. As such, China should formally announce its ECR delineation results to the world as its contribution to targets 1 and 3 of the KMGBF. This action demonstrates China's leadership and exemplary role in implementing the KMGBF, showcasing its image as a responsible country. Meanwhile, aiming to align with international standards and the KMGBF goals, China will further optimize and refine its ECR system. It will actively promote cooperation globally, with a particular focus on Belt and Road countries, highlighting the contribution of the ECR model and its potential application and adaptation to differing national systems and conditions. It is recommended to establish an International ECR Promotion Expert Group, led by CCICED and comprised of multidisciplinary experts.

3. **Adopt Nature-based Synergistic Solutions on Biodiversity and Climate Change to Realize the National Contributions Identified in the Paris Agreement and the KMGBF.**

Integrate biodiversity and climate change solutions in line with the concept of "Unity of Nature and Man" by adopting and scaling up measures that provide cost-effective climate mitigation options while enhancing climate resilience and biodiversity co-benefits. Priority should be given to high-potential, cost-effective NbS/NCS—such as sustainable forest management, farmland nutrient management, and grassland and peatland conservation—to synergistically tackle climate change and biodiversity loss.

4. **Promote the establishment of a mechanism and agency to synergize exchange and collaboration for China's biodiversity-related multi-conventions.**

Based on China's "National Biodiversity Coordination Mechanism," establish a communication mechanism for China's biodiversity-related national focal points of multiple conventions to promote exchanges and collaboration among the national focal points of multiple conventions, including CBD, UNFCCC, UNCCD, CITES, RAMSAR, etc., and to realize mutual support to cross-cutting issues, sharing of information and data on related issues, and sharing of reports on convention compliance.

5. Build a synergized conservation mechanism that relates to the Whole-of-Government and Whole-of-Society approach, and strengthen Government-led public conservation engagement and the sustainable use of biodiversity.

Construct a government-led, multi-stakeholder biodiversity conservation system with clear incentives, rights, and responsibilities. Support community-based sustainable use models by ensuring fair benefit-sharing and decision-making power to align ecological protection with community livelihoods. Strengthen market competitiveness of eco-products through coordinated policy and technical support, while diversifying funding sources to enhance long-term resilience of conservation initiatives.

Appendix 1: Existing Chinese Protected Area Types

Nature Reserves

Nature reserves refer to areas of land, inland water bodies, or marine environments that are legally designated and managed to protect representative natural ecosystems, the natural habitats of rare and endangered wildlife, and significant natural relics.

Over the past 60 years, the CPC Central Committee, the State Council, and local governments at all levels, along with relevant departments, have attached great importance to the conservation and sustainable use of the natural environment and resources. A large number of nature reserves have been designated as emergency conservation measures.

China's nature reserve system has evolved from scratch, growing in size and complexity, from a single-purpose to a comprehensive protection framework. A relatively well-distributed and complete classification system has gradually taken shape. By the end of 2017 (prior to institutional reforms), China had established a total of 2,750 nature reserves of various types and administrative levels, covering an area of 1.4717 million km². Among them, 463 were national-level nature reserves, with a total area of 974,500 km², accounting for 66.2% of the total area of all protected areas nationwide.

Statistical data show that Guangdong Province has the highest number of nature reserves, with a total of 384. In terms of area, the Tibet Autonomous Region ranks first, with nature reserves covering 41.37 million hectares.

National Parks

To date, over 100 countries around the world have established nearly 10,000 national parks, though their definitions and criteria vary significantly across jurisdictions. In China, national parks refer to specific terrestrial or marine areas approved and managed by the central government, with clearly demarcated boundaries. These areas are designated primarily for the protection of large-scale, nationally representative natural ecosystems and aim to ensure the scientific conservation and rational utilization of natural resources.

The initiative to establish a national park system was first proposed at the Third Plenary Session of the 18th CPC Central Committee in 2013 and was subsequently identified as a key priority in the comprehensive deepening of reforms. This marked the formal launch of a uniquely Chinese national park system. In 2017, the General Office of the CPC Central Committee and the General Office of the State Council jointly issued the Overall Plan for Establishing a National Park System, which emphasized three fundamental principles: ecological conservation as the top priority, national representativeness, and universal public benefit.

In October 2021, during his keynote speech at the Leaders' Summit of the 15th Meeting of the Conference of the Parties (COP15) to the Convention on Biological Diversity, President Xi Jinping officially announced the establishment of China's first five national parks—Sanjiangyuan, Giant Panda, Northeast China Tiger and Leopard, Hainan Tropical Rainforest, and Wuyishan—collectively covering a total protected area of 230,000 square kilometres. These parks encompass nearly 30% of all nationally protected terrestrial wildlife species.

In 2022, the National Park Spatial Planning Scheme was released, setting out a detailed timetable and roadmap for the further development of the national park system. Building on the

foundation of the initial five parks, 49 candidate national park sites have been identified across the country, including the already-designated parks. Of these, 44 are terrestrial, 2 integrate both land and sea, and 3 are marine areas, collectively covering approximately 1.1 million square kilometres—around 10.3% of China's land territory, with 990,000 km² of land area and 110,000 km² of marine area.

According to the National Park Spatial Planning Scheme, by 2035, China aims to establish the world's largest national park system.

Nature Parks

In China, nature parks refer to areas that protect important natural ecosystems, natural relics, and scenic landscapes of ecological, aesthetic, cultural, and scientific value. These areas are designated for sustainable use and aim to ensure the effective protection of critical natural resources—including forests, oceans, wetlands, water bodies, glaciers, grasslands, and biodiversity—as well as their associated landscapes, geological formations, and cultural diversity. The category of nature parks includes various forms such as scenic areas, forest parks, geological parks, marine parks, and wetland parks.

Appendix 2: Details of Coverage of Animal and Plant Species in ECR

Analysis of the Role of Ecological Conservation Redlines in Biodiversity Protection

ECRs encompass 3.04 million km^2 or 31.7% of China's land area and 150,000 km^2 or about 5% of marine areas. Their coverage of protected wild species has been assessed using data from the Global Biodiversity Information Facility, scientific literature, and field surveys:

(1) Coverage of National Key Protected Wild Species, as shown in Table 1, ECRs provide coverage for 615 species of nationally protected wild plants, including 80.60% of all such species. This includes 66 species listed under Class I protection and 549 species under Class II.

For wild animals, ECRs cover 586 species, representing about 92.86% of all national key protected wild animal species; 183 are under Class I protection and 403 under Class II.

Table 1. Coverage of national key protected wild species by ECRs

Category	Total Species (Coverage %)	Class I Species (Coverage %)	Class II Species (Coverage %)
National Protected wild animals	586 (92.86%)	183 (94.81%)	403 (92.00%)
National protected wild plants	615 (80.60%)	66 (74.15%)	549 (81.45%)

Classification Analysis of Protected Plant and Animal Species

Among the nationally protected wild plants covered by ECR,s higher plants account for 99.50% (612 species), with angiosperms representing the largest proportion (Figure 4), among the protected plant groups, gymnosperms, ferns, and lycophytes follow angiosperms in quantity, while bryophytes are the least represented in number but have the highest protection ratio. ECRs cover all five species of bryophytes listed in the national plant inventory, giving bryophytes a 100% coverage rate. Gymnosperms follow with a coverage rate of 86.48%, while lycophytes and angiosperms are covered at rates of 81.08% and 79.90% respectively. Ferns have the lowest protection rate at 71.11%.

At the family level, Orchidaceae has a significantly higher relative protection rate than other families, accounting for approximately 19.67% of all protected species. Fabaceae, Lycopodiaceae, and Liliaceae follow, accounting for approximately 5.37%, 4.39%, and 4.07%, respectively. Three families have a relative protection rate between 3% and 4%, 14 families fall between 2% and 3%, while the majority—97 plant families—have a relative protection rate of less than 1%.

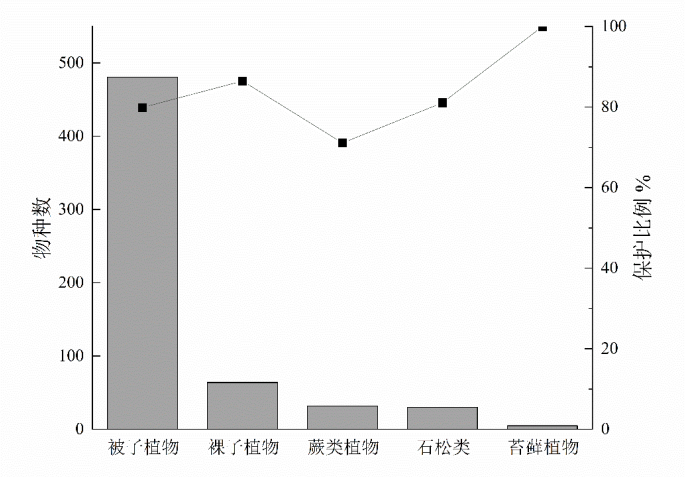

Figure 4. Number and proportion of plant groups protected within Ecological Conservation Redlines

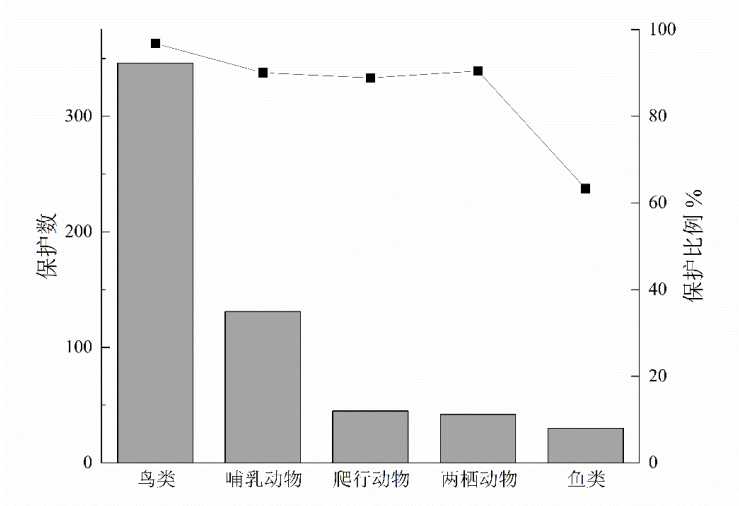

Figure 5. Number and proportion of animal groups protected within Ecological Conservation Redlines

In terms of the protection of nationally protected wild animals within ECRs, vertebrates account for 93.85% (550 species) of the total. Among these, birds make up the largest share, followed by mammals, reptiles, and amphibians, with fish being the least represented. Birds also have the highest protection rate at 96%, while mammals, reptiles, and amphibians show relatively similar protection rates at 90.07%, 88.88%, and 90.47% respectively. Fish have the lowest protection rate, only 63.33%. This may be attributed to the migratory nature and high mobility of many bird species, which makes them easier to observe and document. In contrast, aquatic areas are limited within terrestrial ECR zones, resulting in fewer fish species and lower protection coverage.

Protection Coverage of Rare and Endangered Species. For plant species, ECRs protect approximately 70.45% of rare and endangered nationally protected wild plants (see Table 2). This includes about 41.53% of Critically Endangered (CR) species, 55.64% of Endangered (EN) species, and 71.48% of Vulnerable (VU) species. A total of 207 species are endemic to China, such as Abies beshanzuensis, Ginkgo biloba, and Cypripedium macranthos, accounting for approximately 52.40% of all listed endemic protected wild plant species.

Table 2. Coverage of nationally protected endangered plant species by ECR

Plant category	Number of species protected in ECR (% of category total)
Critically Endangered (CR)	54 (41.53%)
Endangered (EN)	133 (55.64%)
Vulnerable (VU)	173 (71.48%)
Endemic Species	207 (52.40%)
Total Plant Species in ECRs	615 (80.60%)

For animal species, ECRs cover approximately 93.83% of rare and endangered nationally protected wild animals (see Table 3). Specifically, they protect about 96.66% of CR species, 89.36% of EN species, and 95.16% of VU species. A total of 104 endemic animal species are covered—such as the *Syrmaticus humiae, Rhinopithecus roxellana,* and *Ailuropoda melanoleuca*—accounting for 94.54% of all listed endemic protected wild animal species.

Table 3. Coverage of nationally protected endangered animal species by ECR

Animal category	Number of species protected in ECR (% of category total)
Critically Endangered (CR)	87 (96.66%)
Endangered (EN)	84 (89.36%)
Vulnerable (VU)	118 (95.16%)
Endemic Species	104 (94.54%)
Total Animal Species in ECR	586 (92.86%)

In summary, ECRs cover key areas for biodiversity across the country, including representatives of the vast majority of rare and endangered species and their habitats. As a result, over 70% of endangered plants, more than 50% of endemic plants, and over 90% of endangered and endemic animals are effectively conserved, thereby reducing the risk of biodiversity loss and helping to maintain ecosystem stability.

Appendix 3: Mainstreaming Biodiversity Conservation Into National Policy in China

Strengthening High-Level Institutional Design for Biodiversity Conservation

Biodiversity conservation has been elevated to a national strategy and integrated into long-term development plans at regional and sectoral levels. In 2010, the State Council approved the "China Biodiversity Conservation Strategy and Action Plan (2011–2030)," which identified 35 priority areas, 10 key sectors, and 30 priority actions. Since the 18th National Congress of the Communist Party of China, progress has been made in areas such as legislation, in situ and ex-situ conservation, ecological restoration, law enforcement, and international cooperation, forming a uniquely Chinese approach to biodiversity protection. In 2021, the General Offices of the CPC Central Committee and the State Council issued the "Opinions on Further Strengthening Biodiversity Conservation," calling for accelerated legal development, improved policies, a performance assessment system, and accountability mechanisms. The 20th CPC National Congress further emphasized that Chinese modernization must feature harmony between humans and nature, setting strategic goals to enhance ecosystem diversity, stability, and sustainability. The "14th Five-Year Plan and 2035 Long-Term Goals" also identified major biodiversity projects and the establishment of biodiversity networks as key tasks.

Implementing Major Biodiversity Conservation Projects

In 2015, the State Council approved the "Major Biodiversity Conservation Project Plan (2015–2020)," led by the Ministry of Ecology and Environment with active participation from local governments, forming a national-local joint conservation framework. The 20th CPC Congress reiterated the importance of such projects. In response, the Ministry has drafted the "Major Biodiversity Conservation Project Plan (2023–2030)," aiming to enhance capacity and coordination, which is currently under review. In addition, the National Development and Reform Commission and the Ministry of Natural Resources issued the "National Master Plan for Major Projects on Key Ecosystem Protection and Restoration (2021–2035)," laying out nine major projects and 47 specific tasks. Special plans for each major project have followed. The National Forestry and Grassland Administration has also drafted the "Construction Plan for National Parks and Major Projects for Wildlife Protection (2021–2035)," which includes improvements to protected area infrastructure and the monitoring of wildlife epidemics. Since the 14th Five-Year Plan period, over 1.7 billion RMB in central funding has been allocated to strengthen protected area infrastructure and improve habitats and management capabilities.

Enhancing the Legal Framework for Biodiversity Conservation

In 2018, China amended its Constitution to include ecological civilization. Key laws such as the Environmental Protection Law, Wildlife Protection Law, Forest Law, and Wetland Protection Law all prioritize biodiversity and ecological balance. Over the past decade, more than 20 biodiversity-related laws have been enacted or revised, including the Biosecurity Law and laws on genetic resource access and benefit-sharing. These laws cover critical aspects such as ecosystem and wildlife protection, regulation of genetic resources, prevention of invasive species, and biosecurity. Many provinces have also enacted their own local regulations tailored to regional contexts. In 2024, China released the "China Biodiversity Conservation Strategy and Action Plan (2023–2030)," identifying protection and restoration of key ecological areas as a major response to biodiversity

loss. The plan is both a core tool for fulfilling the CBD and a national action road map for implementing the Kunming-Montreal Framework. Public awareness and involvement in biodiversity conservation have been significantly enhanced, and the concept that “lucid waters and lush mountains are invaluable assets” has become a widely accepted social consensus, reflecting a distinctively Chinese path to biodiversity conservation.

Appendix 4: Steps Toward Integration of Climate and Biodiversity Agendas

Peru

• Background: Peru is grappling with the dual challenges of climate change and biodiversity loss, with its forest ecosystems and the lifestyle of Indigenous Peoples under threat.

• Actions Taken: Peru has approved the National Adaptation Plan (NAP) 2021-2030, prioritizing forest conservation and highlighting the role of forests as carbon sinks and for biodiversity protection. Through the National Forest Conservation Program and the Indigenous Peoples Platform for Climate Change (IPPCC), Peru is collaborating directly with Indigenous Peoples to protect and monitor forest ecosystems, incorporating their knowledge and practices.

• Key Insights: An inclusive and participatory approach is crucial for ensuring the long-term sustainability of synergistic actions. Recognizing the rights and knowledge of Indigenous Peoples can lead to more effective achievement of biodiversity and climate change adaptation goals.

Rwanda

• Background: Rwanda is committed to implementing the three Rio Conventions and faces challenges related to climate change and biodiversity loss.

• Actions Taken: Since 2006, Rwanda has been evaluating the links between climate change adaptation and biodiversity conservation. It submitted its second NBSAP in 2016 and established the Rwanda Green Fund (FONERWA) to mobilize resources for biodiversity and climate actions.

• Key Insights: Integrated financing mechanisms and cross-sectoral coordination are vital for the effective implementation of biodiversity and climate policies.

Fiji

• Background: As one of the first countries to prepare a NAP and update its NBSAP, Fiji is addressing challenges related to climate change and biodiversity loss.

• Actions Taken: Fiji's NAP incorporates ecosystem-based adaptation (EbA) as a key approach and includes biodiversity in its vulnerability and risk assessments. Through the Pacific Ecosystem-Based Adaptation to Climate Change project (PEBACC), Fiji identifies and evaluates EbA options.

• Key Insights: Actively linking biodiversity and climate adaptation planning and adopting a synergistic approach using EbA can effectively address climate change and biodiversity loss.

Costa Rica

• Background: With rich biodiversity and forest resources, Costa Rica faces threats from climate change and deforestation.

• Actions Taken: Through the national payment for forest protection program, Costa Rica combines measures such as sustainable chestnut harvesting, fish farming, and eco-tourism to protect forest ecosystems and enhance community adaptation.

• Key Insights: Integrated conservation strategies combined with diverse sustainable livelihood measures can effectively protect forest resources and enhance community adaptation capacity.

Senegal

• Background: Senegal's coastal ecosystems are threatened by climate change and human activities.

• Actions Taken: The Medmerry Managed Realignment Scheme has been implemented to protect and restore coastal wetland ecosystems through measures such as restoring natural coastal vegetation and building new flood defences.

• Key Insights: Nature-based solutions (NbS) can serve as an alternative to traditional gray infrastructure, providing multiple ecological and social benefits.

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