From Solar to Soil: China and Nature as the Next Infrastructure Frontier, A Paper prepared by Bernice Lee (Senior Advisor, Nature Finance and CCICED) for CCICED August 2025

China's climate-linked disasters throughout 2024 and 2025— from floods to record heat — underscored the systemic risks of ecological breakdown, making resilience through 'nature infrastructure' an urgent priority. Premier Li Qiang's 2025 Government Work Report reflects this urgency, placing green transition and systemic resilience at the heart of China's modernisation and long-term development.

The Premier's emphasis on resilience reflects a strategic deepening of China's long-term strategy. Just as solar and batteries became pillars of high-quality growth once recognised as critical infrastructure, the same logic can be applied to forests, wetlands and soils. These are living assets that safeguard food and energy security, reduce disaster risks and strengthen 'common prosperity'. In today's climate-vulnerable era, recognising nature as core infrastructure is both an ecological imperative and a resilient economic strategy.

China has institutionalised this approach through the Ecological Conservation Redline (ECR) system, Main Functional Zoning, and Gross Ecosystem Product (GEP) accounting, all reinforced by the National Climate Adaptation Strategy 2035 and the amended Environmental Protection Law. These frameworks integrate ecosystems into development planning while enforcing ecological accountability. The ECR system in particular treats forests and wetlands as strategic assets—a model now extending globally through the Belt and Road Initiative (BRI) and the Asian Infrastructure Investment Bank's (AIIB) nature-positive finance frameworks.

China's 2024 ESG disclosure rules for major listed firms—mandating Scope 1-2 emissions reporting and climate transition plans by 2026—compel companies to account for both financial risks and their impacts on ecological infrastructure. While stopping short of requiring Scope 3, the rules' implicit double materiality approach could steer capital toward nature-based solutions, protecting the $44 trillion of global GDP at risk from ecosystem degradation.[i] Japan recently joined other jurisdictions that have adopted the IFRS-Foundations ISSB disclosure standards. Together, these moves suggest a wider convergence where China's own frameworks could set regional benchmarks, particularly for BRI partners.

Over half if not all of global GDP depends on nature, making biodiversity loss a structural economic risk. As economic security becomes central to national development and industrial strategy, reaffirming nature's role in securing access to food, water, energy, and critical minerals is no longer a matter of environmental preference — but one of strategic foresight. In today's global debate, nature is increasingly recognised as a pillar of climate security. China's long-term prosperity rests on the health of these natural systems.

Nature must be treated as a frontline defence in an era of global instability, delivering ecological resilience, shock absorption and social equity by supporting rural livelihoods, Indigenous rights, and just transition principles. Framing NbS this way also aligns with donor and MDB requirements for 'people-positive' as well as 'nature-positive' outcomes, unlocking wider financing flows. Nature-based solutions safeguard soil and water, reduce heat exposure, and mitigate macroeconomic volatility. China's experience, from restoring the Loess Plateau to the ECR, shows how nature-based solutions (nbS) deliver compound benefits: reducing disaster vulnerability, strengthening rural incomes, and reversing land degradation.

Recognising nature's role is only a start. Next is embedding it into finance and development institutions, from sovereign credit ratings to fiscal frameworks — co-creating and shaping global

norms via the AIIB and forums like the G20, even as the forum's future will be tested by US government shifts in attitudes under Donald Trump. The bioeconomy is a sustainable socio-economic model focused on industries and value chains that promote the renewable use of biological resources to address climate change, food security, economic development and poverty reduction. Through offering sustainable alternatives to carbon intensive products, promoting regenerative agricultural practices, supporting scientific innovation and contributing to sectors like tourism, gastronomy and medicine, the bioeconomy offers significant potential for inclusive economic growth in ways that simultaneously address climate mitigation, adaptation and resilience. By advancing bioeconomy principles that combine competitiveness and resilience, and leveraging strengths in agritech, biotech, and clean energy, China can champion innovations like regenerative agriculture and alternative proteins. Linking these to blended finance, nature credits, and sustainability-linked mechanisms could catalyse equitable, nature-positive growth globally.[ii]

At home, investments in natural capital reinforce core pillars of China's domestic agenda — from rural revitalisation, common prosperity to carbon neutrality and food security. Restoring and protecting ecosystems especially in vulnerable regions reduces risk, boosts productivity, and supports inclusive growth.

The good news is that China is not starting from scratch. Over the past two decades, it has become a central force in scaling clean technologies — from solar and wind to batteries and electric mobility. These gains have been driven by a strategy to enhance energy security, reduce volatility, and strengthen long-term competitiveness, as well as meeting carbon peaking and neutrality goals.

The concept of ecological civilisation has further helped integrate environmental priorities into infrastructure, urbanisation, and land-use reform. Aligning land-sector policy with national carbon goals – by including land emissions and removals - would elevate restoration's role in carbon neutrality, and reinforce China's integrated planning leadership.

Globally, China is already shaping the material conditions of green development — contributing through infrastructure cooperation, technology platforms, and supply chains. The BRI's green turn, along with the commitment to end overseas coal financing, signals a shift in approach. In this complex, fragmented global landscape, there is also growing interest in how China and other emerging powers can work with other developing economies, multilateral institutions, and global platforms to co-create a more resilient, equitable development pathway. China could consider aligning BRI investments with partners NDCs and biodiversity strategies, positioning the BRI as a platform for Paris and GBF implementation.[iii]

China's ecological leadership could extend to transboundary systems like the Mekong River Basin and migratory species corridors, demonstrating geopolitical leadership through shared ecological infrastructure. Such cooperation would reinforce China and its partners' joint leadership as providers of regional public goods.

China's Dual Carbon and Rural Revitalisation strategies provide a platform to expand the bioeconomy—from sustainable biomaterials to precision fermentation—through BRI Science Parks and G20 knowledge-exchange platforms like the Bioeconomy Trade Alliance. Through these collaborations, China with partners can showcase the synergy between ecological stewardship and development finance, while advancing shared goals in the G20 and beyond. Growing G20 interest and the Global Bioeconomy Initiative (GIB) show the scale of opportunity for China and its partners.

That said, balancing long-term sustainability with near-term energy security remains a challenge. Nature-integrated planning offers a 'triple dividend': reduced risk, rural income, and high-quality

growth. Mangrove restoration, for example, both sequesters carbon and protects vulnerable coastlines.

Increasingly, fiscal resilience and ecological resilience are interdependent. When ecosystems deteriorate — through watershed disruption, land degradation, or biodiversity loss — the effects are direct and measurable: weaker water security, lower agricultural productivity, and increased exposure to risk. In a world of mounting sovereign debt, these ecological stresses translate directly into fiscal vulnerabilities — raising borrowing costs and eroding creditworthiness. For China, incorporating nature-related risks into fiscal planning is imperative.

Evidence from the LSE's Grantham Institute highlights the cost of climate inaction and the need to embed ecological health in fiscal metrics and credit frameworks. China's sustainability-linked debt experience shows how fiscal tools can stabilise debts while tying financing to outcomes like wetland restoration or emissions reductions.[iv] These instruments offer dual benefits (given China's LMIC debt exposure) while reinforcing China's emerging green finance leadership.

China's experience offers clear operational insights for scaling nature-related adaptation finance. For instance, the AIIB's support for flood recovery in Rio Grande do Sul illustrates how adaptation finance delivers both resilience and development gains. ECR-linked municipal bonds and nature-positive guarantees through its policy banks show how fiscal instruments can be structured to account for ecosystem services in resilience projects. Applied cross-border, such tools could help create standardised bankable nbs adaptation project pipelines.

The "nature-positive economy", another term for the bioeconomy, recognises ecosystems as sources of innovations, productivity, and security, from regenerative agriculture, to seaweed packaging.

China's leadership in clean energy technology shows what's possible. The 15th Five-Year Plan is an opportunity to extend this leadership through contributing to the bioeconomy — sustainable materials, green chemistry, regenerative agriculture, nature-smart infrastructure — a USD 4 trillion and growing sector.[v] Like clean energy two decades ago, the bioeconomy offers both security and competitiveness dividends if positioned as core infrastructure. Its evolution can be seen across three dimensions: domestic (dual carbon, rural revitalisation, ecological civilisation); economic (competitiveness, security, fiscal stability); and global (BRI greening, South–South cooperation, and standard-setting in nature-positive finance).

As co-lead of the Kunming-Montreal GBF, China has the standing and the mandate to help shape future standards for 'nature-positive' development. Working with G20 partners, it could help develop frameworks that enable clarity, transparency, and investment alignment — further reinforcing its global governance role.

Encouragingly, a new generation of mechanisms is emerging to incorporate ecosystem health into macroeconomic decisions. Frameworks and methodologies are emerging to model the impact of nature risks and opportunities in macroeconomic forecasting and scenario planning, public debt sustainability analysis and sovereign credit ratings. Efforts are underway to broaden the use of the Financial Materiality Assessment (FIMA) framework that links ecosystem integrity to sovereign creditworthiness. This aligns with broader innovations in sustainable finance—including sustainability-linked debt instruments that embed nature-related KPIs, and sustainability-linked insurance products (as highlighted in AIIB research).

Similarly, the AIIB's 2023 Asian Infrastructure Finance report calls for valuing nature as infrastructure. Flood mitigation, water regulation, and soil retention can and should be integrated into infrastructure planning and investment. The AIIB is also exploring performance-linked instruments and nature-based valuation tools.

China can build on these innovations at home — particularly in ecologically sensitive provinces — and internationally, by supporting nature-integrated investment in Belt and Road countries.

Domestically, China's integration of nature into development planning — from forest conservation to wetland restoration — supports inclusive and balanced growth. These interventions generate rural employment, strengthen public health, and reduce climate vulnerability.

Internationally, China's financing platforms — including BRI, BRICS+, and South–South partnerships — can serve as delivery mechanisms for a nature-positive development model. In high-impact sectors like construction, agriculture, energy, food, and transportation, bio-based alternatives represent the next frontier. Infrastructure aligned with ecological protection enhances China's credibility as a supplier of global public goods and as a standard-setter in sustainable finance.

As one of the GBF's key architects, China is well placed to support integrated approaches — where fiscal responsibility and ecological stewardship work in tandem. This could include technical cooperation on land-use planning under GBF Target 1, or aligning investments with other disclosure frameworks such as TNFD.

China's domestic policy innovations—such as ECRs and ESG disclosures—offer adaptable models for global sustainability efforts. Rather than getting caught in competing frameworks, China could promote internationally recognised standards like ISSB or TNFD (and its LEAP approach) with partners, while drawing selectively on its own GEP accounting where metrics are robust. Pilots could, for example, demonstrate how GEP and TNFD can work together to capture both carbon and ecosystem benefits. Without greater interoperability, nature finance risks fragmentation; China is well placed to help bridge TNFD, ISSB, EU, and ASEAN standards.

Looking ahead, China has a strategic opportunity to consolidate a broader vision of modernisation — one in which nature is understood not as a constraint, but as a foundational asset. Premier Li's report lays the groundwork, the task now is embedding nature into the fiscal, institutional, and investment frameworks.

Doing so would not only strengthen China's domestic resilience — it would also serve as a global reference point. The next financial architecture must reflect the inseparability of ecological and economic stability.

China has the tools, experience, and strategic rationale to contribute to this transformation, as a continuation of its pursuit of high-quality growth and security.

The 15th FYP's evolution should position NbS and the bioeconomy as pillars of China's soft power, combining ecological stewardship with high-value sectors like sustainable biomaterials.

By placing nature at the heart of economic governance, China can help shape a more resilient future — for itself and for the world. In doing so, it would extend its legacy of turning risk into advantage — as it once did with solar, it can now do with soil.

Strategic Priorities and Recommendations

1. **Strengthen Policy Foundations**

- Scale nature-based solutions (NbS) with social impact assessments for ECR-linked projects to deliver on the Beautiful China Initiative's 2035 targets to reduce physical and economic risks, support rural revitalization, and strengthen adaptation.
- Integrate ecosystems as a sovereign asset class using tools like FIMA and standardised valuation methodologies to reflect ecological risk/opportunity. Expand partnerships to scale GEP accounting globally.
- Develop performance-based budgeting tools to align fiscal planning with ECR and climate adaptation goals.
- Pilot nature-linked fiscal instruments and disclosure frameworks (e.g. subnational ecological risk assessments).
- Integrate nature credits into China's carbon market to link ecosystem restoration with carbon neutrality and biodiversity targets.

2. **Contribute to Bioeconomy Innovations**

- Leverage China's leadership in agritech, biotech, biofuels, and waste valorisation to drive domestic low-carbon growth and South-South partnerships.
- Promote sustainable bio-innovation trade (nutraceuticals, biomaterials, bioenergy) through BRI/G20 engagement, including GIB and Sustainable Finance Working Groups.
- Strengthen China's role in bioeconomy governance, shaping standards/financing for nature-positive transitions in key sectors (construction, agriculture, transport) and gender (requiring 30% women's participation in nature-tech training programs)
- Leverage China's Earth observation, AI, and blockchain capabilities to develop digital MRV systems for ecosystem service tracking, positioning China as a 'nature-tech' leader.

3. Drive Global Financial Transformation

- Advance a China model for green development finance, building on AIIB leadership to align BRI investments with climate/biodiversity goals.
- Pilot sustainability-linked debt in BRI partner countries using FIMA-aligned KPIs, with credit enhancement from Chinese policy banks.
- Align China's ESG disclosures with global frameworks by testing integrated TNFD-GEP reporting in Yunnan's rubber sector and BRI mangrove projects.

4. Scale Nature-Centric Adaptation Financ

- Develop blended finance mechanisms that combine BRI infrastructure investments with nature-based adaptation solutions[, prioritising dual-benefit NbS (e.g., mangrove restoration for carbon sequestration and coastal protection) to align with Paris Agreement mitigation/adaptation goals and China's NDC enhancement.
- Partner with MDBs to structure sustainability-linked debt instruments where adaptation KPIs (e.g., watershed restoration, urban heat island reduction) trigger preferential financing terms.
- Establish BRI Nature-Adaptation Hubs in vulnerable regions to demonstrate how ecosystem integration lowers long-term infrastructure costs while meeting NDCs.
  Prioritise knowledge-sharing on gender-inclusive NbS, building on successes like the Loess Plateau women's reforestation collectives.

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[i] While Scope 3 reporting remains voluntary, early adopters like COFCO and BYD are piloting full value-chain assessments for critical commodities (soy, lithium) at the MOF's encouragement. Scope 3 emissions are the **indirect greenhouse gas emissions** that occur across a company's value chain but are not under its direct control.

[ii] https://www.naturefinance.net/resources-tools/financing-sustainable-global-bioeconomy/

[iii] Comparatively, China's GEP approach complements but differs from EU CSRD by valuing ecological assets as productive capital *rather than just risks—a distinction appealing to Global South partners seeking development-aligned frameworks.*

[iv] Pilot ECR-linked bonds in Yunnan (2023) achieved 12% lower borrowing costs—a model now being replicated in Laos BRI projects. This demonstrates how ecological safeguards can reduce sovereign risk premiums.

[v] Nature Finance, *Unlocking finance for Nature*, August 2025, https://www.naturefinance.net/resources-tools/unlocking-finance-for-nature/