
**China Council for International Cooperation on Environment and Development (CCICED)**

# Green Development Cooperation

## CCICED Special Policy Study Report

**CCICED**

**October 2025**

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# Executive Summary

The triple planetary crisis of climate change, biodiversity loss, and environmental pollution is becoming increasingly severe, while the implementation of the United Nations 2030 Agenda for Sustainable Development continues to lag behind. Global climate governance has entered a critical stage, and the importance and urgency of strengthening international cooperation on green development are more evident than ever. Meanwhile, the world is undergoing profound transformations unseen in a century. Global, epochal, and historical changes are overlapping with "unprecedented uncertainties." The increase in unilateralism and protectionism, coupled with sluggish global economic recovery and a widening global governance deficit, has added layers of complexity and uncertainty to global environmental and climate governance. The collective rise of the Global South has reshaped the landscape of global governance. The Global South is shifting from a passive participant to a key driver in global governance, and the international community now has new expectations for China's role in advancing international cooperation on green development.

This year marks the 80th anniversary of the founding of the United Nations, as well as the conclusion of China's 14th Five-Year Plan, and the launch of the 15th Five-Year Plan. In the face of an increasingly complex and evolving international landscape, it is of particular importance to engage in forward-looking reflection and comprehensive planning on international cooperation on green development, and to propose systematic approaches for its advancement. To this end, this study systematically reviews the evolution of international cooperation on green development, identifies and analyzes its current priority areas, and summarizes typical practices and cooperation models under multilateral and bilateral frameworks. Building upon this foundation, and in view of emerging opportunities and challenges, this study explores China's new role and positioning in the field of green development, as well as new models and pathways for cooperation with countries of the Global South. Finally, this study presents policy recommendations and concrete measures for China to promote global green development during the 15th Five-Year Plan period.

## Main Findings

I. **Since green development was first incorporated into the United Nations agenda in 1972, international cooperation on green development has gone through five main stages: emergence, rapid expansion, deep adjustment, vigorous growth, and a stage characterized by both opportunities and challenges.** Although the current global landscape faces the dual challenges of a leadership deficit and increasing uncertainty, and despite the withdrawal of some

countries from the Paris Agreement, advancing green development remains an irreversible trend. Global demand for green development continues to grow, and international cooperation plays an irreplaceable role in meeting this demand. Guided by the vision of a community with a shared future for mankind, China has proposed a series of global initiatives and public goods, including the Global Development Initiative, the Global Security Initiative, the Global Civilization Initiative, and the Global Governance Initiative. China has consistently positioned itself as a leader in multilateral processes, a provider of green technologies, a contributor to South–South cooperation, and a practitioner of environmental responsibility. China's achievements in green development have broadened the space for deepening international cooperation on green development.

II. **At present, international cooperation on green development is converging around five focal areas: climate change and the energy transition, biodiversity conservation, green trade, industrial innovation, and green finance. Scientific and technological innovation, as well as digital economy cooperation, are injecting new momentum into green international cooperation.** Addressing climate change and advancing the energy transition remain the mainstream policy direction of the international community. The Kunming–Montreal Global Biodiversity Framework has ushered in a new era of global biodiversity conservation, calling on governments to strengthen multidimensional cooperation. The green transformation of global value chains is at a critical juncture. However, green trade still faces governance challenges, such as the difficulty of policy coordination, intensifying competition over key technologies, and the continued fermentation of geopolitical tensions. Global green industries and technological innovation are forming a multidimensional and integrated landscape of cooperation. Green finance has become an important driver of economic transformation and now faces multiple opportunities, including strengthened policy support and top-level design, surging market demand, and continuous advances in technology iteration and policy innovation.

III. **International mechanisms represented by the multilateral environmental agreements under the United Nations remain the main platforms for advancing international cooperation on green development. North–South cooperation continues to play an important role in providing financial support, technology transfer, and experience sharing. With the rapid rise of the Global South, the importance of South–South cooperation is growing. China has played a prominent role in providing international public goods, and its cooperative practices with countries, including Brazil, Malaysia, and many in Africa, have provided valuable demonstrations for steering South–South cooperation toward green and sustainable development, producing replicable and scalable models.** China–ASEAN cooperation stands out as an exemplary model of South–South cooperation on green development. By combining China's comparative advantages in green technologies with

ASEAN's resource endowments, a synergistic effect of "1+1>2" has been achieved. China and Brazil have also made solid progress in aligning the Belt and Road Initiative with Brazil's major development strategies, including the Growth Acceleration Program, the New Industry Brazil, the Ecological Transformation Plan, and the South American Integration Routes project.

IV. **Innovative pathways for international cooperation on green development are thriving. South–South cooperation is increasingly characterized by diversified features, such as technology transfer, knowledge sharing, joint financing, and coordination along green industrial chains. China's cooperation with Brazil, Indonesia, and the Vulnerable Twenty (V20) Group faces new opportunities and challenges.** China and Brazil are strengthening their partnership to build a China–Brazil community with a shared future for a fairer world and a more sustainable planet. Brazil has emphasized expanding this effort into a "transformational partnership" to advance cooperation in regenerative agriculture and sustainable trade. China and Indonesia could establish an energy transition mechanism, share China's experience in developing green industrial parks, and support Indonesia in building a domestic supply chain for clean technology manufacturing. In Pakistan, China could initiate a pilot cooperation program with the V20 to formulate systematic transition plans that address both climate risks and financing barriers, thereby helping V20 members achieve their green development goals.

## Main Policy Recommendations

I. Propose the Global Green Development Initiative and build a new framework for international cooperation in the green and low-carbon sector. During the 15th Five-Year Plan period, China should remain steadfast in its strategic pursuit of a green and low-carbon transition and adopt a more proactive posture in advancing the establishment of a fair, inclusive, and open international cooperation architecture for green development. Supported by green technologies, such as photovoltaics and wind power, efforts should be made to foster a cooperation landscape characterized by technology sharing, unimpeded capital flows, and coordinated capacity development. Working jointly with the European Union, ASEAN, and Belt and Road partner countries, China should promote institutional openness, industrial collaboration, and technological cooperation, as well as deepen innovation in cooperation models for green development.

II. **Establish a special fund for international cooperation in green development to support South–South cooperation on green development.** Based on multilateral financial frameworks and fiscal and tax policy tools, efforts should be made to mobilize the international

community to jointly build a stable and dedicated financial support mechanism for international cooperation on green development. It is recommended to establish an interministerial coordination mechanism involving the Ministry of Foreign Affairs, National Development and Reform Commission, Ministry of Finance, Ministry of Commerce, Ministry of Ecology and Environment, Ministry of Industry and Information Technology, and the China International Development and Cooperation Agency, among others, to coordinate China's international cooperation on investment, finance, trade, and supply chains in the field of green development, and jointly support developing countries in achieving green transitions.

III. **Strengthen the synergy between multilateral mechanisms and regional cooperation to unlock new drivers for green growth.** Establish a collaborative mechanism involving governments, think tanks, enterprises, and international organizations, forming a cooperation framework characterized by government guidance, think tank support, enterprise participation, and international organization coordination. Through the dual engines of "mechanism linkage + regional coordination," strengthen multilateral cooperation. By jointly developing low-carbon industrial parks, localizing technologies, and providing financing support, promote the formation of a sustainable model of green development cooperation between China and developing countries. Transform China's experience into replicable solutions for sustainable development in the Global South and build a systematic and coordinated paradigm for international cooperation.

IV. **Build a professional talent pool for international cooperation on ecology and environment, with an emphasis on gender equality.** Through diversified approaches, such as cross-border training, joint research, and talent exchange, provide sustainable intellectual support and human resources for international cooperation on green development. By leveraging platforms, such as jointly established laboratories and international scientific organizations, promote joint research and the enhancement of professional skills. At the same time, encourage female professionals to actively participate in international rulemaking and dialogues on environmental governance, and support them in leadership roles in key areas, such as sustainable development and green innovation.

## Eight Specific Measures

**1. Support green and low-carbon transition in the Global South through demonstration effects of green technologies.** The importance of clean technologies in international cooperation on green development is becoming increasingly evident, and a new model of technology-driven

cooperation is taking shape. Against the backdrop of intensifying global competition in green technologies, China not only needs to maintain its own technological innovation and industrial upgrading but should also, through technology exchange and transfer, help other countries—especially developing countries—achieve green transition. China can carry out in-depth cooperation with Global South countries in key areas, such as sustainable transportation and renewable energy, and play an important role in supporting and guiding such cooperation through green investment and financing.

**2. Give full play to market forces and strengthen alignment with the development plans of other developing countries.** By leveraging the cost advantages of renewable energy technologies, large-scale capital investment should be encouraged. Taking into account updated nationally determined contributions (NDCs) of various countries, China should jointly develop green and low-carbon projects in infrastructure sectors, such as railways, high-speed rail, and power. Through green trade connectivity, efforts should be made to achieve zero-tariff reciprocal trade in new energy products and facilitate exchanges of green technologies, such as new energy vehicles. Through financial market connectivity, promote the synergistic development of green finance and the internationalization of the renminbi. Through the alignment of green standards, jointly establish unified standard systems for sustainable agricultural products and sustainable marine resource utilization.

**3. Explore the development of an intelligent search engine for ecology and environment, and build an AI-driven green transition model.** Promote international cooperation in ecological and environmental protection based on artificial intelligence technologies by developing a professional and highly customizable search engine system for the ecology and environment sector. By building an AI-based intelligent recommendation system for green development policies, tailor-made green development solutions can be designed for developing countries, taking into account their local languages, cultures, and ecological characteristics. This will help optimize scientific decision-making mechanisms, enhance global collaborative environmental governance, and achieve precise and efficient cooperation.

**4. Promote synergistic integration of digital intelligence and green development, and establish a mechanism for coordinated advancement in technology, energy, and policy.** Give full play to the guiding role of national strategies and use digital technologies, such as artificial intelligence, to empower the low-carbon transition of the energy sector. Emphasis should be placed on strengthening intelligent infrastructure construction and the supply of high-quality data elements. Establish a regular coordinated governance framework to enhance the institutional linkage between digital governance and climate governance and develop cross-sectoral incentive

mechanisms to ensure fairness, effectiveness, and sustainability in the application of AI technologies for carbon reduction. Build intelligent urban energy systems.

**5. Foster transformative partnerships with emerging economies to address critical development gaps.** Move beyond commodity-based trade to foster collaboration on sustainable land use, regenerative agriculture, and climate-resilient supply chains. Establish bilateral green investment platforms to expand long-term financing in sectors, such as clean energy, agroforestry, and resilient infrastructure, while leveraging public development banks to catalyze private investment.

**6. Support energy transition mechanisms in fossil fuel-dependent economies.** Provide transition support for existing fossil fuel assets through on-site renewables, green industrial parks, and enhanced technology transfer. Strengthen financing via joint investment frameworks with sovereign funds, greater roles for development banks, and blended schemes that combine concessional and commercial resources. Mobilize instruments, such as green and transition bonds, to reduce risks, attract investors, and accelerate clean energy deployment and supply chain development. Establish a coordination mechanism for maritime cooperation, protect marine ecosystem, and promote the sustainable development of the blue economy.

**7. Deepen partnerships with climate-vulnerable nations to achieve sustainable prosperity.** Work with members of the Climate Vulnerable Forum and V20 to support the implementation of Climate Prosperity Plans, transforming climate risks into bankable opportunities. Provide targeted support for project preparation, investment, and financing to help vulnerable countries break the climate–debt cycle and achieve sustainable prosperity.

**8. Address financing bottlenecks in project preparation and provide funding support for early-stage design.** Establish a green prefeasibility study facility, piloted with national development banks, to finance early-stage project design and expand the pool of viable green projects. Explore diversified revenue mechanisms, particularly by charging a proportional "success fee" upon project closure to recover early development costs and reinvest them into the fund to ensure its sustainable operation. Strengthen partnerships with host-country banks to integrate international capital access with local knowledge and implementation capacity.

**Key words：** New Framework for International Cooperation on Green Development, Sustainable Transition, Synergy Mechanism, Innovative Models, 15th Five-Year Plan

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# Chapter 1. Review of International Cooperation on Green Development

The current international landscape is marked by intertwined turbulence, rising global uncertainty, and deepening governance deficits. The triple planetary crisis of climate change, biodiversity loss, and environmental pollution continues to worsen, while the implementation of the United Nations 2030 Agenda for Sustainable Development has fallen seriously behind schedule. Against this backdrop, it is imperative to systematically review the historical trajectory of international cooperation on green development and to clarify the direction of cooperation under new circumstances. This chapter, drawing on emerging artificial intelligence (AI) technologies, systematically reviews the evolution and contextual conditions of global cooperation on green development, analyzes the opportunities and challenges currently facing such cooperation, assesses prospects, and explores China's role and positioning in this domain. It further elaborates on the contributions China can make in advancing international cooperation on green development, thereby laying the foundation for subsequent chapters.

## 1.1 Background of Global Cooperation on Green Development

### 1.1.1 Definition of Green Development

Green development refers to a model of growth that accords with nature and fosters harmony between humanity and nature. It is development that secures maximum economic and social benefits at the lowest possible cost to resources and the environment, representing high-quality and sustainable growth. Today, green development has become both the core theoretical guidance and a key action framework for China's high-quality growth and the building of Chinese modernization. Green development is closely aligned with sustainable development, as both are committed to fundamentally transforming traditional models of development in pursuit of innovative pathways. Compared with sustainable development, however, green development places stronger emphasis on the principle of ecological priority. Its essence lies in achieving the organic integration of green, low-carbon, and circular approaches. By advancing carbon reduction, pollution control, ecological restoration, and economic growth in a coordinated manner, it seeks to accelerate the comprehensive green transformation of economic and social development. In sum, green development is far from a partial adjustment in a single sector; rather, it represents a comprehensive and revolutionary transformation encompassing production methods, lifestyles, ways of thinking, and value systems, carrying irreplaceable and far-reaching significance for the sustainable development of the global economy and society.

### 1.1.2 Background of International Cooperation on Green Development

**First, the increasingly severe environmental crisis underscores the urgency of strengthening international cooperation on green development.** For decades, unsustainable production and consumption patterns—marked by the over-exploitation of natural resources, surging emissions, and rampant waste—have driven Earth's carrying capacity and ecological boundaries to their limits. Traditional development pathways are no longer viable. The United Nations' 2023 report *Making Peace with Nature* warned the international community that climate change, biodiversity loss, and pollution together constitute a triple planetary crisis, gravely threatening the well-being of present and future generations. In this context, vigorously advancing

green development, deepening international cooperation, and achieving harmony between humanity and nature have become the only viable choices and the pressing task before humanity in its pursuit of survival and progress.

**Second, the imbalance and inequality in current global development highlight the necessity of strengthening such cooperation.** While globalization has fuelled rapid expansion in the world economy and international trade, it has failed to narrow the gap between rich and poor countries; rather, disparities have continued to widen. The 2024 report of the International Resource Panel revealed that high-income countries consume resources at six times the per capita level of low-income countries and contribute up to 10 times as much to climate impacts. Inequalities are also pronounced within countries. Women, for instance, disproportionately bear the burdens of climate change and environmental degradation, yet face structural barriers in accessing resources and participating in decision making. The persistence of widening gaps, both internationally and domestically, poses severe challenges to sustainable development. To fundamentally reverse this trend, the international community must strengthen cooperation by advancing green development, providing adequate green finance, ensuring that developing countries—especially the least developed—have equitable access to and use of the best available technologies, and guaranteeing their full participation in global environmental governance and in decision making on the green transition.

**Third, the rapid advancement of digital intelligence and green technologies demonstrates the feasibility of strengthening international cooperation.** With artificial intelligence representing the wave of digital innovation, and renewable energy symbolizing the momentum of green technologies, both fields are advancing at remarkable speed. Their integration will significantly empower international cooperation on green development, injecting strong momentum and opening vast new avenues for collaboration.

## 1.2 The Course of Global Cooperation and South–South Cooperation

The history of international cooperation on green development can be traced back to the 1972 United Nations Conference on the Human Environment. Since then, the trajectory of such cooperation can be broadly divided into five stages. Overall, international cooperation on green development has always advanced through twists and turns, yet it has demonstrated remarkable resilience and vitality.

**First stage (1970s–1980s): The initial rise of international cooperation on green development.** The 1972 United Nations Conference on the Human Environment marked the official beginning of international cooperation in this field. Following the release of the *Our Common Future* report in 1987, the concept of sustainable development began to exert a profound influence on the direction and trajectory of cooperation. During this period, international collaboration on protecting the ozone layer made significant progress, becoming a landmark achievement.

**Second stage (1990s–early 2000s): A period of rapid expansion.** Following the Cold War, the growing prominence of environmental degradation, coupled with the accelerating pace of globalization, prompted countries to formulate sustainable development strategies, propelling green development cooperation into a phase of rapid growth.

**Third stage (2008–2014): A phase of deep adjustment.** Severely impacted by the 2008 global financial crisis and the setback of the 2009 Copenhagen Climate Change Conference,

international cooperation on green development encountered temporary difficulties and challenges. In this context, mounting pressures for global transformation brought unprecedented attention to the concepts of green economy and green recovery, which emerged as important pathways for overcoming the crisis and allowed cooperation to continue evolving amid adjustment.

**Fourth stage (2015–2020): A new era of vigorous development.** The year 2015 stands as a historic milestone for international cooperation on green development. That year, the United Nations Sustainable Development Summit adopted the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda, and the Paris Agreement. These landmark outcomes collectively ushered in a new phase of vigorous growth in international cooperation.

**Fifth stage (2020s–present): A stage of opportunities and challenges.** Today, rising uncertainty and instability in the world, coupled with mounting pressures from geopolitics, economic trends, and ecological deterioration, pose major challenges to green development cooperation. At this crossroads, the future of international cooperation on green development depends on the wise choices of all countries to sustain and deepen collaboration.

## 1.3 Challenges and Opportunities in International Cooperation on Green Development

### 1.3.1. Overall Situation

At present, international cooperation on green development presents a complex landscape of both challenges and opportunities. Specifically, under the combined influence of multiple factors, **the challenges are manifested in the following aspects:**

**First, uncertainty has grown amid profound changes in the international landscape.** De-globalization is gaining ground, with unilateralism and protectionism on the rise, undermining the very notion of green multilateral cooperation. A momentous transformation of the world is accelerating, pushing international relations into a critical stage of major-power competition. Changes in the world, in our era, and in history, are unfolding in unprecedented ways, creating new uncertainties for advancing international cooperation on green development from shared vision to concrete action. This trend is especially evident in the field of trade. Since 2016, global import restriction measures have risen by 75%, roughly 10 times the number in 2008[1]. Since early 2025, many countries have adopted countermeasures in response to substantial tariff hikes by certain countries, leading to a surge in import restrictions and further deterioration of the global trade environment. This wave of protectionism has not only hindered the free flow of goods and technology but has also exerted a profound impact on global green industrial and supply chains.

**Second, weak global economic recovery is undermining the foundation for cooperation.** The world economy faces persistent uncertainty, and insufficient growth momentum directly undermines countries' willingness and capacity to engage in such cooperation. According to the International Monetary Fund (IMF), the forecast for global economic growth in 2025 has declined from 3.3% to 2.8%, with growth expected to remain sluggish over the next 2 years. This weaker outlook and lack of economic dynamism have further eroded political will to participate in global environmental governance[2]. Meanwhile, global challenges—including climate change, food, and energy crises, public health risks, and the digital divide—are becoming increasingly complex, with

countries divided in their positions, priorities, and interests, making it difficult to forge a shared agenda for action.

**Third, escalating geopolitical conflicts have deepened the trust deficit in international cooperation on green development.** The increase in global conflicts means that efforts to mitigate climate change may face greater obstacles[3]. In recent years, frequent regional conflicts have further intensified geopolitical tensions, widening the trust gap among countries, especially among major powers. The spillover effects of this tense geopolitical landscape have weighed heavily on the field of green development cooperation, leading to declines in resource allocation, financial support, and political attention. The World Economic Forum's *Global Risks Report 2025* lists armed conflict and extreme climate events as the top two global risk factors (Figure 1).

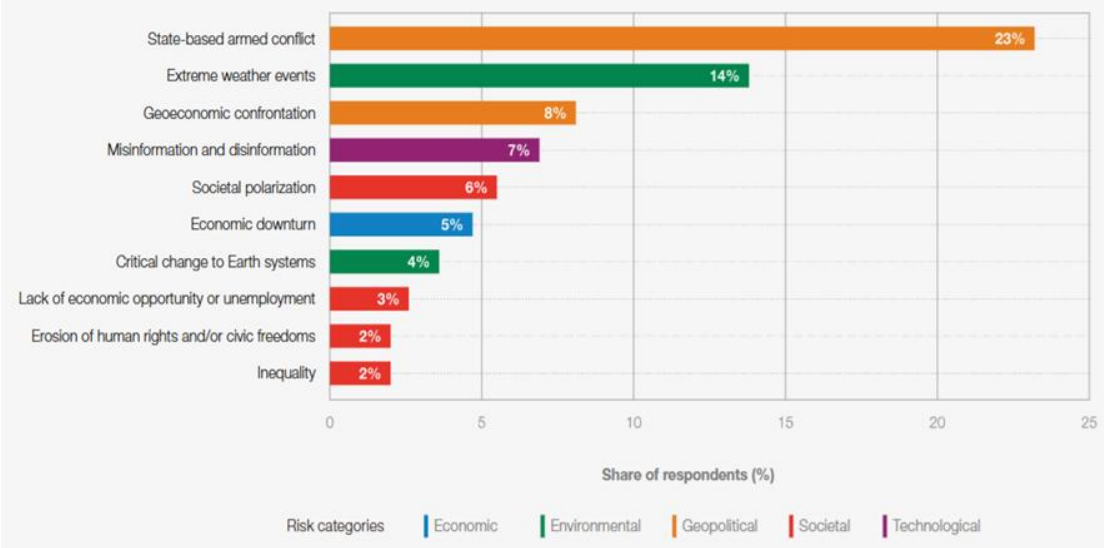


**Figure 1. The top 10 global risk factors identified by the World Economic Forum**

Source: World Economic Forum (2025), Global Risks Report 2025, 20th Edition.

**Fourth, the leadership deficit is widening.** For international cooperation on green development to be effective, it requires both broad participation by the international community and leadership from major powers; neither can be absent. In 2025, certain countries once again withdrew from the Paris Agreement and pursued fossil fuel–first energy policies, prompting renewed debates about the cost and equity of energy transition. This delivered another shock to global environmental and climate governance, further deepening the leadership deficit in green development cooperation. In addition, unilateral sanctions and tariff measures disrupted the global economic and trade order, damaging green and low-carbon industrial and supply chains worldwide.

**Fifth, governance deficit in cooperation mechanisms is growing.** Multilateral cooperation mechanisms on green development, with the United Nations at their core, are increasingly fragmented under intensifying major-power rivalry, while their operational efficiency remains limited. This has seriously constrained global environmental governance. Implementation of the UN 2030 Agenda for Sustainable Development is falling behind schedule, with many environment- and development-related targets unlikely to be met on time. At the same time, worsening crises of climate change and biodiversity loss have further exposed the deficiencies of existing mechanisms in coordinating action, mobilizing resources, and enforcing rules. This governance deficit weakens

the ability of the international community to address environmental challenges collectively and hampers the overall progress of the global green transition.

**At the same time, international cooperation on green development is also embracing new opportunities, including the following:**

**First, ecological crises generate endogenous momentum for cooperation.** The urgency of global greenhouse gas reduction has reached new heights. In 2024, global temperature rise exceeded, for the first time within a calendar year, the 1.5°C target set by the Paris Agreement. This overshoot has intensified climate risks and extreme weather disasters worldwide, spurring broad calls from the international community for stronger mitigation actions. According to the World Economic Forum's *Global Cooperation Barometer 2025*, among five critical domains of global cooperation—peace and security, trade and capital, health and well-being, innovation and technology, and climate and natural capital—the cooperation index was highest in climate and natural capital. This indicates that despite the overall downturn in global cooperation, there remains strong consensus and willingness for collective action on environmental and climate issues (Figure 2).

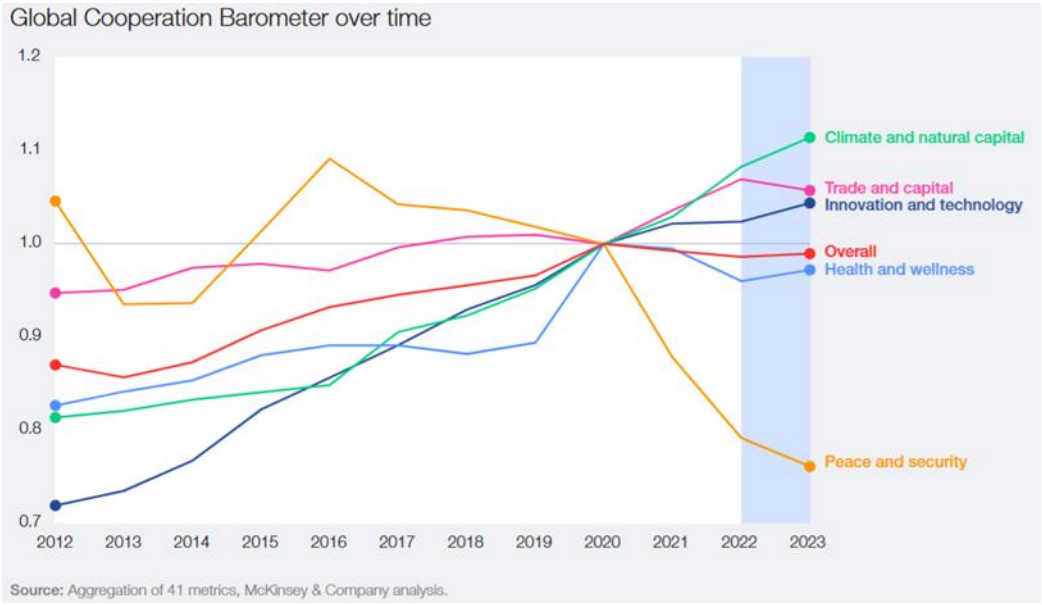


**Figure 2. Global overall cooperation and cooperation pillars**

Source: McKinsey & Company.

**Second, technological innovation and digital economy cooperation provide fresh impetus.** The rise of emerging green industries has fostered new sectors grounded in technological innovation and digital economy—such as intelligent renewable energy generation and digitalized environmental monitoring services—that now underpin environmental protection efforts. Technologies such as smart grids and energy management systems enable real-time monitoring and precise control of energy consumption, improving energy efficiency. The accelerating pace of scientific and technological revolution and industrial transformation, with constant breakthroughs in renewable energy, energy conservation, environmental protection, and low-carbon technologies, is creating major opportunities and strong momentum for international cooperation, driving ongoing innovation in both the modes and substance of cooperation.

**Third, expanding international green investment provides market guidance.** Intensifying environmental challenges, from extreme weather to resource scarcity, are increasingly affecting the asset quality and profitability of financial institutions. Against this backdrop, global attention to

climate change and sustainable development has driven rapid expansion in green investment. Projections suggest that by 2030, global environmental, social, and governance (ESG) assets will reach USD 40 trillion[4]. This demonstrates investors' growing preference for channelling capital into projects and enterprises aligned with ESG standards, further propelling the growth of green investment. Meanwhile, at the civil-society level, international cooperation on green development is also flourishing. Businesses, financial institutions, and non-governmental organizations are actively engaging in green investment and market development through diverse channels, further enriching the dimensions and practical pathways of global green development cooperation.

**Fourth, the proactive green transition of the Global South creates new space for cooperation.** The collective rise of the Global South is reshaping global governance, transforming these countries from passive participants into active drivers. Facing the dual pressures of economic growth and environmental protection, developing countries have an increasingly urgent demand for green, low-carbon, and sustainable growth pathways. In this context, the Global South has been building consensus and steadily enhancing its role and influence in global green governance. This trend has not only propelled new modes of collaboration, notably South–South cooperation, but it has also injected strong impetus and opened new avenues for the global green cooperation system.

### 1.3.2. Gender Perspective

In the process of global green development, **gender equality is a critical lever for achieving environmental sustainability.** The impacts of climate change and ecological crises on human society are deeply gender-differentiated. According to United Nations data, in extreme weather disasters, the mortality rate for women and children is 14 times than for men, underscoring the gendered impacts of climate change. This vulnerability stems from socio-economic disparities and structural inequalities that restrict women's access to resources, rights, and decision-making power. Due to prevailing social and cultural norms, women often bear greater responsibilities for household care. Climate change exacerbates their burdens in maintaining family health and sanitation. Particularly in impoverished regions, women's greater dependence on natural resources for livelihoods exposes them more acutely to the climate poverty trap.

**Gender equality is thus a strategic choice for enhancing the effectiveness and sustainability of climate action.** The United Nations 2030 Agenda for Sustainable Development places Gender Equality (SDG 5) and Climate Action (SDG 13) side by side as core goals. Moreover, women play irreplaceable roles in knowledge contribution, decision making, and economic empowerment. **In terms of knowledge contribution,** women—often the primary managers of household life, decision-makers in green consumption, and organizers of community activities—tend to have deeper insights into local climate and environmental conditions, enabling them to provide practical solutions for climate adaptation and mitigation. **In terms of decision making,** women's participation in environmental governance significantly improves the inclusiveness and effectiveness of policies. Research shows that when women are involved in natural resource management, the efficiency and sustainability of conservation measures increase markedly. **In terms of economic empowerment,** women's empowerment during the green transition directly strengthens community resilience to climate impacts, creating a virtuous cycle.

Box 1-1. Empowering women to participate in sustainable development practices

Studies by UN Women and the Food and Agriculture Organization of the United Nations (FAO) have shown that promoting gender equality and equity in fisheries is critical to achieving sustainable development. In Lampung Province, Indonesia, this issue is particularly pressing. The blue swimmer crab fishery, a key pillar of the local economy, serves as the primary livelihood for thousands of families. Women play an indispensable role across this value chain, yet their contributions are often undervalued. To address this gap, in 2021, local communities pioneered the establishment of women's groups to systematically enhance women's economic participation and community leadership. By 2024, the initiative successfully expanded to five villages, engaging 94 women and forming eight active women's action groups. These groups not only provide training and resource access but have also significantly strengthened women's voices in fisheries resource management, market negotiation, and community affairs. Through effective organizational models, this initiative has brought greater inclusiveness and resilience to fishing communities, offering valuable experience and replicable models for advancing sustainable development in similar regions worldwide.

Nonetheless, mainstreaming gender into international cooperation on green development still faces some challenges, mainly reflected in the following:

**First, gender inequality heightens environmental vulnerability.** Although international cooperation on green development has increasingly incorporated a gender perspective, structural barriers and implementation gaps remain. Gender disparities in access to resources and participation in decision making directly undermine the overall effectiveness of responses to the climate crisis. Globally, women are responsible for about 70% of water collection and management, yet in drought-prone areas, their chances of accessing irrigated land and credit are 60% lower than those of men, limiting women's ability to adopt water-saving technologies. In disaster-prone countries such as Bangladesh and the Philippines, early warning information is transmitted through male-dominated community networks, leaving women on average 30 minutes less preparation time than men and significantly increasing their survival risks. Gender segregation in the labour market further compounds environmental inequities: women hold only 32% of jobs in the global renewable energy sector, and account for less than 12% in high-value roles, such as technology research and development, which weakens the innovative potential of the green transition.

**Second, gender mainstreaming in international cooperation mechanisms remains limited.** While international environmental conventions have gradually integrated gender equality into policy frameworks, there are still major gaps in implementation. The United Nations Framework Convention on Climate Change adopted the Enhanced Lima Work Programme on Gender (2019), requiring parties to incorporate gender actions into their nationally determined contributions (NDCs). However, a 2023 review found that only 35% of national NDCs included specific gender-related indicators. At the 15th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 15), the Kunming–Montreal Global Biodiversity Framework emphasized women's participation, but women still account for less than 20% of the decision-making level in global protected area management. The problem of imbalanced funding allocation remains prominent: less than 15% of global climate finance flows to gender-responsive projects, and women's environmental organizations receive, on average, under USD 50,000 per year, making

it difficult to sustain systemic action.

At the same time, integrating gender equality more deeply into the global energy transition has become a key priority for the international community, and has generated a range of important opportunities, including the following:

**First, stronger policy momentum and growing global consensus.** An increasing number of countries worldwide are incorporating gender considerations into their climate commitments. Among 120 supported countries and regions, 110 have submitted enhanced nationally determined contributions (NDCs), of which 106 explicitly mention or strengthen gender equality provisions.

**Second, international cooperation and financing mechanisms that favour gender-responsive approaches.** Global climate governance frameworks are placing greater emphasis on gender mainstreaming. Under the UNFCCC, the Enhanced Lima Work Programme on Gender has been extended for another decade. In parallel, many international climate funds and development institutions have shown a growing preference for supporting projects that explicitly include gender equality objectives. As a result, energy transition projects that integrate gender perspectives are more likely to attract international financial and technological support.

**Third, contributions to community resilience and project sustainability.** Women are often more closely connected to household and community daily life and have a nuanced understanding of local resources and environments. Their participation in energy transition projects—particularly in distributed energy systems and off-grid solutions—helps ensure that such initiatives are better aligned with local needs, thereby enhancing social acceptance and long-term sustainability.

**Fourth, unleashing women's potential to address the green skills gap.** The global renewable energy sector faces significant human resource demands. Increasing women's participation in this sector not only helps alleviate talent shortages but also introduces diverse perspectives and innovative capacity, fostering more comprehensive and balanced industry development.

Integrating gender equality deeply into green development can unleash three drivers of transformation, directly accelerating progress on SDG 5 (Gender Equality), SDG 13 (Climate Action), and SDG 8 (Decent Work and Economic Growth). The three drivers include the following:

**First, economic empowerment and green industry innovation.** Empowering women with economic autonomy can significantly expand the scale and inclusiveness of the green economy. In Kenya, women-led solar cooperatives have supplied clean electricity to remote communities, reducing household dependence on fossil fuels by 70% while creating 12,000 jobs for women. Practice has shown that when women gain access to green skills training and market opportunities, they not only advance SDG 8 but also help reduce environmental pressures (SDG 12) through sustainable production models.

**Second, environmental governance and decision-making innovation.** Strengthening women's roles in environmental decision making can enhance the effectiveness of ecological protection. Research shows that when women account for more than 30% of members in forest community management bodies, reports of illegal logging increase by 55%, and the sustainable management cycle of resources extends by more than 3 years. This confirms women's unique advantage as "change agents" in ecological governance: they tend to place greater emphasis on long-term community well-being and intergenerational equity (SDG 16).

**Third, enhanced climate resilience and adaptive capacity.** Investing in gender-responsive adaptation projects is essential to reducing disaster vulnerability. In Bangladesh, a women-led

flood-resistant rice breeding project developed saline-tolerant rice varieties, enabling coastal communities to maintain stable grain output during cyclone seasons—directly contributing to SDG 2 (Zero Hunger) and SDG 13.

## 1.4 China's Role and Positioning in the New Context

### *1.4.1 China's Positioning in International Cooperation on Green Development*

In response to the new circumstances and developments in international cooperation on green development in recent years, the Chinese government has continuously adjusted its approach and progressively clarified its role and positioning. China has consistently upheld the vision of building a community with a shared future for people and has successively put forward the Global Development Initiative, the Global Security Initiative, the Global Civilization Initiative, and the Global Governance Initiative. The Global Development Initiative focuses on advancing international development cooperation with the aim of accelerating the implementation of the United Nations 2030 Agenda for Sustainable Development; promoting stronger, greener, and healthier global growth; and building a global community of shared development. The Global Governance Initiative identifies the direction, principles, and pathways for reforming the global governance system. Rooted in addressing the governance deficit, it contributes China's wisdom and solutions for reshaping the international cooperation framework.

Since 2018, the Chinese government has steadily clarified its role and positioning in international cooperation on green development. At the National Conference on Ecological and Environmental Protection in August 2023, it was stressed that since the 18th National Congress of the Communist Party of China, the country has kept pace with the times and taken a global perspective, shouldering the responsibilities of a major country and making significant contributions, thus achieving a historic shift from being a participant in global environmental governance to becoming a leader. The Opinions of the CPC Central Committee and the State Council on Accelerating the Comprehensive Green Transformation of Economic and Social Development, issued in 2024, explicitly called for China to "participate in and lead the global green transition process." Guided by the vision of building a community with a shared future for people, China actively engages in international rulemaking in areas such as climate change response, marine pollution control, biodiversity conservation, and plastic pollution governance, working to build a fair, equitable, and win-win global governance system for the environment and climate. It promotes the implementation of the Global Development Initiative, strengthens cooperation in the Global South and with neighbouring countries, and supports developing countries to the best of its ability. The *2025 Government Work Report* underscored that China will **"actively engage in and steer global environmental and climate governance."** Furthermore, the Global Governance Initiative released in September 2025 clearly reaffirmed that, **as the world's biggest developing country, China has all along been a staunch builder of world peace, contributor to global development, defender of the international order, and provider of public goods.**

### *1.4.2. China's Contributions*

China is a leader in multilateral cooperation. China has always played the crucial role of stabilizer, promoter, and doer in advancing global climate governance, leading negotiations at the Conference of the Parties (COP) to the UNFCCC. In global biodiversity conservation, China—as

presidency of the 15th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 15)—promoted the establishment of the landmark Kunming–Montreal Global Biodiversity Framework and launched the Kunming Biodiversity Fund, which has significantly boosted global confidence in biodiversity conservation. In recent years, China has been committed to building up channels for communication, bridging differences, and proposing constructive solutions in international negotiations on plastic solutions, aiming to advance the development of a just and reasonable, legally binding international treaty to end plastic pollution.

**China is a provider of green technologies. China's "new trio" of electric passenger vehicles, lithium batteries, and solar cells has developed rapidly, with its accelerated energy transition contributing to global efforts to address climate change.** As an active player in climate action, China has set clear carbon peaking and carbon neutrality goals and action plans, making the steady advancement of a green and low-carbon energy transition, and the accelerated development of renewable energy, the cornerstone of its $CO_2$ emissions control. China has also emerged as a pivotal force in the global new energy industry. Authorizations of patents in new energy technologies have grown at an average annual rate of 12%, with China contributing more than 75% of global green and low-carbon technology innovation. Since the launch of the 14th Five-Year Plan, China's output of photovoltaic modules and lithium batteries has increased by more than 3.7 times and 6.4 times respectively. In the first half of 2025, sales of new energy vehicles reached 6.937 million units, accounting for 44.3% of all new automobile sales.

**China is a contributor to South–South cooperation. China has also actively supported and practised South–South cooperation on climate change.** It has contributed to the construction of energy transition projects in Belt and Road partner countries. Since China pledged in 2021 to cease building new overseas coal-fired power projects, its investment in green and low-carbon energy in Belt and Road countries has surpassed that in traditional energy. China has cooperated on green energy projects with more than 100 countries and regions, delivering a host of landmark projects as well as "small yet smart" livelihood projects. These initiatives have met the goals of high standards, sustainability, and public well-being, while accelerating host countries' energy supply transitions toward greater efficiency, cleanliness, and diversification[5][6]. The cooperation between China and other developing countries in ocean governance and fisheries is another example of China's constructive efforts in promoting South–South cooperation. Through open, inclusive, and mutually beneficial cooperation, such efforts have achieved real results in safeguarding food security, promoting growth of the blue economy, and driving sustainable development. Through knowledge sharing, technology transfer, infrastructure construction, and capacity building, such cooperation not only improves the capacity of developing countries to independently develop the marine economy, but also helps to incorporate the concept of equitable and sustainable development into the global ocean governance system.

**China has provided the international community with a large volume of affordable, high-quality clean energy equipment.** As the world's largest exporter and investor in clean technologies, China has built the world's largest clean power generation system, with wind and solar products exported to more than 200 countries and regions. Its rapid advances in photovoltaics, wind power, energy storage, hydrogen, and digital technologies have enabled the global deployment of solar modules, wind turbines, and other key components, driving down the cost of wind and solar power generation by more than 60% and 80% respectively, over the past decade. By the end of 2024, Chinese wind turbines had been exported to 57 countries across six continents, totaling 5,799 units

with a combined capacity of 20.8 million kilowatts. In 2024 alone, China's exports of photovoltaic modules totaled 236 million kilowatts, with exports to as many as 38 countries each exceeding 1 million kilowatts.

**Overall, China's achievements in green development provide broad space for international cooperation.** Over the past decade, China has made remarkable progress in green development, as reflected in continuous improvements in environmental quality; a deceleration in resource consumption growth; steady gains in resource-use efficiency; the accelerated establishment of a green, low-carbon, and circular economic system; the rapid formation of new drivers of green development; the rapid expansion of urban and rural environmental infrastructure; marked improvements in living environments; and significant enhancements in ecosystem quality and stability. On the globally salient issue of energy transition, China has also delivered outstanding results. According to the World Economic Forum's *Fostering Effective Energy Transition 2025* report, among the world's five major economies—China, the United States, the European Union, Japan, and India—China ranks first in energy transition performance (see Table S1).

The year 2025 marks both the conclusion of China's 14th Five-Year Plan and the critical transition toward the 15th Five-Year Plan. Amid transformations unseen in a century, the collective rise of the Global South is profoundly reshaping global governance, and the international community widely expects China, as an important member and central force of the Global South, to play an even stronger leading role. A report on the 2025 Davos Forum noted that, "the essence of future international economic competition lies in the governance capacity of green value chains." Only through institutional innovation that transcends zero-sum thinking and through technology sharing that bridges global development divides can the inclusive growth envisioned in the 2030 Agenda for Sustainable Development be truly achieved. In this process, China is well placed to serve as a key bridge between the North and South, and the East and West. It can also give greater play to the "Beijing Effect" of trade rules. Leveraging its position as the world's largest importer of soft commodities, China can actively lead the formulation of sustainable production and trade standards for these goods. By advancing institutional and methodological innovation, China can promote green transition while safeguarding the interests of small and medium-sized enterprises and developing countries, thereby fostering sustainable development that is both just and inclusive. Through policy guidance and collaborative innovation mechanisms, China has already achieved key breakthroughs in green technologies, such as photovoltaics and new energy vehicles, not only fostering large-scale industrial clusters at home but also sharing advanced technologies with Global South countries through the Belt and Road Initiative. Moreover, by harnessing digital technologies, such as cloud computing, big data, and artificial intelligence, China can help Global South partner countries assess the greening of production methods and optimize production processes, combining technology transfer with digital empowerment to create a dual advantage in cooperation. In green finance, China has made sustained, long-term investments and has become a key driving force in the global green transition, demonstrating the capacity, resolve, and resources to assume an even greater leadership role.

## Chapter 2. Key Areas of International Cooperation on Green Development

At present, international cooperation on green development is undergoing a profound transformation, with opportunities and challenges intricately intertwined. In the course of addressing the "triple planetary crisis" of climate change, biodiversity loss, and environmental

pollution, the international community faces both strategic opportunities and practical challenges. On the one hand, opportunities include the accelerated formation of a global consensus on carbon neutrality, the use of digital technologies to empower green innovation, and the expanding demand for green development in developing countries. On the other hand, challenges include fragmented governance rules, geopolitical disruptions, and the proliferation of standards barriers. This chapter, drawing on recent developments in international cooperation in the fields of environment and development, identifies and systematically reviews five priority areas: climate change and energy transition, biodiversity conservation, global value chains and green trade, green industries and technological innovation, and green finance. It analyzes progress and bottlenecks in each field with respect to policy coordination, technology diffusion, and financial flows, and offers perspectives on key directions that merit particular attention under the new circumstances.

## 2.1 Climate Change Response and Energy Transition

### 2.1.1 Global Setbacks in Climate Action Risk Delaying Cooperation on Energy Transition

Shifts in the climate policies of certain countries have severely disrupted global cooperation on climate change, slowing the low-carbon transitions of developing countries, and potentially delaying international cooperation on energy transition.

**The reversal of climate policies in some countries has triggered a negative impact in global climate governance.** The Trump administration's renewed withdrawal from the Paris Agreement, its domestic push for fossil fuel development and slowdown in renewable energy deployment, and its retreat from international climate commitments have plunged global climate governance into a period of turbulence. According to the requirements of the Paris Agreement, all 195 parties are to submit their nationally determined contributions (NDCs) for 2035 by February 10, 2025. However, only 11 countries have met the deadline, with most developing countries yet to do so. Countries such as Argentina and Indonesia—citing concerns over shifting international circumstances and their own financial pressures—have indicated plans to re-evaluate their climate policies, while many others have opted to slow the pace of their climate commitments.

**Developing countries face a massive financing gap for the energy transition.** The new collective quantified goal on climate finance (NCQG), established at COP 29, calls for no less than USD 300 billion per year by 2035 to be provided to developing countries in support of mitigation, adaptation, and responses to loss and damage. However, the Trump administration's tariff policies have exacerbated risks of a global economic downturn, and the termination of U.S. participation in international climate finance cooperation has further tightened the financing sources available for developing countries' energy transitions, making it difficult to implement more robust transition measures. For example, in Africa, fully addressing the electricity needs of 600 million people by 2030 will require USD 500 billion in investments in renewable energy, such as solar, wind, and hydropower, leaving a significant funding shortfall. In addition, compounded by the slowdown in global climate governance cooperation and the reduction of financial support from developed countries, Indonesia's climate envoy has even indicated the possibility of retracting its commitment to phasing out coal-fired power plants.

**The rise of resource nationalism has driven up the cost of accessing critical minerals.** In recent years, resource-rich countries, including Chile, Peru, Argentina, Indonesia, and the Democratic Republic of the Congo, have witnessed a surge in resource nationalism, adopting

measures such as tightening investment reviews, raising royalties and tax rates on mineral resources, nationalization, and export bans. Some countries have even proposed forming alliances modeled on the Organization of the Petroleum Exporting Countries (OPEC), such as an Organization of the Lithium Exporting Countries (OLEC), or an Organization of the Nickel Exporting Countries (ONEC), which has to some extent raised the costs of the global energy transition.

### 2.1.2 The Global Green Transition Offers Broad Scope for Deeper International Cooperation

Against the backdrop of joint global efforts to address climate change, major countries have successively adopted ambitious green and low-carbon development targets. As the costs of developing and utilizing renewable energy continue to fall, an increasing number of countries are making renewable energy development a core strategy for safeguarding energy security. The prospects for international cooperation in the field of energy transition are therefore extensive.

**On the one hand, climate action and energy transition remain mainstream policy directions of the international community, creating significant opportunities for expanding green trade and investment.** The frequent occurrence of extreme climate events has compelled more countries to recognize the urgency of accelerating the green and low-carbon energy transition, keeping climate governance and energy transition at the core of global governance agendas. At present, more than 150 countries worldwide have proposed carbon neutrality targets in one form or another, and over 120 countries have joined the global pledges to triple renewable energy capacity and double energy efficiency. The global energy transition process is expected to further accelerate. China's new energy industries are developing rapidly with massive production capacity. The "new trio"—solar photovoltaics (PV), power batteries, and new energy vehicles (NEV)—has already acquired strong international competitiveness, creating even broader space for international trade and investment in the new energy sector.

**On the other hand, the sharp decline in generation costs for renewable energy, such as wind and solar, has created enormous opportunities for cooperation with resource-rich regions.** In recent years, with increasingly pronounced economies of scale and rapid technological progress, the cost of renewable power generation has continued to fall, making it competitive with fossil fuel power generation in countries across the Middle East, Africa, and Southeast Asia. Many developing countries can address energy supply shortages through large-scale development of renewable energy. The International Renewable Energy Agency (IRENA) projects that by 2030, the installed renewable energy capacity of Middle Eastern and African countries will expand to 13 times its 2020 level, and by 2050, it will further rise to 44 times its 2030 level. This enormous growth potential in new energy offers China and partner countries broad space for advancing pragmatic cooperation in the renewable energy sector.

## 2.2 Biodiversity Conservation

Faced with the accelerating global crisis of biodiversity loss, the international community confronts significant implementation gaps at the policy level. Structural deficiencies persist in biodiversity finance mobilization mechanisms among developed countries, while developing countries face the dual constraints of insufficient technological autonomy and disputes over benefit sharing of digital sequence information (DSI). Conflicts between conservation and development continue to intensify, compounded by the fact that only 30% of parties globally have updated their national biodiversity strategies and action plans (NBSAPs). Global biodiversity conservation is

entering a new era of implementing the Kunming–Montreal Global Biodiversity Framework. The resumed 16th meeting of the Conference of the Parties (COP 16) to the Convention on Biological Diversity adopted four key consensuses, signalling a systemic shift from single-species conservation toward integrated ecosystem restoration and transformations in human civilization. This calls for governments to assume more proactive roles by advancing technological innovation, leveraging finance, and enhancing social governance through multidimensional cooperation. The objective is to achieve the "30-by-30" target—protecting at least 30% of the world's land and ocean areas by 2030—reverse species extinction trends, and realize the 2030 mission and 2050 vision articulated in the Kunming–Montreal Global Biodiversity Framework.

### 2.2.1 Persistent Implementation Gaps Under Multiple Pressures

The Global Biodiversity Outlook 5 indicates that biodiversity loss worldwide continues to accelerate, with pressures on ecosystems mounting. Without urgent international action, the rate of global species extinction will increase further—it is already dozens to hundreds of times higher than the average over the past 10 million years.

**(1) Ongoing North–South divide in finance.** On one hand, developed countries have fallen short of their commitments, with resource mobilization strategies lacking binding force. Doubts remain over the governance structure of the Cali Fund, and there are high risks to not meeting the USD 20 billion annual target. On the other hand, developing countries remain heavily dependent on the fund, while their conservation actions are constrained by both financial and technological shortages[7].

**(2) Difficulties in implementing targets of the Kunming–Montreal Global Biodiversity Framework.** Conflicts between conservation and development persist: deforestation rates in the Brazilian Amazon remain high, and palm oil expansion in Southeast Asia threatens habitats, underscoring tensions between the "30-by-30" target and economic development. At the same time, monitoring and accountability mechanisms are weak. Current evaluation systems emphasize outcome indicators but lack tracking of policy implementation and fund utilization, with some countries' NBSAPs reduced to formalities. Of the 196 parties to the CBD, less than one third have submitted updated NBSAPs.

**(3) Gaps in technology and capacity building.** Many developing countries face severe technical shortfalls. Among the 72 parties that have submitted NBSAPs, most relied on external assistance for data collection and analysis, showing a lack of independent capacity. In addition, disputes over DSI benefit sharing remain unresolved. Companies diverge widely over revenue-sharing ratios, while biotechnology patent barriers limit access to resources in developing countries.

**(4) Lack of unified standards among major financing institutions and infrastructure providers.** Fragmented standards have led to divergent approaches in assessing biodiversity impacts, hindering coordination and significantly raising compliance and management costs. The absence of harmonized standards undermines the effectiveness of large-scale conservation actions. Developing countries, constrained by limited capacity, find it even more difficult to reconcile differences across multiple standards, further exacerbating the challenges of meeting conservation targets[8].

### 2.2.2 Historic Breakthroughs in Biodiversity Conservation

**(1) Deepening multilateral cooperation.** During COP 16, UN Secretary-General António Guterres, together with the heads of state of Colombia, Ecuador, Suriname, Armenia, and other countries, jointly launched a coalition with the goal of "making peace with nature," calling on all nations to take immediate action to safeguard the planet's development. Fifteen countries signed the Cali Declaration, advancing the integration of biodiversity into economic policy-making.

**(2) Technology-enabled monitoring and finance synergies.** The monitoring framework has promoted data comparability through the standardization of indicators (e.g., species abundance, ecosystem integrity), laying the foundation for synergy between climate and biodiversity finance, including nature-based solutions.

### 2.2.3 A New Era of Implementing the Kunming–Montreal Global Biodiversity Framework

In 2022, the 15th meeting of the Conference of the Parties (COP 15) to the Convention on Biological Diversity adopted the Kunming–Montreal Global Biodiversity Framework. The framework set the "30-by-30" target, which aims for effective conservation and management of at least 30% of terrestrial, inland water, coastal, and marine areas by 2030. It also, for the first time, established a pathway for addressing digital sequence information (DSI) on genetic resources, created a Global Biodiversity Framework Fund, and articulated the vision of "Living in Harmony with Nature" by 2050. Together, these milestones outlined a new blueprint for global biodiversity governance through 2030 and beyond. At the resumed COP 16 in February 2025, four key consensuses were reached on resource mobilization, financial mechanisms, and a global review of progress in implementing the GBF targets:

**(1) Innovative resource mobilization and an improved funding framework.** The resumed session adopted the revised resource mobilization strategy (2025–2030), under which countries agreed to increase biodiversity financing to USD 200 billion annually by 2030. Of this, international financial flows are expected to reach USD 20 billion annually by 2025, marking an incremental step toward the 2030 goal. Reforms of the Global Environment Facility (GEF) were also clarified, emphasizing greater financial autonomy for developing countries and greater flexibility in project design.

**(2) Roadmap for improving the global financing architecture.** COP 16 defined the basic principles for a global biodiversity financing mechanism and adopted a detailed roadmap for advancing the biodiversity financing system over the next three COPs. This provided a clear pathway for mobilizing funds for global biodiversity conservation, marking a significant step toward implementing the GBF targets.

**(3) Establishment of the Cali Fund.** The resumed session created the Cali Fund, which, through a DSI benefit-sharing mechanism, requires private-sector contributions and ensures that 50% of resources are prioritized for Indigenous Peoples and local communities.

**(4) Advancing the "30-by-30" target globally.** In view of insufficient progress toward conservation goals—only 2.8% of marine areas are currently effectively protected, with projections of only 9.7% coverage by 2030[9], while terrestrial conservation faces challenges such as habitat degradation and invasive species—the resumed session adopted a monitoring framework to strengthen implementation of the "30-by-30" target.

Marine biodiversity conservation and the development of sustainable fisheries have become critical pathways for achieving the GBF's "30-by-30" target. Advancing these in tandem is essential for meeting the milestone goal of conserving at least 30% of the global ocean by 2030. Marine biodiversity underpins the material foundation and resilience of fisheries, while sustainable fishing practices themselves are a key means of delivering the target. The Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement), adopted under the United Nations Convention on the Law of the Sea, provides a mechanism for establishing high seas marine protected areas, thereby supporting the restoration of marine ecosystems, including critical fishing grounds.

**Box 2-1. Marine biodiversity conservation and sustainable fisheries development**

South Asia and Pacific Island countries are biodiversity hotspots in which island ecosystems rely heavily on species migration. However, these regions face multiple challenges, including climate change, pressure from small-scale fisheries, and weak financial management. Research has shown that traditional field surveys are prohibitively expensive, while digital simulations perform poorly in nearshore intertidal zones due to insufficient data accuracy. By contrast, molecular methods, such as DNA markers and environmental DNA, offer a low-cost and standardized way to directly reflect species connectivity and community similarity, making them better suited to management needs. For this reason, small island states could consider building networks of small-scale protected areas, integrating molecular tools to improve monitoring efficiency, and strengthening data sharing and standards cooperation.

Ghana, a major fisheries hub along the Atlantic coast, has been hit hard as rising sea temperatures drive fish populations into deeper waters, undermining traditional fishing practices. In response, a non-governmental organization partnered with local fishers to deploy a sensor network that collects real-time environmental data and tracks fish movements. This initiative not only improves fishing efficiency but also fills critical monitoring gaps. It forms part of the Fishing Vessel Observing Network (FVON), which currently covers hundreds of vessels across eight countries and aims to expand to tens of thousands of vessels by 2030, driving innovation in global fisheries management.

## 2.3 Global Value Chains and Green Trade

### 2.3.1 Challenges and Governance Dilemmas in Green Trade

**(1) Increasing difficulty in policy coordination.** According to WTO statistics, the number of green trade barrier cases has tripled since 2020, involving trade volumes equivalent to 12% of the global total. Developing countries generally have weak carbon accounting capacities, with only 28% of African enterprises able to provide full carbon emission disclosures. The "domestic content" clause in the Inflation Reduction Act 2.0 of the United States conflicts with the EU's Carbon Border Adjustment Mechanism (CBAM), leading to an escalating trade dispute over electric vehicles between the United States and Germany in 2024.

**(2) Intensifying competition over key technologies.** The Group of Seven (G7) has

established an alliance for the protection of key green technologies, imposing strict restrictions on the export of 14 categories of technologies, including solid-state batteries and carbon capture materials. The global shortage of green talent is estimated at 8 million, further aggravating mismatches between technology supply and demand.

**(3) Geopolitical shocks continue to escalate.** Trade protectionist policies have significantly increased carbon emissions. For instance, the Red Sea crisis in 2024 caused the carbon intensity of Asia–Europe shipping to surge by 25%, while traffic through the Suez Canal fell by 40%, forcing companies to return to traditional high-emission routes. The "friendshoring" strategy pursued by the United States has added approximately USD 18 billion in costs to the global solar panel supply chain[10]. Competition over critical minerals has also intensified: restrictions on cobalt exports from the Democratic Republic of the Congo triggered global battery price fluctuations exceeding 40%. In contrast, open trade policies toward China have demonstrated a positive effect in driving emission reductions[11].

### 2.3.2 2. Strategic Opportunities in the Restructuring of Global Rules for Green Trade

**(1) Opportunities for technological leapfrogging in emerging markets.** Through the Technology Transfer South South Cooperation Centre, China has shared smart microgrid and photovoltaic agriculture technologies with African countries, helping Kenya reduce its off-grid power generation costs to USD 0.05 per kWh in 2024.

**(2) Continuous innovation in green finance instruments.** The International Monetary Fund (IMF) launched the Resilience and Sustainability Trust (RST), with a targeted funding scale of USD 45 billion dedicated to supporting the development of green industrial chains in developing countries. The green bond market surpassed USD 1.8 trillion, with Belt and Road green bonds recording year-on-year growth of 210%[12]. In addition, China's Cross-Border Interbank Payment System (CIPS) introduced carbon credit settlement functions, processing bilateral emission reduction transactions worth RMB 12 billion.

**(3) Standard systems reshaping value.** The International Organization for Standardization (ISO) released the Carbon Neutrality Guidelines for Global Value Chains (ISO 14068), the first internationally recognized carbon management standard, which has been adopted by 83 countries. Certified enterprises can charge a premium of 15%–30% for their products; in 2024 alone, this enabled Vietnam's textile industry to secure an additional USD 5 billion in export orders.

### 2.3.3 The Green Transition of Global Value Chains at a Critical Turning Point

**(1) Breakthrough progress in multilateral mechanisms.** In 2024, the United Nations Climate Change Conference (COP 29) successfully adopted the landmark Baku Agreement, which, for the first time, incorporated carbon accounting of global value chains into the implementation mechanism of the Paris Agreement. Members of the Group of Twenty (G20) pledged to establish a unified system for the mutual recognition of green product certifications by 2027, a framework that will cover 85% of internationally traded goods.

**(2) Divergent trajectories in regional cooperation.** The European Union's implementation of its Carbon Border Adjustment Mechanism (CBAM) has introduced new rules for global climate governance while also creating tangible challenges for the multilateral trading system, including higher compliance costs, intensified competition over standards, and widening development gaps. In 2024, the share of low-carbon steel imported by the EU from ASEAN increased by 42% year-

on-year, with the "Brussels effect" accelerating the construction of green trade barrier response mechanisms among its partners. In the Asia–Pacific region, the Regional Comprehensive Economic Partnership (RCEP) has leveraged its green provisions to pioneer a cross-border carbon credit trading mechanism, driving China–ASEAN clean energy trade to exceed USD 800 billion and raising clean energy's share of regional cross-border investment to 45%. Overall, the contrasting regional governance paradigms are clear: the EU emphasizes regulatory pressure through carbon standards, while the Asia–Pacific region focuses on market incentives to drive transformation.

**(3) Corporate practices leading a wave of technological revolution.** Among the world's top 100 companies by market capitalization, 76 have already adopted Scope 3+ emission reduction strategies, requiring upstream and downstream suppliers to undertake emission reduction measures in parallel. Apple, through its USD 200 million Green Supply Chain Fund, has helped 30 of its Chinese suppliers achieve 100% renewable energy usage. Tesla has introduced a "battery passport" system that uses blockchain technology to track the full life-cycle carbon footprint of its power batteries.

## 2.4 Green Industries and Technological Innovation

### 2.4.1 Barriers to Green Industry and Technological Innovation

**(1) Technological gap and regulatory barriers.** There is a significant gap between developed and developing countries in green technology capabilities. Developed countries maintain a dominant position in green technology and innovation, whereas developing countries often lack core technologies and are heavily dependent on technology imports. However, some developed countries impose strict export controls on green technologies and apply tariff and non-tariff trade barriers to contain the development of green industries in other countries. The significant discrepancies among national green technology standards, environmental regulations, and certification systems increase the complexity and cost of cross-border collaboration on technology and products.

**(2) Capital shortages and financing difficulties.** The research, development, and application of green technologies are costly, with extended return cycles. Developing countries generally face the challenge of insufficient financing channels. Taking solar technology as an example, many developing countries are unable to achieve large-scale adoption due to high initial investment and maintenance costs. From 2018 to 2021, the total import volume and export volume of green technology in developed countries increased by about USD 99 billion and USD 96 billion respectively, while developing countries' green technology imports grew by only USD 15 billion [13].

**(3) Capability gaps and information deficiencies.** Many developing countries lack the necessary talent and institutional capacity in the research, application, management, and maintenance of green technologies, which limits the depth and breadth of their participation in international cooperation. Cooperation efficiency is reduced due to information asymmetry and absence of robust knowledge-sharing platforms and communication mechanisms, making it difficult to fully realize synergistic effects.

### 2.4.2 Paradigm Shift in Collaborative Innovation of Green Industries

**(1) Surge in global green demand.** The global green industry is transitioning from the introduction phase to the growth phase, with increasing demand for technologies, such as photovoltaics (PV), wind power, hydrogen energy, and electric vehicles (EVs). This expansion provides broad space for international cooperation. Developing countries can integrate into the global value chain through technology transfer and joint R&D. For example, China has carried out renewable energy projects in Ethiopia and Sri Lanka, achieving technology localization and knowledge sharing through planning cooperation, local adaptation, and capacity building. The integration of digital technologies, such as artificial intelligence (AI) and blockchain with green industries, has given rise to new business models, including smart grids and carbon footprint tracking, opening up new avenues for international cooperation.

**(2) Policy coordination and market complementarity.** National policies favouring green industries provide institutional guarantees for international cooperation. For example, Sweden has driven energy decarbonization through its carbon tax mechanism, which prompted supply chains to reduce emissions. China's "dual carbon" targets continue to gain momentum, promoting the export of new energy products and driving upgrades across global industrial chains. The tightening of green standards in European and American markets also accelerates the internationalization of technical standards, promoting the formation of a unified regulatory framework.

### 2.4.3 A Multidimensional Cooperation Landscape in Global Green Industry and Technological Innovation

Currently, global green industry and technological innovation is evolving toward a multidimensional and multilayered cooperation landscape, forming a strong joint force to promote sustainable development.

**(1) Multilateral mechanisms are synergistically driving global green technology innovation.** To systematically assess the development trends and innovation pathways of energy technologies, the International Energy Agency (IEA) produces a series of key reports, including *Energy Technology Perspectives* (ETP), providing scientific grounds for national policy-making and corporate investment strategies. Under multilateral initiatives, such as Mission Innovation (MI), various parties focus on breakthroughs in key clean energy technologies, promoting the integration of public and private sector capital to accelerate technology R&D and industrialization. Multilateral development institutions, such as the World Bank, the Asian Development Bank, and the Green Climate Fund, support the R&D demonstration and large-scale application of frontier technologies, like renewable energy and EVs, by relying on diversified financial tools, such as concessional loans, risk sharing, and joint financing. At the same time, the International Organization for Standardization and related industry associations actively establish and promote international standard systems for green technologies and sustainable products, laying the foundation for global green trade and industrial chain cooperation.

**(2) Bilateral and regional green technology cooperation is steadily deepening.** Some countries are continuously deepening bilateral green technology cooperation through joint research, technology demonstrations, and investment agreements. For example, Australia and Indonesia have established the Australia–Indonesia Climate and Infrastructure Partnership to

strengthen emissions reduction and promote cooperation in clean energy systems and industries. India and Brazil are jointly developing sustainable aviation fuel by leveraging their existing infrastructure and resources, aiming to achieve decarbonization in the aviation industry. The European Union launched the European Green Deal, planning large-scale deployment and promotion of new technology research and demonstrations to build a new innovation value chain. Kenya spearheaded the African Green Industrialization Initiative to accelerate and expand green industry and enterprise development in Africa. ASEAN and the European Union have established a dialogue mechanism on green technology and innovation to promote mutual technology transfer, research cooperation, and capacity building.

## 2.5 Green Finance

### 2.5.1 Dilemmas Facing Green Finance Such as Divergent Standards

**(1) Lack of unified standards and information asymmetry.** Globally, there is no unified definition or certification system for green finance, and only 30% of countries have clearly defined green credit standards. Due to the lag in green finance standardization, regional variance in ESG rating systems, and regulatory uncertainty facing cross-border capital flows, the opportunities for corporate "greenwashing" are significantly amplified.

**(2) Financing gap and regional imbalances.** Developing countries face an annual financing gap of over USD 2.5 trillion for green projects, while 80% of green bonds are concentrated in developed countries[14]. Regions such as Africa and Latin America have relatively low attractiveness for green investment due to policy instability and currency risks. Nigel Clarke, Deputy Managing Director, IMF, warned that high global debt and geopolitical conflicts could hamper investment in sustainable projects, while the financing costs of green projects in developing countries are 15% to 20% higher than those in developed countries.

**(3) Uncertainty of international cooperation mechanisms.** In early 2025, the U.S. Federal Reserve announced its withdrawal from the Network for Greening the Financial System (NGFS), and several well-known Wall Street banks declared their exit from the Net-Zero Banking Alliance (NZBA), raising concerns about the future of green finance. On one hand, the Federal Reserve's withdrawal undermines the network's ability to drive global green finance policies and standard setting, injecting uncertainty into the system. Meanwhile, the swift retreat of Wall Street banks could make stakeholders hesitant to commit capital to green projects, disrupting the overall balance of the green finance ecosystem. On the other hand, the European Union is intensifying its internal green finance framework, while private capital and market forces are also becoming important drivers of green finance cooperation.

### 2.5.2 Harnessing the Multiple Opportunities of the Green Finance Transition

**(1) Strengthened policy support and top-level design.** Governments around the world are developing green finance through legislation and policy frameworks. China has incorporated green finance into the G20 agenda and led the drafting of the *G20 Green Finance Synthesis Report*. The European Union has clarified green investment standards through the EU Taxonomy for Sustainable Activities. More than 130 countries globally have proposed carbon neutrality targets, providing long-term policy momentum for green finance. Developing countries, such as India and

Brazil, have introduced tax incentives for green bonds to encourage financing of renewable energy projects.

**(2) Explosive growth in market demand.** The scale of environmental, social, and governance (ESG) investments continues to expand. In 2024, global ESG assets under management exceeded USD 40 trillion, with institutional investors allocating more than 30% of their funds to green assets. The green bond market is also growing rapidly, with emerging markets such as Southeast Asia witnessing an annual increase of 50% in green bond issuance.

**(3) Multiple opportunities for green finance from technological iteration and policy innovation.** Financial technologies (such as blockchain and AI) improve the efficiency of evaluating green projects. For example, satellite monitoring of carbon emission data can support credit decision making. New financial products are also emerging, such as sustainability-linked bonds (SLBs), carbon futures, and green asset-backed securities (green ABS), to meet diverse financing needs.

### 2.5.3 Ongoing Improvement in Global Green Finance Tools and Policy Systems

Against the backdrop of severe global climate change, green finance has drawn widespread attention as a key driver of economic transformation. Multilateral institutions are promoting systemic reforms. The New Development Bank, in cooperation with China, established a USD 5 billion Climate Investment and Financing Center in Shanghai, adopting a "blended finance" model to leverage private capital. The World Bank lowers the financing costs of clean energy projects in developing countries through green bonds and carbon credit guarantee tools. The European Union takes the lead in setting green finance standards, with its core being the EU's Taxonomy Regulation, which provides detailed scientific definitions for "sustainable economic activities." ASEAN member states, given their diverse development levels and priorities, issued the ASEAN Taxonomy for Sustainable Finance, which places greater emphasis on flexibility and inclusiveness in standard setting. Sovereign states, when formulating their own green bond standards, generally draw on international frameworks while adapting them to local contexts.

## 2.6 Conclusion and Outlook

International cooperation on global green development is currently standing at a critical juncture of profound transformation and systemic restructuring. Addressing climate change and advancing the energy transition remain the mainstream policy directions of the international community. Despite global setbacks in climate response, such as the U.S.'s withdrawal from the Paris Agreement, the huge financing gap in energy transitions for developing countries, and the rise of resource nationalism, China can still accelerate its energy shift, deepen international cooperation, actively participate in global energy governance, and help the world tackle the climate crisis more effectively.

The Kunming–Montreal Global Biodiversity Framework has ushered in a new era of global biodiversity conservation, creating a historic opportunity by calling for governments to be more proactive in carrying out multidimensional cooperation to achieve the "30-by-30" target and the 2050 vision. The international community places high expectations on China to continue leading the biodiversity conservation process.

The green transformation of global value chains is at a pivotal inflection point. Technological leaps in emerging markets, continuous innovation in green financial instruments, and the

establishment of carbon management standards in global value chains have created strategic opportunities for green trade. However, green trade is still grappling with profound challenges and governance dilemmas. These hurdles include the difficulty of achieving policy coordination, intensifying competition for key technologies, and escalating geopolitical tensions. To promote sustainable development, China can play a bridging role in connecting the Global North and South, as well as coordinating between East and West, by actively formulating sustainable production and trade standards for commodities.

The surge in global green demand, along with policy coordination and market complementarity among countries, is driving the formation of a multidimensional and multilayered cooperation landscape for global green industries and technological innovation. However, technological gaps and regulatory barriers, capital shortages and financing difficulties, as well as capacity gaps and information deficiencies, seriously restrict the development of green industries and technological innovation in developing countries. China has already become a key force in global green industry and technological innovation, and it is widely anticipated that China should spearhead these collaborations.

Green finance has become an important driver of economic transformation, creating multiple opportunities, such as strengthened policy support and top-level design, explosive market demand growth, and technological iteration combined with policy innovation. In the meantime, the development of green finance is restricted by multiple hurdles, including the lack of unified standards, information asymmetry, persistent financing gaps and regional imbalances, and fragile international cooperation mechanisms. China can leverage green finance to mobilize broader international cooperation in green development.

In the face of the triple planetary crisis of climate change, biodiversity loss, and environmental pollution, the international community urgently needs to work together to resolve structural contradictions between developed and developing countries in areas such as financial distribution, technology transfer, and standards recognition, while seizing the strategic window of restructuring green trade rules and accelerating the clean energy transition. The paradigm of global governance is shifting from passive “crisis response” to proactive “systemic reconstruction,” requiring technological innovation as the core driving force to break through traditional regulatory barriers. Building upon cooperation in five key areas, namely climate change and energy transition, biodiversity conservation, global value chains and green trade, green industries and technological innovation, and green finance, future efforts should expand into emerging fields, such as governance of new pollutants (including microplastics and antibiotic pollution), circular economy transformation, and geo-climate security, thereby fostering new dimensions of international collaboration.

## Chapter 3. Typical Practices in International Cooperation on Green Development

In international cooperation on green development, despite the unprecedented challenges currently faced by the UN-centred international system, multilateral environmental agreements under the UN framework continue to serve as the primary platform, providing the basic regulatory framework and common objectives for global environmental governance. North–South cooperation

continues to play an important role in financing, technology transfer, and experience sharing, helping developing countries address environmental challenges. Meanwhile, with the rapid rise of the Global South, South–South cooperation has become increasingly significant. Through knowledge exchange, technology cooperation, and mutually beneficial projects, it has injected new momentum into global sustainable development. Diversified modes of cooperation have not only broadened the scope and depth of global environmental governance but also enhanced the efficiency and inclusiveness of collective responses to climate change, reflecting the shared wisdom of the international community in tackling global environmental issues.

As the largest developing country, China has consistently positioned itself as a contributor to global development and a provider of international public goods. In particular, through cooperation with Global South partners, such as Brazil, ASEAN, and African countries, China has further demonstrated its proactive role in delivering international public goods, offering preliminary models of South–South cooperation for green development. By reviewing typical cases of green development under multilateral and regional cooperation, North–South cooperation, and South–South cooperation, and combining them with China's own practical experience, this chapter seeks to distill replicable and scalable models of cooperation on green development, providing reference pathways for reconciling economic development with ecological protection.

## 3.1 Multilateral Organizations and Regional Cooperation

### 3.1.1 Implementation of International Environmental Conventions

**Multilateral environmental agreements under the United Nations framework are the core mechanisms for coordinating global environmental action,** and they remain the principal platforms for advancing international cooperation on green development. The most representative agreements cover cooperation on biodiversity conservation, climate change mitigation, marine litter, and chemical pollution management, all with broad participation.

Through active engagement and strict fulfillment of its commitments under international environmental conventions, China has consistently contributed its wisdom solutions to global environmental governance, demonstrating the responsibility and leadership of a major environmental country. In fulfilling these commitments, China adheres to the principle of "common but differentiated responsibilities," drawing on the financial and technological support available through North–South cooperation while proactively sharing its own practical experience in pollution control, ecological protection, and green transition through South–South cooperation. This has effectively improved implementation efficiency and the inclusiveness of global environmental governance. China's practice shows that the key to delivering tangible results under international conventions lies in translating global objectives into concrete national actions and advancing sustainable and scalable governance models through systematic technological innovation, policy reform, and capacity building.

**(1) Case Study: Global Environment Facility (GEF) China POPs Waste Management Project**

Background

After China signed the Stockholm Convention in 2001, it faced the legacy challenge of safely disposing of large quantities of obsolete pesticides and dioxin-containing fly ash, for which no

secure treatment technology was available. These substances posed severe threats to both the environment and public health. In 2009, with support from the Global Environment Facility (GEF), China launched a project to systematically address the environmental risks associated with POPs waste.

Core Measures

The project was carried out across three dimensions: policy, technology, and capacity. In terms of policy and regulation, POPs waste management policies and technical standards were drafted and revised to improve the regulatory framework. On the technological front, key innovations, such as high-temperature sintering of fly ash, were developed, and demonstration facilities were established. For capacity building, nationwide training sessions were conducted, and provincial management offices were set up to strengthen implementation capacity.

Outcomes and International Recognition

In terms of environmental benefits, the project disposed of 6,352 tons of POPs waste, 42,000 tons of contaminated soil, and 80,000 tons of incineration fly ash, reducing dioxin emissions by more than 150 grams toxic equivalent. As for policy outcomes, the project promoted the revision of relevant technical standards and guidelines for POPs waste, thereby improving the policy and regulatory framework. In the international arena, the project was rated "highly satisfactory" by GEF's independent evaluation, and its technical solutions were disseminated to other developing countries.

**(2) Summary and Takeaways**

This case study fully demonstrates the role of international convention implementation in advancing global environmental governance.

•North–South cooperation provided foundational support, with GEF funding and technology transfer helping China overcome technical bottlenecks in waste disposal.

•South–South cooperation expanded the demonstration effect, as China's policies, technologies, and management experience were shared with other developing countries through UN platforms to help them address POPs challenges.

•The project also pioneered an innovative governance model that integrated "policy frameworks + technological innovation + capacity building," offering a replicable pathway for global pollutant management.

In fulfilling the Stockholm Convention on Persistent Organic Pollutants, China not only effectively controlled domestic environmental risks but also, through the implementation of the GEF China POPs Waste Environmentally Sound Management and Disposal Project, established a model for other developing countries confronting similar challenges. China's experience shows that fulfilling international conventions is not merely an obligation but also an important opportunity to improve domestic environmental quality, promote green technological innovation, and engage more actively in global environmental governance.

### 3.1.2 Small Multilateral Cooperation Mechanisms

Small multilateral cooperation mechanisms have shown positive momentum in advancing green development, and their role has become increasingly prominent. Frameworks such as the Asia-Pacific Economic Cooperation (APEC), the Group of Twenty (G20), the BRICS cooperation mechanism, and the Shanghai Cooperation Organization (SCO) have all been expanding the scope and depth of their cooperation, taking on an important role in green development. These

mechanisms promote implementation of the global green agenda through policy coordination, knowledge sharing, and pragmatic cooperation. As the highest-level, broadest, and most influential economic cooperation mechanism in the Asia–Pacific region, APEC has launched a series of initiatives and cooperative actions to promote green growth and sustainable development. The G20, as a key platform for global economic governance, plays a crucial role in coordinating global green finance, energy transition, and climate governance. The BRICS mechanism and the SCO are likewise deepening cooperation in the green sphere, building consensus and taking joint actions to support global green and low-carbon development. Through these combined efforts, such mechanisms not only enrich the architecture of global environmental governance but also inject multilateral momentum into green development.

The APEC Cooperation Network on Green Supply Chain is an innovative practice in regional green development cooperation, demonstrating how market mechanisms combined with multilateral cooperation can effectively promote green transition in the Asia–Pacific region. By leveraging supply chains as economic linkages, it integrates environmental governance into mainstream regional trade and investment, thereby providing a pragmatic platform for both North–South and South–South cooperation.

**(1) Case Study: APEC Cooperation Network on Green Supply Chain**

The network, which was approved at the 2014 APEC Economic Leaders' Meeting in Beijing, was initiated by China as the Asia–Pacific region's first multilateral cooperation platform dedicated to green supply chains. Its goal is to reduce the environmental impact at every stage of the supply chain through market-based approaches.

•Core mechanism: Centred on the Tianjin Demonstration Center, the network advances policy coordination, capacity building, and mutual recognition of standards. It promotes exchanges and technical cooperation among economies by convening annual meetings, developing management tools (such as a green indicator system for e-commerce logistics), and building an information-sharing platform.

•Innovative practice: The network adopts a "government-enterprise linkage" model, under which the Chinese government guides enterprises, such as Huawei and Cainiao Logistics, to implement green supply chain management through policies, including green procurement and green finance, while enterprises respond through market actions, creating a dual driving force of policy and market. It has also promoted the incorporation of environmental factors into credit evaluation systems to steer green finance in support of supply chain greening.

•Key outcomes: The network has facilitated green trade and promoted the cross-border flow of green products and services. The green supply chain management model it advocates for has been practised in Tianjin, Dongguan, Shenzhen, and other cities in China, yielding positive results and providing useful experience for regional green development.

（2）Summary and Takeaways

The value of the APEC Cooperation Network on Green Supply Chain lies in several aspects:

•It has provided a replicable regional cooperation model: its "demonstration centre + capacity building + information sharing" framework is readily adaptable elsewhere, while the government-enterprise linkage model has enhanced policy implementation efficiency.

•It has strengthened China's influence in regional green governance: by initiating and leading the network, China has successfully shared its concepts and solutions for green development, contributing Asia–Pacific experience to global environmental governance.

•It has achieved synergy between environmental and economic benefits: by embedding environmental standards into the core of supply chains, it has reduced environmental risks while helping enterprises enhance competitiveness and lower compliance costs, thereby promoting regional green transition and sustainable development.

This case demonstrates that regional cooperation mechanisms such as APEC can effectively complement UN multilateral agreements by advancing international cooperation on green development in a more flexible and pragmatic manner.

## 3.2 South–North Cooperation

Traditional North–South cooperation continues to play an irreplaceable role in bridging financing and technology gaps for green transition and accelerating global sustainable development. Developed countries provide support to developing countries through technology sharing, policy coordination, and institutionalized dialogue, thereby enhancing their capacity to address climate change and advancing the process of global climate governance. The China–EU High-Level Dialogue on Environment and Climate is a key mechanism for deepening the green partnership between the two sides. Under this framework, both parties have engaged in practical cooperation and mutual learning in key areas, such as green energy, low-carbon technologies, and plastic pollution control. Other representative forms of North–South cooperation include the China–Norway cooperation on carbon market development, Sino–German Environmental Forum, and China–Denmark water environment cooperation. Together, these initiatives have enriched the practice of North–South cooperation and injected diverse momentum into the global green transition.

**(1) Case Study: China–Norway Cooperation on Carbon Market Development**

Since the late-20th century, China has been actively advancing the development of a nationwide carbon market and has needed to draw upon international experience to refine its domestic system. Norway, as one of the earliest countries to establish a carbon trading system and to levy a carbon tax, has extensive expertise in carbon pricing. Against this backdrop, the two countries launched in-depth cooperation on the development of a carbon emissions trading system. In 1995, the environmental authorities of China and Norway signed the Memorandum of Understanding on Environmental Cooperation, initiating bilateral collaboration in emissions trading system (ETS) development. In 2012, Norway started to support China to establish a national carbon emissions trading system. In December 2019, China's Ministry of Commerce and Norway's Ministry of Foreign Affairs signed an agreement on the Sino–Norwegian Emissions Trading System Project, under which Norway shared its experience in carbon pricing and monitoring, reporting, and verification (MRV) to support the establishment of China's national carbon market. The cooperation focused on three main areas:

•Policy design: Drawing on Norway's allocation methods and carbon pricing mechanisms to facilitate China's adoption of the Interim Regulations on the Administration of Carbon Emissions Trading.

•Capacity building: Delivering carbon accounting training programs across high-emission sectors, such as power generation and cement.

•Market linkage research: Exploring the potential for future linkages between the Chinese, European, and Norwegian carbon markets.

（2）Summary and Takeaways

•Core strengths of North–South cooperation: Developed countries, such as Norway, contribute mature expertise in market mechanism design, while China offers large-scale application scenarios, creating a complementary "experience-practice" dynamic.

•Value for global governance: The outcomes of this cooperation directly supported China's carbon market, which now covers more than 40% of national $CO_2$ emissions, making it one of the largest carbon markets in the world and providing a replicable transition pathway for other developing countries.

•Replicability of the model: Through joint research, technology transfer, and policy dialogue, China and Norway built a model of North–South cooperation that can be extended to areas, such as green finance and marine protection. This case shows that North–South cooperation, when focused on institutional co-building and capacity empowerment rather than simply financial aid, can more effectively drive transformation in the global green governance system.

**Box 3-1. China–EU High-Level Environment and Climate Dialogue mechanism**

The China–EU High-Level Environment and Climate Dialogue was launched in September 2020, following a joint decision at a virtual meeting of Chinese, German, and EU leaders, with the aim of building a green partnership between China and the EU. As the highest-level dialogue mechanism between the two sides in the fields of environment and climate, at vice-premier level, it is co-chaired by the Vice-Premier of the State Council of China and the Executive Vice-President of the European Commission. Distinguished by its high frequency, broad agenda, and substantial outcomes, the dialogue has focused on climate policy, biodiversity conservation, green energy transition, carbon market development, circular economy, and global environmental governance. To date, six meetings have been successfully held, producing a series of tangible outcomes and joint statements. Marking the 50th anniversary of China–EU diplomatic relations in 2025, the two sides issued the Joint Statement on Climate Change by Chinese and EU leaders in July, once again sending a clear signal to the international community of their joint commitment to addressing global climate change and firmly upholding multilateralism.As an integral part of the China–EU Comprehensive Strategic Partnership, the China–EU High-Level Environment and Climate Dialogue has further advanced bilateral cooperation on low-carbon transition and technological exchange, while injecting stability and leadership into global multilateral environmental processes. It fully reflects the firm resolve and pragmatic action of China and the EU in working together to confront the global climate crisis.

## 3.3 South–South Cooperation

South–South cooperation is increasingly becoming an indispensable force in global governance, playing an ever more important role. In the field of green development, it has advanced through technology sharing, financial support, and capacity building, enabling developing countries to safeguard their right to development while effectively addressing climate change and ecological pressures. In doing so, it offers practical solutions to the longstanding dilemma between development and environmental protection. Moreover, South–South cooperation helps to consolidate collective consensus among developing countries, strengthen their voice in global

environmental governance, and promote the establishment of a fairer and more equitable international order, injecting vital "southern momentum" into the implementation of the Paris Agreement and the safeguarding of global ecological security.

China has been an active participant and promoter of multiple South–South cooperation initiatives. China–ASEAN green cooperation directly affects the ecological well-being of one quarter of the world's population. The Africa Solar Belt program—a partnership between China and African countries—has pledged to provide solar lighting to 50,000 households without electricity, significantly improving energy access and quality of life in the region. Cooperation between China and Brazil has been recognized as a model case of South–South cooperation, carrying important demonstration significance. Together, these examples highlight China's leading role in South–South cooperation and the broad applicability of green development pathways.

### 3.3.1 China–ASEAN Cooperation

China–ASEAN cooperation is an important example of South–South cooperation in the field of green development. Through institutionalized cooperation and knowledge sharing, China and ASEAN have developed a distinctive "technology-resource-culture" tripartite synergy in the green economy. On the technological front, China's full industrial-chain advantages in photovoltaics and energy storage complement ASEAN's abundant renewable energy potential: ASEAN holds one quarter of the world's geothermal resources and has solar development potential exceeding 1 terawatt, providing large-scale application scenarios for the export of Chinese green technologies. In terms of resources, ASEAN's biodiversity density ranks among the highest globally, and when combined with China's biotechnology research capacity, it creates opportunities for new forms of green economic cooperation. On the cultural dimension, the two sides share the concept of "harmony between humanity and nature," which facilitates the acceptance of China's ecological governance experience within ASEAN.

**(1) Case Study: ASEAN–China's Year of Sustainable Development Cooperation (2021–2022)**

This cooperation year marked the first comprehensive China–ASEAN initiative, themed around sustainable development. Its core approach was to deepen regional green governance through a three-dimensional model of "policy dialogue + capacity building + multistakeholder participation":

•Institutional innovation: Supporting the establishment of platforms, such as the China–ASEAN Environmental Cooperation Forum and the China–ASEAN Green Envoys Program, which involved more than 50,000 officials, youth, and enterprise representatives, and mainstreamed topics, including climate adaptation and green value chains.

•Practical achievements: Implementing 14 thematic activities, including those on green finance, community plastic reduction, and mangrove protection. Clean energy cooperation stood out in particular; Chinese investment accounted for 60% of ASEAN's foreign direct investment in renewable energy, thereby supporting projects, such as Thailand's floating photovoltaic farm and hydropower plants in Cambodia.

•Multistakeholder participation: Forming a collaborative network of "government leadership + scientific research support + enterprise practice + youth innovation," exemplified by the Youth Climate Innovation Programme, which trained nearly 500 young leaders and strengthened the pool of governance talent.

(2) Summary and Takeaways

•Core value of South–South cooperation: The China–ASEAN model demonstrates that developing countries can achieve green leaps through knowledge sharing and asymmetric technology transfer, rather than relying on conventional North–South technology flows.

•Regional governance innovation: The cooperation year established a "policy-science-business" framework that provides the Global South with a paradigm of capacity co-building that goes beyond financial assistance, with lessons that can be extended to China–Africa and China–Latin America cooperation.

•Global governance significance: Through ASEAN cooperation, China has translated the concept of ecological civilization into regional practice, strengthening its rule-shaping capacity in the global environmental agenda and providing a regional pathway for the implementation of multilateral goals, such as the Paris Agreement.

This case demonstrates that the success of South–South cooperation lies in building institutionalized platforms and sharing adaptable technologies. By aligning China's green technology advantages with ASEAN's resource endowment, China–ASEAN cooperation has achieved a "1+1>2" synergistic effect.

**Box 3-2: ASEAN Energy Transition**

The ASEAN energy transition is characterized by "ambitious targets but lagging implementation." Although ASEAN has set positive goals such as achieving a 35 percent share of renewable energy capacity by 2025, by 2023 it had only achieved 96 percent of the capacity target (33.6 percent). The share of renewables in primary energy consumption (14.4 percent) and the reduction in energy intensity (24.5 percent) also fell well short of expectations. It is projected that by 2025, the share of renewable energy consumption will reach only 19.6 percent, far below the intended goal. Driven by industrialization and industrial relocation, energy demand is expected to increase by 30 percent by 2030 and by 170 percent by 2050. At the same time, ASEAN remains heavily dependent on fossil fuel imports, with 20 percent of the population lacking access to clean cooking energy. The region also faces an average annual investment gap of USD 130 billion (with only USD 72 billion achieved between 2021 and 2023), as well as technological constraints and incomplete industrial chains. As a result, ASEAN relies on the "10+N" cooperation mechanism and external collaboration with China, Japan, South Korea, Europe, and the United States to drive its energy transition.

Malaysia serves as a benchmark in ASEAN's transition, with strong policy leadership. In 2023, it issued the National Energy Transition Roadmap, setting a target for renewables to account for 70 percent of total energy generation by 2050. By 2023, renewables already accounted for 25 percent of its power generation, with solar capacity exceeding 3 gigawatts. Key projects include the Sarawak green hydrogen plant and ASEAN power grid interconnection project. Policies such as "green electricity tariffs" have also been introduced to reduce energy costs. However, the country still faces a financing gap (USD 66.9 billion required by 2030), technological dependence, and resistance from entrenched fossil fuel interests. To overcome these challenges, Malaysia will need to attract foreign investment through public-private partnerships, explore new models such as floating solar hydrogen production, and rely on regional collaboration and external cooperation as key drivers.

### 3.3.2 Lancang–Mekong Cooperation

Lancang–Mekong Cooperation (LMC) represents China's innovative practice of advancing South–South cooperation in subregional environmental governance. Through its pragmatic, efficient, and project-based model, the LMC has integrated green and low-carbon development into regional economic integration, offering the Global South a replicable model of sustainable development for jointly tackling climate and environmental challenges.

**(1) Case Study: Green Lancang–Mekong Initiative**

Launched in 2018, this initiative serves as the core platform for environmental cooperation under the LMC. It promotes regional green transition across three dimensions—policy coordination, technology sharing, and livelihood projects:

•Institutional innovation: Establishing a dual-track mechanism of "high-level consensus + professional institutional implementation." For 4 consecutive years, environment cooperation has been included in the declarations of the LMC Leaders' Meetings. The Lancang–Mekong Environmental Cooperation Center has coordinated the implementation of more than 40 joint studies, covering areas such as low-carbon infrastructure and water environment management.

•Livelihood demonstration: Implementing "small yet beautiful" projects in countries, such as Cambodia and Laos. Examples include a rural solid waste management pilot project in Laos (covering 16 villages and more than 9,000 people), school wastewater treatment projects (with a 100% treatment rate), and the development of low-carbon demonstration zones in Cambodia (providing solar streetlights, air quality monitoring stations, and other equipment).

•Capacity building: Convening more than 40 policy dialogues and training over 5,000 environmental officials. The initiative has also established the Lancang–Mekong Knowledge Hub, which promotes technologies and practices, such as mangrove conservation and sustainable infrastructure.

（2）Summary and Takeaways

•Core strengths of South–South cooperation: The LMC model has addressed financing challenges through a "seed funding + international collaboration" approach, achieving both environmental governance and livelihood improvements.

•Regional governance demonstration effect: By linking policy, technology, and livelihoods in a closed loop, the LMC has translated global agendas (such as the UN 2030 SDGs) into localized actions, providing green support to regional countries.

•Value for the Global South: The LMC model can be extended to other river basins (such as the Nile in Africa and the Amazon in Latin America), particularly in developing regions with weak infrastructure but abundant ecological resources, advancing green transition in tandem with poverty alleviation.

The Lancang–Mekong experience demonstrates that the success of South–South cooperation requires the synergy of institutionalized platforms, adaptable technologies, and livelihood-oriented projects. By sharing green technologies (such as photovoltaics and wastewater treatment) and policy experience, China has strengthened its influence in global environmental governance.

### 3.3.3 China–Africa Cooperation

The Chinese government has introduced an industrialization support plan for Africa, and since 2024, has granted zero-tariff treatment on 100% of taxable products from 33 least developed

African countries. This policy was subsequently extended to all 53 African countries with diplomatic relations with China, marking a new stage of comprehensive zero-tariff trade between China and Africa and creating unprecedented favourable conditions for African products to enter the Chinese market.

In the field of green energy, China–Africa cooperation has become a highly effective and innovative practice within South–South cooperation. Guided by a model of "technology adaptation + livelihood orientation," China has leveraged its technological, production, and cost advantages in the photovoltaic industry and aligned them with Africa's abundant solar resources and urgent energy access needs. By implementing a series of "small yet beautiful" livelihood-oriented initiatives, such as the Africa Solar Belt Program, China has supported African countries in alleviating energy shortages, advancing green and low-carbon transition, and providing the Global South with replicable and scalable models for expanding energy access and sustainable development.

**(1) Case Study: Africa Solar Belt Program**

Announced by China at the inaugural Africa Climate Summit in September 2023, the program adopts a three-dimensional model of "material assistance + capacity building + joint research" to address the challenge of populations without electricity in Africa:

•Livelihood delivery: Donating more than 20,000 household photovoltaic systems to five countries, including Burundi and Chad, directly benefiting nearly 20,000 households. Each household gained an average of 3 hours of electricity per day, with energy costs reduced by 40%.

•Capacity co-building: Organizing China–Africa climate capacity-building workshops, training 28 photovoltaic specialists from 15 countries, and supporting the establishment of a vocational training base for photovoltaic education to cultivate local talent.

•Model innovation. Exploring integrated "photovoltaics + agriculture/water supply" solutions that link energy provision with productive uses, overcoming the limitations of single-purpose electricity supply.

(2) Summary and Takeaways

•Core value of South–South cooperation: By focusing on "small yet beautiful" programs (household systems as substitutes for large-scale power stations), China and Africa directly addressed the challenge of weak power grids, avoided high-cost infrastructure investments, and achieved rapid and inclusive benefits.

•Innovation in global governance: The program was recognized at COP 29 as a "model of South–South cooperation." Its closed-loop approach of material assistance and training-research can be replicated in other renewable energy fields, such as wind and biogas, particularly in developing regions with underdeveloped infrastructure.

•China's evolving role: China has moved from being a supplier of photovoltaic equipment to a provider of green energy system solutions. By sharing technologies, such as distributed PV operation and maintenance, it has strengthened Africa's capacity for self-sustained development and provided a practical pathway for global climate governance.

This case demonstrates that the success of South–South cooperation depends on accurately matching needs (such as Africa's populations without access to electricity) with adaptable technologies (such as distributed photovoltaics). Through the Africa Solar Belt Program, China and Africa have simultaneously advanced energy access and climate action, offering a regional example for the implementation of the United Nations 2030 SDG 7.

### 3.3.4 China–Brazil Cooperation

During President Xi Jinping's visit to Brazil in 2024 and President Lula's visit to China in May 2025, China and Brazil signed a series of cooperation documents that explicitly called for deep strategic alignment of Brazil's Growth Acceleration Plan, New Industry Brazil, the Ecological Transformation Plan, and the South American Integration Routes project with China's Belt and Road Initiative cooperation framework. China–Brazil cooperation has become a benchmark practice of South–South cooperation in the green value chain field. Relying on a tripartite complementary model of resources and technology-market, the two countries are deeply integrating China's strengths in green technologies and market access with Brazil's rich resource endowments, offering a replicable and scalable cooperative paradigm for Global South countries that are balancing economic growth with ecological protection.

**(1) Case Study: China–Brazil Green Value Chain Collaboration in Agricultural Products**

This collaboration centres on key agricultural products, such as soy and beef, and promotes full-chain green transformation through "policy coordination + technology traceability + mutual recognition of standards":

•Policy mechanism: Building on the establishment of the China–Brazil Subcommittee on Environment and Climate Change in 2023, green trade has been incorporated into high-level dialogues. Under this framework, the Work Plan of the Subcommittee on Environment and Climate Change (2025–2029) outlines clear pathways for emissions reduction and cooperation on sustainable agriculture.

•Technology application: Scaling up satellite remote-sensing and blockchain traceability technologies, aiming for 100% farm-level traceability of soy in Brazil's high-risk zones (e.g., Bunge, COFCO International), and more than 50% traceability in the beef supply chain (e.g., JBS, Marfrig), thereby effectively curbing emissions associated with deforestation.

•Trade upgrading: In 2023, Brazil's agricultural product exports to China reached USD 55.83 billion, accounting for about 37% of its total agricultural export value. Through green certification, these products achieved premium pricing while also helping to stabilize China's supply chains.

(2) Summary and Takeaways

•Core value of South–South cooperation: China and Brazil trade market access for green transformation, resolving the tension between environmental protection and growth common in developing countries. This approach has helped achieve both large export volumes (over USD 180 billion annually) and reductions in carbon intensity.

•Innovation in global governance: The collaboration has been recognized as a model for agricultural green finance; its "technology-policy-trade" interactive model offers potential for replication in resource-exporting regions, such as Southeast Asia and Africa.

•China's evolving role: Moving beyond being an importer of agricultural goods, China is now co-shaping green standards and contributing traceability technologies via companies, like COFCO, enhancing supply chain resilience across the Global South.

China–Brazil cooperation demonstrates that successful South–South cooperation depends on anchoring in key industries (like soy and beef), leveraging technical tools (remote sensing, blockchain), and securing high-level institutional backing (such as the Subcommittee on Environment and Climate Change). When these elements align, the "ecology-trade-development"

triple objective becomes feasible, providing a Southern approach to implementing the United Nations 2030 Agenda (especially SDG 12 and SDG 13).

# Chapter 4. Innovative Models in International Green Development Cooperation

The global landscape is undergoing a significant transformation marked by a fragmenting multilateral architecture, escalating climate risks, persistent economic uncertainties, and geopolitical tensions. In this context, traditional models of development cooperation are being re-evaluated, and innovative approaches are emerging, particularly within the Global South. This chapter explores these evolving models, focusing on the dynamics of South–South cooperation as a vital pillar for a sustainable future. It provides a summary of the current cooperation status and challenges, identifies emerging pathways for collaboration, and highlights the innovative interplay between governments, think tanks, and corporations. By drawing on the experiences of Brazil, Indonesia, BRICS and climate-vulnerable nations, and the role of China as a key partner, this chapter illuminates the potential for new paradigms in international green development cooperation.

## 4.1 Existing Cooperation Frameworks and Challenges

This section examines existing bilateral and multilateral cooperation frameworks of South–South cooperation and challenges to be tackled, particularly China–Brazil, China–Indonesia, and China–V20. The China–Brazil partnership seeks to move beyond a commodity focus toward a more sustainable global economy, addressing shared challenges, such as global trade disruptions, supply chain security, and climate impacts amidst domestic vulnerabilities. The China–Indonesia cooperation highlights strategic shifts toward clean energy and economic diversification. Finally, China–V20 collaboration focuses on supporting climate-vulnerable nations through initiatives, such as the Climate Prosperity Plans, aiming to leverage China's green technology and infrastructure investment to overcome economic strain and achieve climate resilience.

### 4.1.1 China–Brazil

As noted above, China and Brazil have long maintained a resilient and pragmatic relationship grounded in shared development priorities and strong economic complementarity. Over the past 2 decades, bilateral trade has expanded rapidly, evolving into a deep strategic partnership on various fronts, including those related to several BRICS initiatives.

Currently, the China–Brazil partnership focuses primarily on commodities and energy, with limited diversification. The urgency of expanding the relationship is especially reinforced by recent global developments. **First**, the trade war initiated by the United States has disrupted global supply chains and challenged long-standing norms in multilateral trade, forcing both Brazil and China to reassess their strategic alliances and economic dependencies. **Second**, there is a growing geopolitical emphasis on the security of supply in energy, critical minerals, and sustainable agri-food systems. Both nations must now consider not only economic efficiency but also strategic resilience when securing essential resources. **Third**, escalating climate-related disasters—from floods and droughts to ecosystem degradation—demand immediate action in adaptation and ecosystem restoration, including forest protection and regeneration.

China and Brazil can work together to address their respective challenges. In particular, Brazil's structural vulnerabilities—low productivity, chronic underinvestment, and social inequalities—were worsened by the COVID-19 pandemic. Although socio-economic indicators have improved significantly in recent years, it is evident that the country lacks the necessary investments to establish a sustained, inclusive, and technologically advanced development path. Meanwhile, China faces its own pressures: sustaining economic growth while transitioning to a greener economy and securing food and energy supplies.

These challenges are further exacerbated by a difficult financial environment. The breakdown of multilateral trade regimes, rising economic nationalism, and heightened volatility in international capital markets have increased risks for emerging economies, like Brazil, which rely heavily on commodity exports and foreign investment. Access to capital, particularly long-term, low-cost financing, has become more restricted. This adds pressure to a pre-existing macro-financial environment already marked by high interest rates and fiscal constraints.

At the same time, growing investor scrutiny regarding deforestation and environmental, social, and governance (ESG) risks poses a threat to Brazil's access to capital[15]. For countries like Brazil, where capital scarcity has been a long-standing challenge, the convergence of these trends threatens to delay or derail critical investments necessary for sustainable development. These systemic changes have also led to heightened financial volatility and risk aversion in capital markets, thereby tightening global liquidity conditions.

### 4.1.2 China–Indonesia

Indonesia is solidifying its role as a key economic force in Southeast Asia, with the approaches of President Jokowi and President Prabowo demonstrating both continuity and strategic shifts. President Jokowi's commitment to accelerating the clean energy transition was evident in October 2023 with the USD 54 billion cooperation agreement[16]. This agreement, signed by Indonesia's state-owned utility PT Perusahaan Listrik Negara Persero (PLN), involved two of China's clean energy giants, along with Chinese banks and tech companies. Following this, President Prabowo's first foreign trip to China immediately after taking office was highly symbolic, underscoring the continued importance of the bilateral relationship.

Most recently, in May 2025, the Chinese Prime Minister Li Qiang's visit marked 75 years of diplomatic relations between China and Indonesia. This visit resulted in 12 strategic agreements across various sectors, including bilateral cooperation in industrial and supply chains, and a trilateral agreement with the Fujian provincial government to advance the Two Countries, Twin Parks initiative. These agreements build upon the USD 10 billion trade cooperation signed in October 2024.

Indonesia's official entry into BRICS in January 2025 is a strategic move to expand its economic reach. This membership will potentially provide access to vast combined markets, diversify trade opportunities, and facilitate South–South cooperation and technology transfer. Given the significant U.S. tariffs currently facing Southeast Asia, Indonesia must leverage its domestic strengths to create a buffer against global trade headwinds. Indonesia's economic priorities—downstreaming, strengthening resilience, and accelerating clean energy rollout—are well aligned with China's goals of diversifying its markets and supply chains, making this partnership a pragmatic alignment of interests.

Among others, Indonesia's coal phase-out goals, while challenging, present an opportunity for

China to demonstrate its commitment to a Green Belt and Road Initiative by actively supporting the transition of Indonesia's existing and future energy assets. This includes full implementation of President Xi's pledge to cease construction of new coal-fired power projects abroad.

Currently, Indonesia's domestic energy sector dynamics and Indonesia–China's bilateral cooperation in the energy field have the following features.

**First, the challenge of implementing Indonesia's coal phase-out target.** The role of Chinese investors and developers in Indonesia's coal power sector is an opportunity for China to contribute to Indonesia's goal of phasing out coal-fired power [17][18]. This is particularly true in captive coal power plants linked to nickel processing [19][20].

**Second, redefining energy security.** President Prabowo has framed energy security as "energy self-sufficiency" (*swasembada energi*) over "energy resiliency" as the top national priority in his vision for Golden Indonesia 2045[21]. Although such emphasis has been historically interpreted through the lens of fossil fuels, China can use this opportunity to demonstrate how clean energy is, in fact, the ultimate path to true and prosperous energy self-sufficiency. Indonesia's abundant domestic renewable resources, such as solar, wind, geothermal, and hydro, can provide a buffer against global price volatility and geopolitical disruptions. By emphasizing shared benefits and addressing Indonesia's immediate needs, China can leverage existing commitments and help shift this paradigm, building a more resilient and integrated green energy supply chain in the process.

**Third, stagnant clean energy investment.** Indonesia's clean energy investment has remained stagnant over the past decade, falling significantly short of targets. In 2023, renewable energy investment was only USD 1.5 billion, nowhere close to the USD 146 billion of near-term investment needed to meet 2030 climate targets. Although PLN's previous 10-year business plan aimed to add 21 GW by 2030, only 1.6 GW has been realized[22]. Most of the remaining additions will carry over to the next 10-year plan, targeting 42 GW of new renewable energy by 2034[23]. Notably, only 14% of Indonesia's energy comes from renewables, well below the 2025 target of 23%[24]. Beyond generation capacity, annual investment on grid upgrades, energy efficiency measures, and the localization of clean energy manufacturing remains limited.

China is projected to account for over 25% of global energy investment in 2025. A significant investor in emerging economies, China is influencing a shift in investment from coal to clean energy by allocating funds for 68%[8] of overseas generation capacity to solar and wind projects, and controlling over 70%[9] of global manufacturing capacity for solar panels, wind turbines, and batteries. This demonstrates a strong preference for a clean energy future. Indonesia should prioritize crucial reforms to create an attractive investment environment.

### 4.1.3 China–V20

While the entire planet is imperiled by climate change, the vulnerability of the 74 member nations of the Climate Vulnerable Forum and its V20 Finance Ministers (CVF-V20) is unique and distinguishable. For these countries—which represent over 20% of the world's population but only 4% of global greenhouse gas emissions—climate vulnerability is less a matter of geography than a socio-economic condition. They grapple with impacts from slow-onset events and episodic disasters, which are compounded by a lack of development, uncertain economic situations, and systemic financial barriers. This has created a development trap where economies lose wealth to climate impacts, struggle with costly capital and debt, and cannot invest in resilience or low-carbon growth.

According to the V20 debt report, over the past 2 decades, these climate-vulnerable countries lost about 20% of their collective wealth (approx. USD 525 billion) due to climate change impacts. The hardest-hit economies would be twice as wealthy today if climate disasters did not erode their gains. At the same time, they face immense costs to adapt and transition. Estimates suggest the V20 needs USD 490 billion per year in climate finance by 2030 to meet its development and climate goals, yet the resources to fund resilience and green growth remain elusive.

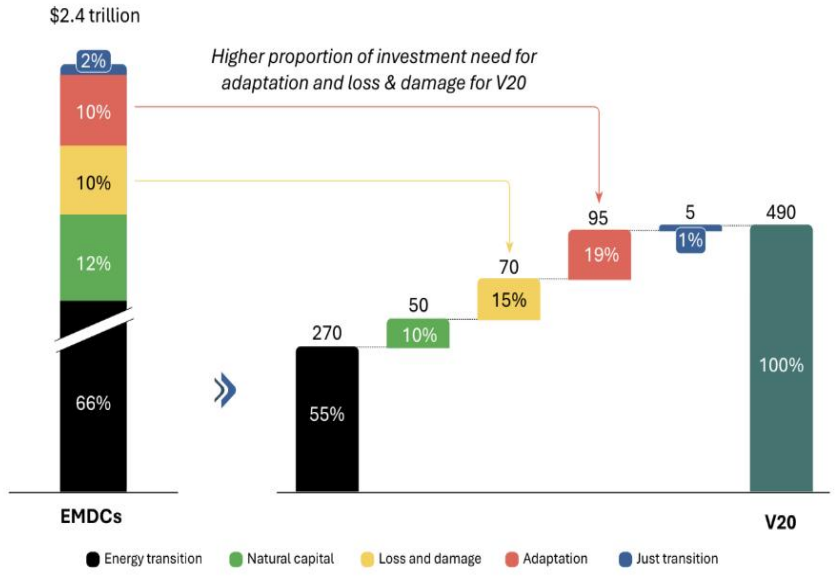


Figure 3. Estimated annual climate finance for EMDCs (excluding China) and the V20 by 2030 (USD billion)

Source: CVF/V20. 2025. The Resilience Effect: 10 Super Levers to Catalyse Climate Finance in Climate-Vulnerable Countries.

The multifaceted challenges facing the V20 can be characterized by several interconnected factors:

- **Disproportionate impacts.** Climate-vulnerable nations bear the brunt of climate change, with impacts far outweighing their contributions to global emissions.
- **Economic strain.** High cost of capital, unsustainable debt burdens, and limited fiscal space make investing in resilience or recovery nearly impossible.
- **Technology access gap.** Without equitable access to technologies, adaptation and economic transformation remain out of reach.
- **Interrupted recovery:** Prolonged recovery times are a direct result of repeated climate disasters, creating a cycle of crisis rather than progress.
- **Systemic barrier.** The current state perpetuates inequality, blocking the pathway to economic transformation and climate prosperity.
- **Technology and data gaps:** A lack of equitable access to green technologies, coupled with insufficient data on hazards and exposures, hinders adaptation and economic diversification.

- **Governance and human capacity gap.** Limited institutional capacity, governance challenges, and insufficient skilled human resources constrain effective climate planning, policy implementation, and disaster response.

At the heart of the crisis is a debilitating financial squeeze, defined by a massive outflow through debt repayment and a reduction in grant availability.

On the one hand, mounting debt and its servicing costs have reached historically high levels of 15% on average across the V20 membership, with 11 V20 member countries spending over 25% of government revenue servicing external debt alone. Many V20 members face increasing capital costs and are paying interest rates higher than those in developed economies, partly due to climate-related risk premiums on their debt. External debt burdens are unsustainable: In 2023, the V20's total external sovereign debt stock amounted to USD 1.01 trillion, with multilateral development banks (MDBs) forming the largest creditor class at 40%. Sixteen V20 members spent more than 20% of government revenue on debt service payments in 2024. V20 members are also expected to pay USD 746 billion in debt service payments over 2025–2031[25]. This has ignited a vicious climate-debt spiral: climate disasters drive up debt, and high debt in turn crowds out the climate investments needed to build resilience. In too many cases, new development is constantly suppressed by the climate–debt spiral (see Figure S1).

In 2023 alone, nearly USD 200 billion flowed out of the economies of emerging nations in debt repayments, compared with only around USD 2 billion received in concessional aid. In 2025, major donors have made deep aid cuts, slashing global ODA by up to USD 48 billion by 2027, a 14%–21% drop. At a time of escalating health, food, and climate crises, the world's safety net is shrinking just when resilience is needed most. Health-based infrastructure is at its all-time weakest due to the unfettered expansion of vector-borne diseases and worsening extreme heat-related morbidity and mortality; adaptation programs responsive to the thermal impact on labour are virtually non-existent. The world is grappling with intensifying food insecurity and high levels of youth unemployment.

Against the backdrop, the Climate Prosperity Plans (CPPs) were initiated to transform climate-vulnerable nations into future investment hubs. These plans mobilize resources and foster collective action by encouraging the sharing of best practices and collaborative innovation alongside traditional funding channels. CPPs are comprehensive, multiphase national investment and technology access strategies led by the finance ministries of CPP countries, building upon existing national development plans, nationally determined contributions (NDCs), and other relevant strategies. They support climate-vulnerable nations in turning climate risks into "bankable opportunities" by creating long-term investment strategies for low-carbon and climate-resilient development.


Figure 4. Ten interconnected "super-levers" identified to mobilize an additional USD 210 billion annually in affordable climate finance for V20 countries

Source: CVF/V20. 2025. The Resilience Effect: 10 Super Levers to Catalyse Climate Finance in Climate-Vulnerable Countries.

A strong partnership between V20 nations and China is critical for the success of CPPs. As a global leader in South–South cooperation and a major provider of green technology and infrastructure investment, China can significantly support project preparation, investment, and financing for CPP initiatives. Aligning CPPs with China's increasingly green-focused Belt and Road program can attract new capital and expand cooperative strategies. This collaboration between China and V20 countries is crucial for vulnerable nations to achieve sustainable prosperity, ultimately increasing confidence in reaching global climate goals.

## 4.2 Emerging Bilateral Models and Pathways

This section identifies opportunities in emerging bilateral mechanisms for green development, in particular, between China and Brazil (Section 4.2.1) and China and Indonesia (Section 4.2.2). In the Brazil section, a transformational partnership is highlighted that expands on the existing partnership. In the Indonesia section, a China–Indonesia Energy Transition Mechanism is envisioned that focuses on retiring existing coal assets, nurturing Indonesia’s supply chains, and aligning Indonesia’s Danantara fund with Chinese public and private investments through joint frameworks and blended financing schemes to reduce risk and attract investors.

Both the Brazil and Indonesia partnerships emphasize technology transfer and knowledge sharing. In Brazil, this includes enhancing the financial sector's understanding of climate-aligned investments. In Indonesia, China can share best practices on green industrial parks and support the development of a domestic clean tech manufacturing supply chain.

### 4.2.1 A Transformational Partnership for China-Brazil Cooperation

In Brazil, the focus is on creating a transformational partnership that moves beyond commodity trade. **Three interconnected areas present immediate opportunities** for this reimagined partnership.

#### *4.2.1.1 Regenerative Agriculture and Sustainable Trade*

China has substantial demand for soybeans and corn as animal feed, and feed remains one of the highest cost components for livestock producers. Joint efforts to develop more sustainable and value-added feed ingredients could reduce emissions, lower production costs, and improve the overall resilience of the livestock sector in both countries.

In 2023, Brazil launched the National Program for the Conversion of Degraded Pastures (PNCPD), seeking to recover 40 million hectares through low-carbon, deforestation-free agriculture. This initiative represents an ideal entry point for green cooperation between these two trading partners. By supporting traceable, sustainable production, China can enhance its food security while reducing the environmental footprint of its imports.

Building on this cooperation, China and Brazil have a strategic opportunity to enhance the sustainability and efficiency of feed and livestock supply chains. As more companies seek to reduce Scope 3 emissions, including those associated with raw material sourcing, attention is growing around the environmental impacts of feed production worldwide.

This agenda also aligns with China's green Belt and Road Initiative (BRI) principles and creates potential synergies with low-carbon fuel markets for aviation and maritime sectors.

#### *4.2.1.2 Patient Capital for the Green Transition*

As previously indicated, a long-standing constraint on Brazil's development has been the scarcity of long-term financing for infrastructure and innovation. Most decarbonization projects require patient capital to cover early-stage risks and long payback periods. For those reasons, and despite Brazil's commitment to fulfilling its decarbonization commitments, it is unlikely that two major programs—the Ecological Transformation Program and its new green industrial policy (Nova Industria)—will be implemented.

China has been very successful in financing its decarbonization and green industrial policy programs, which can be partly attributed to the abundant dedicated capital available for these initiatives. With its substantial savings and global financial influence, China is uniquely positioned to help bridge the financing gap in Brazil. Bilateral financial mechanisms—including green investment platforms and feasibility study funds—could facilitate scalable investment in sectors, such as agroforestry, clean energy, and climate-resilient infrastructure.

Both countries have a remarkable comparative advantage in building the institutional bridge needed to close the green financing gaps. A strong and coordinated role for public development banks—particularly newer multilateral institutions like the New Development Bank (NDB) and the Asian Infrastructure Investment Bank (AIIB), as well as Chinese and Brazilian national development banks—can be transformative[26].

These institutions are uniquely positioned to co-develop investment projects and project pipelines, provide long-term financing, and catalyze private sector involvement through risk-sharing mechanisms. To fully realize this potential, China and Brazil should also collaborate on capacity building and deepen technical knowledge exchange, particularly to enhance the financial sector's understanding of climate-aligned investments in both countries. They should also work together to boost initiatives that can help create and scale projects, in turn developing pipelines that support blended finance operations among national public banks—for instance, by assisting BNDES in expanding its count platform (the Brazilian Investment Platform), which was created

last year.

Cooperation among them could lead to the creation of financial instruments tailored to the specific needs of climate-aligned and infrastructure investments. This may include blended capital structures and guarantees that reduce perceived risk and enhance the bankability of green projects, requiring an additional effort for the development of innovative, win-win investment solutions that are viable in both China and Brazil, potentially with complementary support from other countries and international partners on these multilateral arrangements.

*4.2.1.3 Renewable Energy and Green Industrialization*

Chinese investments in Brazil have focused mainly on the energy sector, with a significant portion directed toward renewable energy. Recently, Chinese outbound investment has also expanded into basic materials and infrastructure sectors[27].

However, enhancing this cooperation toward a more sustainable economy offers multiple benefits and mutual opportunities. For instance, Brazil's clean energy matrix, especially in the northeast, provides a competitive foundation for emerging green industries, such as green hydrogen, ammonia-based fertilizers, and low-carbon steel, among others. Increased investment, trade, and knowledge partnerships to support Brazil's green industrial development present mutual advantages for both nations while promoting more sustainable global industrial production.

In addition, expanding China–Brazil cooperation beyond generation to include transmission, storage, and industrial use could drive regional development, reduce emissions, and create quality jobs. It also helps reposition Brazil's economy on a more diversified and future-oriented basis while enhancing energy security for China's future development.

Finally, collaboration on carbon markets could leverage the complementary strengths of the two countries: Brazil's forests as a major source of high-quality nature-based credits, and China's growing emissions trading system as a structured demand platform. China's support for the official launch of Tropical Forest Finance Facility (TFFF) would also be a potential avenue to deepen bilateral green development cooperation.

### 4.2.2 A Proposed China–Indonesia Energy Transition Mechanism

A proposed China–Indonesia Energy Transition Mechanism aims to support Indonesia's coal phase-out. This involves developing transparent phase-out plans and catalyzing clean tech manufacturing within Indonesia. This goal could be achieved with the following efforts.

*4.2.2.1 Strategically Position China to Best Support Indonesia's Coal Phase-Out*

China is uniquely positioned to strategically support Indonesia's coal phase-out through a multifaceted approach, leveraging its leadership in clean energy and robust bilateral relations. As a global leader in clean energy, China can **facilitate on-site clean power generation at industrial sites** and offer best practices and cost-competitive solutions for green industrial parks to integrate from inception[28]. Furthermore, China can encourage Chinese firms to shift investments toward large-scale on-site renewables, thereby enabling greener production. This approach is further strengthened by China–Indonesia bilateral relations, which can support local content requirements and technology transfer, benefiting Indonesia's green manufacturing goals and fostering job creation.

China's unparalleled expertise in ultra-high-voltage electricity transmission, smart grids, and

large-scale energy storage systems aligns well with Indonesia's challenge to connect clean energy potentials to demand centres across its islands. This expertise can directly assist PLN in realizing the Green Super Grid[29]. Chinese financial institutions can also provide the substantial capital needed to accelerate the deployment of utility-scale solar and wind, as well as grid-scale battery energy storage systems (BESS) projects.

**China's extensive experience in the large-scale development of on-grid clean energy**, as the world's largest investor in clean energy with a proven track record for rapid scaling, would strongly complement Indonesia's grid upgrades. China's dominance in clean tech manufacturing allows it to leverage Indonesia's efforts to build its own domestic supply chain for solar panels, wind turbine components, and batteries, while encouraging strategic utilization of Indonesia's critical mineral resources. Ultimately, China's commitment to the green Belt and Road Initiative (BRI), or the "green and digital silk road," can be realized by directly supporting Indonesia's emissions reduction targets and its ambitious coal phase-out.

*4.2.2.2 Increase Cooperation Rather Than reverting to the Fragmentation of Supply Chains*

To foster a truly transformative partnership, China can empower Indonesia to become a key player in the global clean energy supply chain rather than merely being a recipient of clean energy solutions. This could include joint efforts to enhance the clean energy supply policy frameworks, fiscal incentives for clean tech manufacturing and exports, and establish reliable infrastructure to support green industrial parks, positioning these parks as crucial diversification hubs for Chinese companies[30].

Leveraging the green BRI, China should direct funds specifically toward clean energy projects and establish genuine joint ventures with local Indonesian partners for clean tech manufacturing, highlighting Indonesia's critical mineral reserves (nickel, bauxite, copper, and tin) as strategic resources for full value chain capture within these parks.

China can facilitate dialogues, drawing from its own experiences, and share best practices to shift Indonesia's energy security focus toward clean energy. Key topics may include strategic national planning and regulatory frameworks to support energy transition efforts, market-based mechanisms, incentives for community participation in renewable energy project, technology transfer, innovative financing mechanisms[31], energy efficiency measures, and decarbonization strategies for energy-intensive industries.

Supporting President Prabowo's vision of energy self-sufficiency by demonstrating that utility-scale and distributed clean energy projects are increasingly cost-competitive, and that reliance on finite fossil fuels and overseas manufacturing for components does not align with Indonesia's long-term energy security goals, would complement other parallel efforts.

Power supply planning for industrial parks should be coordinated to **prioritize large-scale, on-site renewables or dedicated off-site sources, coupled with demand-side incentives for industries,** and push for PLN's grid strengthening with renewables integration in mind. Finally, to bridge fragmentation and major gaps in national coordination, China can advocate for captive coal to be included in Indonesia's JETP discussions and express support for strict screening for new fossil fuel developments.

*4.2.2.3 Align Indonesia's Danantara Fund With China's Public and Private Investments*

Strategically aligning Indonesia's Danantara fund with China's public and private investments

requires creating a structured framework for joint climate finance. Both China and Indonesia could express support for joint fund agreements and co-investment schemes to ensure that both countries' priorities are integrated into project development.

A prefeasibility fund facility can play a central role. By identifying, screening, and preparing projects before formal investment, such facility ensures a reliable set of opportunities for both Danantara and Chinese investors. It also reduces regulatory, financial, and operational risks while accelerating the mobilization of capital into projects that are bankable and climate aligned.

Innovative blended financing schemes can further enhance stability and significantly reduce regulatory risks. China's cooperation with Danantara to enable joint ownership and financing of clean energy assets by Chinese and Indonesian entities would mitigate perceived risks, making projects more appealing to a broader spectrum of private investors.

Success can be demonstrated by quantifying on climate impacts, growth in green and low-carbon projects, expanded market access for China's clean technology industries, and overall increases in investment volumes. Demonstrating effective cooperation in climate-aligned finance would reinforce China's leadership, foster trust, and inspire greater ambition in international green finance efforts.

Lastly, transparency is particularly vital for Danantara, as it ensures accountability and efficiency and builds investor and public trust from the outset. Both are foundational to the success of Danatara's mandate and long-term aspirations. Danantara, Indonesia's newly formed sovereign wealth fund, has much at stake under its commitment to boost national economic growth through strategic investments and asset optimization.

## 4.3 Reform and Innovation of Multilateral Financing Mechanisms

This section identifies reform and innovation of multilateral financing frameworks, including the need for prefeasibility study facilities (Section 4.3.1) and a China–Pakistan partnership to implement Climate Prosperity Plans (Section 4.3.2).

The NDB prefeasibility study facility is a concrete proposal to pilot a green prefeasibility study facility. This facility would address a critical bottleneck in project preparation by funding the early-stage assessments needed to create a pipeline of bankable green projects. The China–Pakistan partnership to implement CPPs highlights priority areas for China to collaborate with V20 member countries, like Pakistan, through country platforms.

### 4.3.1 Potential for NDB Prefeasibility Study Facility

The prefeasibility study phase is often the biggest bottleneck in the preparation of green projects. It is in the prefeasibility stage that land rights are secured; initial site, solar, and wind resource assessments are conducted; plant and grid capacity is evaluated; and preliminary financing scenarios are established. Investors and developers are reluctant to pay for prefeasibility studies because there is no guarantee that each study will turn into a bankable project. Therein lies the bottleneck. An increase in funding for the prefeasibility stages not only increases the pool of bankable projects, but it also improves the quality of the pipeline of projects.

A number of MDBs and other vertical funds have established funds for prefeasibility studies that have been quite successful in this regard. The International Finance Corporation (IFC) and the

Global Environment Facility each have funds that have yielded important bankable projects in their lifetimes. National development banks have also created their own facilities, which sometimes link to vertical funds for greater impact. The Development Bank of Southern Africa (DBSA) has a USD 60 million Green Fund that provides financing to the prefeasibility stage for renewable energy, sustainable waste management, sustainable water management, and energy efficiency. Table 1summarizes the key characteristics of some of these funds and facilities.

An NDB prefeasibility facility would allow the NDB to build a strong project pipeline in collaboration with the host country's national development bank and exploit the complementarities between the two banks. A unique feature of the NDB is that core to its business model is partnering with national development banks. National development banks are embedded in national strategies and deeply networked with public and private sector interests that identify and participate in bankable projects with the right kind of partnership with international financial interests. MDBs can access international finance and foreign currency, helping lower the cost of capital, and collaborate on risk management[1].

Given the strong partnership between China and Brazil and the fact that this year's COP 30 will take place in Brazil, it may be opportune to establish a pilot facility at the COP with the Brazilian National Development Bank (BNDES). The BNDES is well suited to advise on local developers and actors, as well as on local scientific and regulatory aspects. The financial analyses can explore what parts of a project will need, for example, foreign currency and global risk management, which are components where NDB participation would add value.

Brazil's National Energy Plan (PDE) estimates that Brazil will need an extra 10 GW and 2 GW of solar and wind power respectively. To reach that goal, a prefeasibility study facility would need roughly USD 14 million (Table 1).

Table 1. Funding cost and structure of a proposed prefeasibility study facility

| **Description** | **Solar** | **Wind** |
|---|---|---|
| Cost per MW (USD million) | 1 | 2 |
| GW needed to 2030 | 10.0 | 2.0 |
| Total cost of investment (USD million) | 10 000 | 4 000 |
| | | |
| Development cost as a % of total cost | 0.50% | 0.50% |
| Development cost of investment (USD million) | 50 | 20 |
| | | |
| Prefeasibility costs as a % of development cost | 20% | 20% |
| Prefeasibility costs (USD million) | 10.0 | 4.0 |
| Assumptions<br>*Excludes the developer's out-of-pocket expenses. | | |

Source: Author's calculations based on Brazil Energy Expansion Plan, PDE (2020-2031)

In general, the cost per megawatt is approximately USD 1 million for solar and USD 2 million for wind; thus USD 14 billion would be needed to meet Brazil's goals. Development costs are seen to be roughly 0.5% of total project costs of investment, with the prefeasibility stage accounting for roughly 20% of development costs. Given the importance of COP 30, with initial investments by the NDB and BNDES, other entities could be recruited into the fund, such as industry associations and green philanthropies.

[1] Mariotti, C., Kozul-Wright, R.K., Bhandary, R.R. and K.P. Gallagher. 2025. Blending from the Ground Up: Multilateral and National Development Bank Collaboration to Scale Climate Finance. Boston University Global Development Policy Center

The facility could be established as a trust fund or special purpose vehicle that has a small board appointed by NDB and BNDES, but potentially other developer groups or philanthropies that make initial investments into the fund. Drawing on the standard model, it is important to ensure the fund is sustainable through charging a success fee of up to 3% of the total project cost recovered at financial close. This fee is designed to recover the development costs from the project and fund the operations of the fund itself and ensure the perpetuity of financing.

### 4.3.2 A China–Pakistan Partnership to Implement Climate Prosperity Plans (CPPs)

Breaking the development trap caused by climate vulnerability requires transformative solutions that address both climate risks and financial constraints. Through the V20-developed Climate Prosperity Plans (CPPs), Pakistan offers an ideal pilot for a China–V20 collaboration on facilitating member-specific green development goals.

In 2022, Pakistan was struck by catastrophic floods that inundated a third of the country, affecting 33 million people. The damages and economic losses exceeded USD 30 billion, about 10% of Pakistan's GDP, shredding infrastructure and ending livelihoods. This climate disaster not only caused a humanitarian tragedy but also threatened Pakistan's long-term fiscal stability and growth, as recovery costs and debt soared. As the country ranked most vulnerable to the climate crisis, according to Climate Risk Index, Pakistan urgently needs accelerated climate adaptation measures to strengthen resilience to climate-related disasters[32][33].

At the same time, Pakistan faces structural energy challenges. Overcapacity in the current power sector limits efficiency, strains budgets, and slows the transition to clean energy. The country's updated NDCs (nationally determined contributions) commit to a 50% reduction in projected greenhouse gas emissions by 2030 (15% unconditional, plus 35% conditional on international support). To achieve this, Pakistan aims to have 60% of its power capacity from renewable sources by 2030, along with 30% electric vehicle adoption and a ban on new coal plants. These targets reflect a vision to pivot toward clean energy and sustainable growth.

There are **several high-return opportunities** where a China–Pakistan climate prosperity partnership can make a significant impact:

- **Renewable energy.** Scale up renewables, like solar and wind, while considering an early retirement plan for underutilized fossil fuel power plants in order to reach 60% renewable energy by 2030. Investments in grid modernization and energy storage are also needed for reliability. This not only reduces emissions but also cuts Pakistan's reliance on imported fuel, freeing up space in the national budget. China, a global leader in renewable energy and energy transmission systems, can offer technology and financing for solar parks, wind farms, and grid infrastructure.
- **Climate-smart agriculture.** Agriculture is the backbone of Pakistan's economy and society, accounting for 19% of its GDP and 60% of export earnings (largely through textiles). It also provides livelihoods for 68% of the rural population. Collaboration can introduce resilient farming techniques, rootstock innovation, efficient irrigation, and climate-proof and short-term crop varieties. Investment in this sector safeguards national food security and protects farmers and rural incomes as climate impacts grow.
- **Green manufacturing, infrastructure, and industry.** One of the cornerstones of Pakistan's CPP is the transformation of its industrial sector through green initiatives

while enhancing export competitiveness and increasing value addition across key sectors. A significant bet is converting existing Special Economic Zones into Green Economic Zones through Chinese cooperation (there are many SEZs as part of CPEC).

- **Circular economy initiatives.** Managing waste and resources more sustainably can reduce emissions and create new business opportunities. Projects in recycling, waste to energy, and sustainable packaging could be piloted. China's experience in circular economy practices can help Pakistan leapfrog to modern waste management and resource efficiency.
- **Electric transportation.** Pakistan's rapidly growing transport sector is expanding at double-digit rates as it strives to keep pace with rapid urbanization and population growth. It is also looking to integrate EV charging infrastructure with clean energy grids. EVs and public sector electric buses are another avenue—a part of Pakistan CPP—that can be mutually beneficial for Chinese investments.

Pakistan is already moving to seize these opportunities. The government has requested the V20 Secretariat's support to develop its national Climate Prosperity Plan, signalling the country's high-level commitment. Pakistan has been working closely with the V20 in recent months to identify pipeline of projects and financing strategies for its CPP. This plan will serve as Pakistan's blueprint for turning climate risks into a long-term investment strategy.

China's proactive engagement with the V20 is timely and a strategic win-win initiative that tackles the twin crises of climate change and slow development across the Global South. For the 74 nations of the CVF-V20, China's partnerships on CPPs offer a path to escape the vicious cycle of disaster and debt. By working with China's unparalleled leadership in infrastructure development, renewable energy technology, and climate finance innovation**,** vulnerable countries can break out of the climate–debt trap, achieve inclusive green growth, and bolster their climate resilience.

Through well-designed CPP investments across resilient infrastructure to clean power projects, China and its partners can invest in resilience now so that climate-vulnerable economies prosper tomorrow, demonstrating that climate action is not a cost but a chance to create shared prosperity in even the most at-risk economies. Such South–South cooperation would advance global climate resilience and stability, ensuring no one is left on a weak boat, weathering this storm.

## 4.4 Innovative Collaborative Model Between Governments, Think Tanks, and Corporations

As the complexity of global green development challenges grows, traditional siloed approaches are proving insufficient. A collaborative model anchored in a "triangle" approach involving governments, corporations, and think tanks could be a key driver of effective green development. While governments are responsible for setting strategic direction, corporations drive investment and implementation, and think tanks provide the analytical underpinning and innovative proposals.

For example, the Sino–Brazilian High-Level Commission (COSBAN) can serve as a key platform for coordinating policy alignment, traceability standards, and technology transfer. The V20 CPPs rely on the establishment of "country platforms," led by finance ministries, to facilitate coordination across government sectors, civil society, the private sector, and academia to improve

access to finance and strengthen implementation capacity.

Furthermore, bilateral cooperation on green taxonomy development, ESG norms, and financial regulation could unlock sustainable capital flows. Their national public banks are well positioned to go beyond mere co-financing, forming strategic alliances to develop and scale projects that foster more ambitious cooperation.

The success of this tripartite collaboration will largely depend on the various governments' political will to have the appropriate policies in place to unlock these opportunities. Adequate funding will need to be allocated to create an enabling environment. China's balance sheet is not unlimited. A transparent investment environment will help crowd in the private sector.

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Table S1 Top five largest economies in the ETI 2025

| Economy | 2025 ETI score | Structural strengths | Structural challenges | 2025 progress highlights |
|---|---|---|---|---|
| **China** | 67.5 | China showed high levels of readiness for the energy transition, backed by leading clean energy and industrial infrastructure, human capital, innovation and investment. The economy accounted for nearly 40% of the world's clean energy investment in 2024. | Despite the rapid expansion of renewable energy and clean energy technology diffusion, energy and emission intensity remained relatively high. Meanwhile, energy supply flexibility and diversity could be further strengthened to augment energy security. | China showed strong progress due to expanding renewable capacity and clean-energy technology production and diffusion. For the first time, the country's $CO_2$ emissions declined 1.6% y-o-y in the first quarter of 2025,[98] despite increasing energy demand. |
| **US** | 66.8 | The US is a world leader in energy security and equity thanks to an affordable, abundant and diverse energy supply, and relatively reliable grid infrastructure. The US' transition is also supported by favourable conditions for innovation, a skilled labour force, and deep and robust financial markets. | While the country has made significant progress, expanding clean energy use and reducing energy and emission intensity over the past decade, its energy efficiency and emission levels lag behind other major advanced economies. | The US showed continued gains in energy efficiency and an increasing share of clean energy, backed by expanding renewable energy capacity and low-carbon employment. |
| **EU** | 65.5 | Over 40% of member states scored in the top 20 of the 2025 ETI. The EU's lead in energy sustainability expanded over the past decade, with member states on average having lower energy intensity and $CH_4$ production, and greater clean energy shares than other major economies. The region's energy transition is supported by strong regulatory architecture, infrastructure, human and technological capital and financial markets. | Differences in economic development and transition readiness can lead to uneven transition progress among member countries. Moreover, despite recently easing prices and import diversity, energy affordability and import dependence remain critical equity and security challenges. | Easing energy prices improved affordability, while energy sustainability was supported by increased renewables capacity and the diffusion of clean energy technology. |
| **Japan** | 64.9 | Favourable regulatory, innovation and financial ecosystems bolster readiness and clean energy technology diffusion and production, while energy security and equity are backed by reliable grid infrastructure and diverse electricity supply. | Over the past decade, Japan has experienced increased electricity and gas prices, and reduced energy supply flexibility. The country needs to continue to improve energy sustainability and expand the use of clean energy. It will be crucial to take action to reinvigorate the deployment and development of related technologies. | Recent declines in electricity and gas prices have eased affordability challenges, while increased use of clean energy and regulatory improvements have coincided with declining energy and emissions intensity. |
| **India** | 55.3 | Over the past decade, India made significant strides in increasing equity through greater access to energy and clean fuels, while also improving energy regulations and investment in renewable and other clean-energy technologies. | Continued improvement in grid reliability, energy access for rural areas and further reducing dependence on imported energy may enable further progress in energy security and equity. Further investment in infrastructure, renewables, labour force development and financing conditions could help boost the country's energy transition. | India made progress in lowering energy intensity and $CH_4$ emissions, creating more favourable energy regulations and increasing clean energy investments. |

**Note:** EU score is based on the simple average of its 27 member states.
Country selection is based on GDP in purchasing power parity (PPP).

Table S2 Summary of key characteristics of some existing funds and facilities

| Fund | Host | Purpose | Successes and Challenges | Fund Size | Grants (Y/N) | Technologies Supported |
|---|---|---|---|---|---|---|
| The Global Environmental Fund (GEF) | Accredited agents including DFIs and MDBs | Early development capital | Success: funding earmarked for the Small Scale IPP Program for funding feasibility studies for small and medium enterprises. Challenge: Delays in securing approval and committing funds. | TBC | Y | Environmental projects, biodiversity, sustainable cities and transport |
| Green Climate Fund (GCF) | Accredited agents | Early-stage project development and technical assistance; among other purposes; hosts a Project Preparation Facility | Success: 48 accredited entities supported representing $42 million | $10 billion (including other purposes) | N | Climate mitigation and adaptation projects |
| The Green Fund (GF) | Development Bank of Southern Africa | Prefeasibility, project preparation, implementation funding | Challenges: Projects currently in due diligence | $27 million | Y | Renewable energy, sustainable waste management, sustainable water management, energy efficiency |
| Energy and Environment Partnership Trust Fund (EEP Africa) | Funded through donations from Finland, Denmark, Norway, Sweden, Iceland and Austria. | Early-stage grant and catalytic financing to innovative clean energy projects in southern African countries | Success: 67 projects approved for financing from 2018 to 2020, covering 9 technologies in 14 countries | $84 million | Y | Technologies supported include solar, wind, hydro, biogas, biomass, biofuels, waste to energy, energy efficiency and waste to energy |
| IFC Global Infrastructure Project development Fund (IFC InfraVentures) | International Finance Corporation | Early-stage risk capital and experienced project development support | Success: 100 MW Kipeto Wind power project in Kipeto, Kenya with GE, Craftskills and Kipeto Energy; 33MW solar PV project in Mali | $150 million | N | Wind, solar, gas, hydro |

Source: CCICED 2022-2023 Special Policy Report-Sustainable Development Innovation Mechanism Boosted by the Belt and Road Initiative

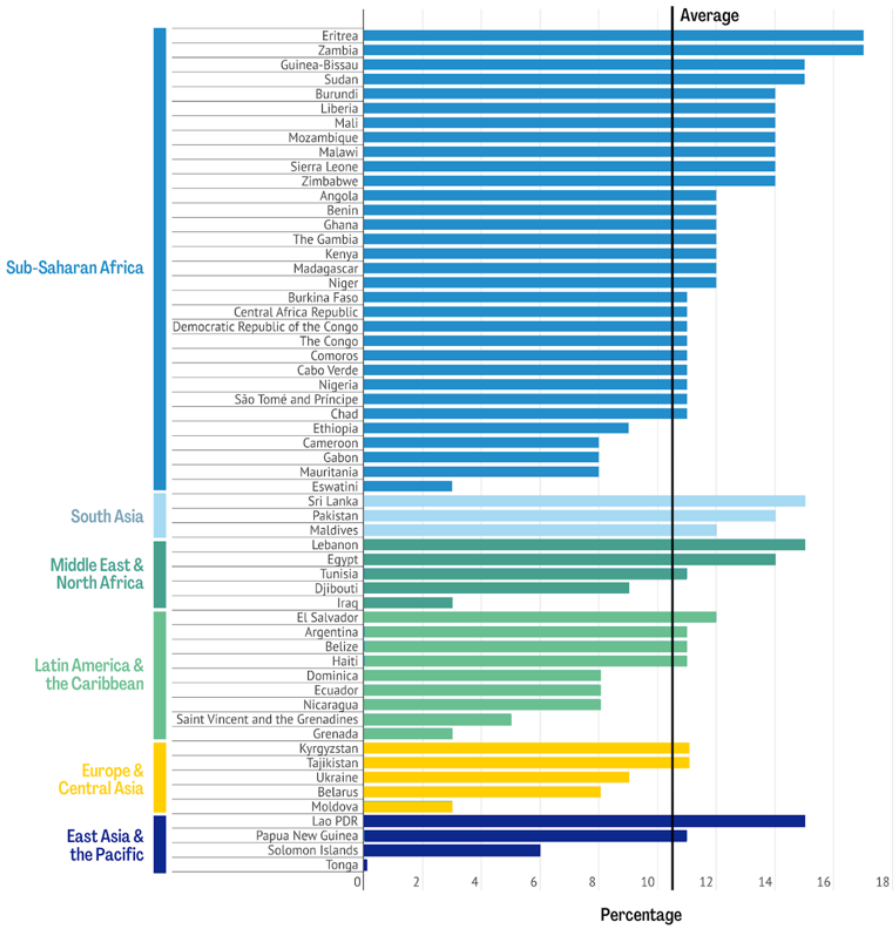


Figure S1 A high cost of capital and debt challenges across V20 memberships restrict member in making new investments towards development and climate

Source: Ramos, L., Ray, R., Bhandary, R.R., Gallagher, K.P., and W.N. Kring (2023). Debt Relief for a Green and Inclusive Recovery: Guaranteeing Sustainable Development.