

KEY POINTS

- Nature-based projects often lack commercial viability and stable repayment flows, reducing interest from private capital and widening the financing gap. Drawing on case studies from the PRC, the brief explores how nature-based projects can combine restoration and protection efforts with ecological utilization to diversify revenue sources. It also looks at how they can diversify risk by expanding funding sources, using innovative collateral schemes, and introducing insurance mechanisms. The authors suggest policy considerations for other contexts in Asia and the Pacific.
- The PRC's approaches focus on two strategic dimensions. First, enhanced project model design supports the integration of "ecological restoration" into commercial industries to improve commercial viability. Second, it uses innovative financing structures that help diversify risks through expanded funding sources, new collateral schemes, and insurance mechanisms.
- This brief examines the experiences and case studies of the PRC in promoting ecological protection and restoration projects and their financial viability. Its insights and lessons can also guide policymakers elsewhere in Asia and the Pacific as they consider nature-based solutions.

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Enhancing the Financial Viability of Nature-Based Projects: Insights from the People's Republic of China

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INTRODUCTION

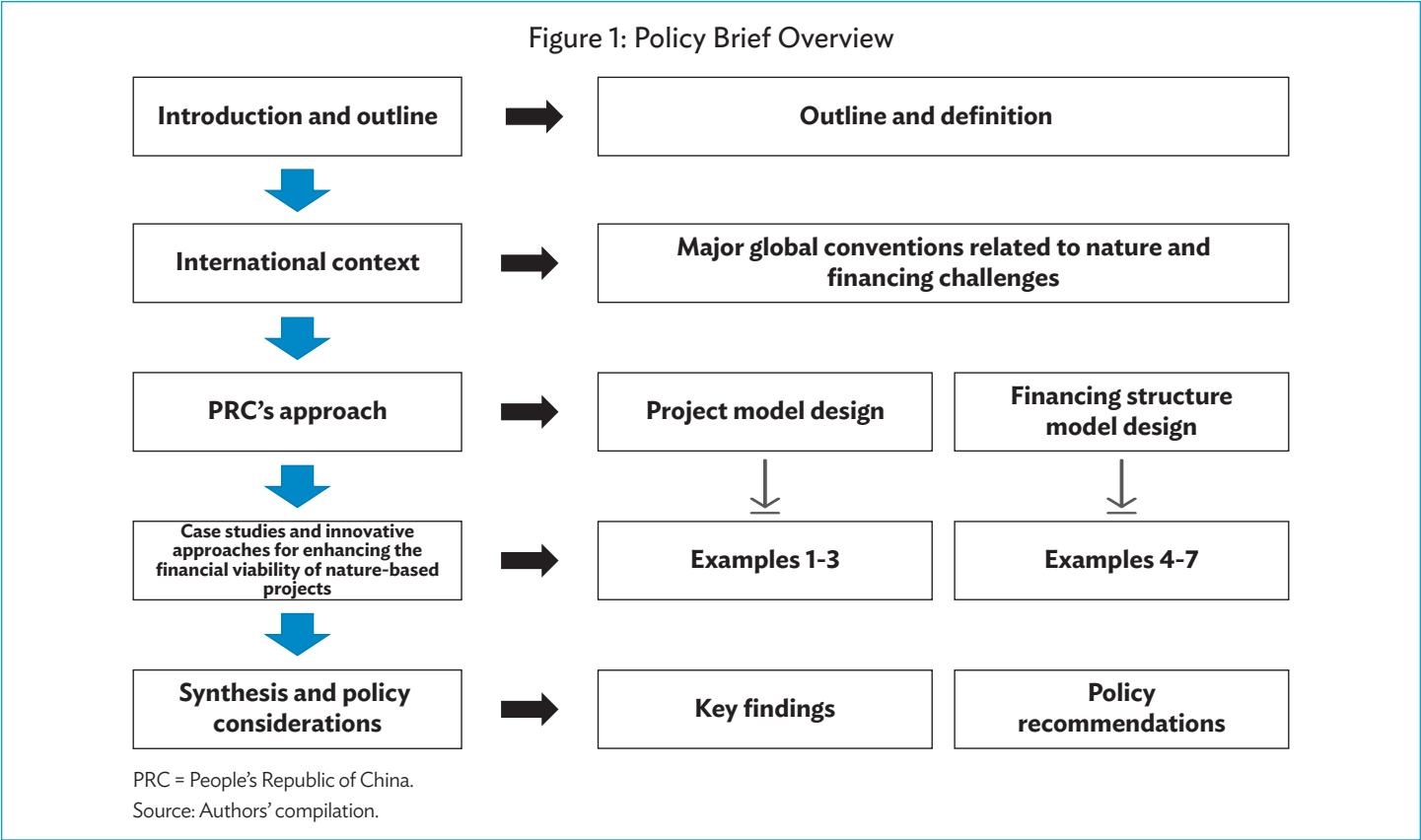
Enhancing the financial viability of nature-based projects globally is critical as countries seek to balance ecological restoration with sustainable economic development. However, as these are essentially public goods, public finance for nature-based projects is scarce, and commercial finance must be tapped to effectively bridge the financing gap. This calls for measures to improve their bankability.

In this context, this brief examines the experiences of the People's Republic of China (PRC), which, in its drive for ecological protection and restoration, has directed significant efforts toward improving the commercial viability of nature-based projects.

Notes:

In this publication, "\$" refers to United States dollars. ADB recognizes "China" as the People's Republic of China.

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Of course, natural systems vary within countries and across regions, and measures must be tailored to address unique contexts. Nonetheless, insights from the PRC could be useful to economies across Asia and the Pacific.

This brief reviews international experiences in the design and financing of nature-based projects. It then examines the PRC's approach toward improving the financial viability of projects from two dimensions: project model design and financing structure design. To illustrate both dimensions, the brief presents seven examples and synthesizes findings. The structure of the brief is outlined in Figure 1.

Notably, given that nature-based projects often span decades, their full ecological and financial impacts can take time to materialize. Although the case studies presented are still in progress, they already offer valuable insights for the strategic design and financing mechanisms that underpin the foundation for achieving sustainable outcomes. This brief focuses on the enabling conditions and innovative approaches that enhance the financial viability of such projects.

The long-term nature of ecological projects often leaves many commercial banks and other private investors hesitant to invest. To address this issue, the General Office of the State Council of the PRC issued Opinions on Encouraging and Supporting Social Capital Investors to Participate in Ecological Protection and Restoration in 2021 (General Office of the State Council of the PRC 2021).¹ This brief thereby complements Lan, Wang, and Rosenkranz (2024), who explore experiences in financing and investing for ecological protection and restoration in the PRC, including policy experience and recommendations.

To ensure clarity and coherence in the discussion, Table 1 defines key concepts.

INTERNATIONAL CONTEXT

Nature is deeply intertwined with human development and numerous international conventions have emerged to address the impact of human activity on the natural environment. Indeed, protecting natural ecosystems is crucial for meeting climate and biodiversity goals. Ecosystems such as forests, wetlands, and oceans play a pivotal role in climate regulation

¹ "Social capital investors" is a general term for nongovernment investors such as enterprises, individuals, and public welfare organizations that invest in and are directly engaged in ecological protection and restoration (Lan, Wang, and Rosenkranz 2024).

Table 1: Concepts and Definitions

Concepts	Definitions
Nature-based solutions	Actions to protect, conserve, restore, sustainably use, and manage natural or modified terrestrial, freshwater, coastal, and marine ecosystems that address social, economic, and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits (UNEP 2022).
Dual carbon climate targets	The PRC's commitment to peak carbon emissions by 2030 and achieve carbon neutrality by 2060.
Eco-environment oriented development model	A model that aims to integrate the public benefit of ecological restoration projects, which are essentially of a public goods nature, with commercial industries such as tourism and health; this is a typical example of "nature project + industry development" in the PRC.
Financial viability	The capacity of a project, initiative, or enterprise to secure and sustain sufficient financial resources over its lifecycle to achieve its objectives, while maintaining economic feasibility, risk-adjusted returns, and alignment with stakeholder expectations.

PRC = People's Republic of China.

Sources: Authors' compilation; United Nations Environment Programme (UNEP). 2022. Nature-Based Solutions for Supporting Sustainable Development. EA.5/Res.5. Adopted 2 March 2022.

and, as such, are critical for reducing greenhouse gas emissions and enhancing climate resilience. Simultaneously, climate change threatens the stability and safety of these ecosystems. Among international agreements, the Convention on Biological Diversity (1992) and the Paris Agreement (United Nations Framework Convention on Climate Change 2016) recognize the importance of conserving natural ecosystems for protecting the endangered plants and animals, and for responding to climate change. In addition, earlier conventions, including the Ramsar Convention on Wetlands (1971), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1993), and the United Nations Convention to Combat Desertification (1994), highlight the protection of natural ecosystems from specific fields. In 2022, the United Nations Environment Assembly defined and recommended nature-based solutions (UNEP 2022a).

Financing for nature-based projects is a significant challenge for the protection of natural ecosystems. The global community has strived in recent years to channel finance toward the nature sector through the establishment of dedicated funds. However, available finance still falls short of meeting required investment levels. According to the United Nations Environment Programme's 2022 State of Finance for Nature report, investments in nature-based solutions need to rise to \$384 billion per year by 2025 to limit global warming to below 1.5°C, prevent biodiversity loss, achieve zero land degradation, and meet the Sustainable Development Goals (UNEP 2022b). However, at the time of this writing, annual funding allocated to these solutions was only \$154 billion, highlighting a significant financing gap that needs to be closed by leveraging more public and private capital sources. Because many nature-based projects are public goods and lack commercial viability, nature-based projects often lack stable repayment guarantees, making them less attractive for private capital.

THE APPROACH TO DESIGNING AND FINANCING NATURE-BASED PROJECTS IN THE PEOPLE'S REPUBLIC OF CHINA

The PRC has been an early adopter of key strategies to respect, adapt to, and protect nature, such as through its comprehensive Ecological Protection and Restoration Investment and Financing Policies. The overarching policy direction of "respecting, adapting to, and protecting nature" was established by the PRC's high-level Overall Plan for Ecological Civilization System Reform (2015). This vision was subsequently operationalized through a series of concrete national initiatives.

A pivotal example is the 2020 Master Plan for Major Projects for Protection and Restoration of Important National Ecosystems (2021–2035), which translated this high-level strategy into a concrete action plan. It outlined the goal of "comprehensively improving the quality of the national ecological security barrier; promoting the virtuous cycle and sustainable utilization of the ecosystem; and taking the integrated protection and restoration of mountains, waters, forests, farmlands, lakes and grasslands as the main line, scientifically plan and organize the implementation of major projects for the protection and restoration of important ecosystems" (National Development and Reform Commission and Ministry of Natural Resources of PRC 2020).

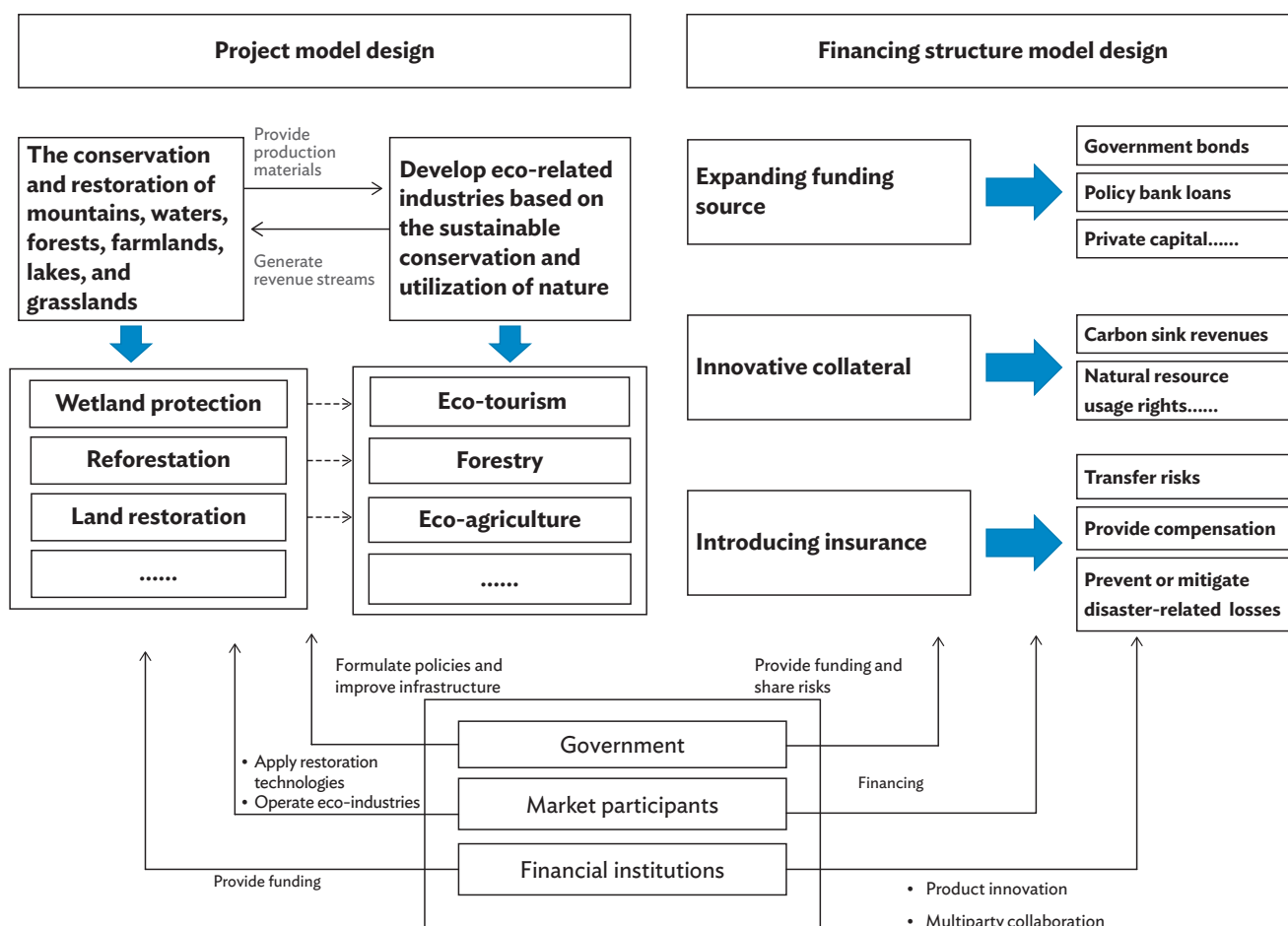
Subsequently, the Opinions on Encouraging and Supporting Social Capital Investors to Participate in Ecological Protection and Restoration (2021) provided a specific policy instrument to mobilize social capital investors into ecological protection and restoration projects, including investment, design, restoration, management, and protection (General Office of the State Council of the PRC 2021).

Following the announcement of the PRC's "dual carbon" climate targets in 2020, in particular, top-level policies driving climate action once again stressed the priority of ecological considerations and the construction of a green, low-carbon, circular economy.

The PRC has achieved remarkable results for environmental protection. Due to the PRC's strong focus on environmental protection, it has achieved notable progress. For example, in 2024, the average concentration of PM_{2.5}² in cities at and above the prefecture level³ was 29.3 micrograms per cubic meter, a year-on-year decrease of 2.7% (Ministry of Ecology and Environment 2025a). Likewise, areas with good water quality in the country have reached 90.4%, exceeding 90% for the first time, with a year-on-year increase of 1% (Ministry of Ecology and Environment 2025b). Since the 18th National Congress of the Communist Party of the PRC in 2012, the PRC has promoted sweeping changes for ecological protection.

Proactive measures to encourage financing of nature-based projects, especially stimulating private capital participation, are an important part of the PRC's policy of respecting, adapting to, and protecting nature. Nature-based projects are funded through a combination of public capital and social (private) capital investors in the PRC. Public capital involves direct government investment in ecological protection and restoration, including through special financial funds. In 2024, the Ministry of Finance allocated a budget of 17.2 billion yuan (CNY) for nature protection, restoration, and governance to support implementation of the integrated protection and restoration projects of mountains, waters, forests, farmlands, lakes, grasslands, and deserts during the 14th Five-Year Plan period, 2021–2025.⁴ This also supported demonstration projects for the ecological restoration of historically abandoned mines (Ministry of Finance of the PRC 2024).

Figure 2: Dimensions to Improve Financing Viability in the People's Republic of China



Source: Authors' compilation.

² PM_{2.5} refers to fine particulate matter that is 2.5 micrometers or smaller in diameter.

³ In the PRC administrative hierarchy, "cities at and above the prefecture level" refers to all urban administrative units that are ranked at the prefecture level or higher. This classification comprises all prefecture-level cities and provincial-level municipalities.

⁴ As of 27 October 2025, CNY1 = \$0.14 (Oanda Currency Converter).

However, because public finance will not be sufficient to meet the substantial investment requirements for ecological protection and restoration, new ways are needed to attract social (private) capital. In its exploration of solutions, the PRC has found that successfully attracting private finance depends on a project's design features and the proposed financing structure. The design dimensions are provided in Figure 2.

Dimension 1: Project Model Design

- (i) **Key point:** Design nature-based projects with greater commercial viability.
- (ii) **Main objective:** Improve the “operability” of nature-based projects through effective implementation arrangements.
- (iii) **Rationale for initiative:** Nature conservation or restoration projects typically have strong public good components. Without predictable returns, these projects face uncertain

- sources of repayment, making them less attractive to private capital and significantly lowering their financing viability. This is the primary challenge in financing nature-based projects.
- (iv) **Main practices:** Adopting the “ecological restoration + industry integration” integrated design approach. By combining “restoration and protection” with “ecological utilization,” these projects tap into the diverse values of nature, increase the “commercial viability” of nature-based projects, diversify revenue sources, and improve project sustainability. Typical models currently include “ecological restoration + eco-agriculture” “ecological restoration + eco-forestry,” and “ecological restoration + tourism.” Based on this, the PRC is piloting the Eco-Environment Oriented Development model nationwide. Notably, projects that meet “ecological restoration + industry integration” requirements can be defined as Eco-Environment Oriented Development projects (Box 1).

Box 1: Overview of the Eco-Environment Oriented Development Model

The Eco-Environment Oriented Development model is a significant innovation in ecological environmental governance led by the Ministry of Ecology and Environment of the People's Republic of China. Environmental governance is a public welfare initiative primarily funded by government financial resources for projects facing challenges such as inadequate overall investment, limited financing channels, lack of self-sustainability, and the need for enhanced long-term viability.

The model incorporates ecological governance into industrial development projects, generating incremental revenue through ecological restoration and relying on industrial profits to reinvest in ecological management, reducing the financial burden on governments and facilitating the participation of private enterprises (social capital investors) and financial institutions.

Key Design Principles of the Model

- Ecology as the foundation: Ecological governance is central to Eco-Environment Oriented Development projects, ensuring the quality of the ecological environment improves significantly and remains sustainable.
- Deep integration, interdependence: Ecological governance and industrial development must be closely integrated, with each promoting the other and creating mutual benefits.
- Value-added feedback: Eco-Environment Oriented Development projects balance investment in ecological governance with the value-added revenue from related industries, achieving financial equilibrium at the project level.
- Market operations: Ecological governance and related industry development are implemented as an integrated project by a market entity, with investments and revenues managed by the same entity.

Core Industries Under the Eco-Environment Oriented Development Model

- Eco-agriculture, forestry, eco-tourism, health care, leisure, and creative industries that depend on the environment.
- Environmentally sensitive industries including the digital economy, clean pharmaceuticals, and precision instruments.
- Skill-driven industries including high-tech innovation and entrepreneurship.
- Integrated industries in desert, desertified, or arid regions, such as photovoltaics, farming, and animal husbandry.

Organization of Cooperation Under the Model

- Government entities: Local government departments act as project organizers, responsible for planning, coordination, and oversight, as well as providing technical guidance and financing support.
- Market entities: Market participants, as project implementers, operate under the principles of self-decision-making, and profit and loss accountability. They are responsible for project implementation, operation, and maintenance, in compliance with relevant laws, standards, and agreements.

Primary Funding Sources for Eco-Environment Oriented Development Projects

These are provided by market entities, with various financial institutions offering funds based on market operations and controllable risks. Policy banks play a key role in providing funding for ecological projects, while commercial banks support industrial development projects.

Source: Compiled by the authors based on the Implementation Guidelines (Trial) for Ecological Environment-Oriented Development (EOD) Projects (Office of the Ministry of Ecology and Environment, Office of the National Development and Reform Commission, Office of the People's Bank of China, and Office of the State Administration for Financial Regulation, 2023). https://www.mee.gov.cn/xxgk/xxgk05/202401/t20240102_1060425.html?share_token=024e1573-3c6c-4781-9492-4207c8349f85.

Box 2: New Collateral in the “Nature Project + Industry Development” Model Examples

- Industry anticipated revenue rights: For instance, forest economy revenue can be used as a repayment source, as seen in the forest protection and forestry resource utilization projects in Sichuan Province and Liupanshui in Guizhou Province. In these projects, revenue from the forest economy and recreational tourism may serve as collateral or future repayment sources.
- Natural resource usage rights: For example, land rights for grape planting in Ningxia Hui Autonomous Region or forest management rights in Jincheng, Shanxi Province, can be pledged. In these projects, securing legal ownership of natural resource use or management rights allows stakeholders to utilize these rights for financing.
- Industry concession rights: For instance, scenic area revenue rights in Huangshan of Anhui Province or power generation rights under the “pig manure–biogas power generation–fertilizer–crops” model in Quzhou of Zhejiang Province. Concession rights granted by the government in public utilities or social welfare sectors can effectively mean expanding financing sources in nature-based projects.
- Carbon sink revenues: For example, forestry carbon sink revenue rights in Chongqing can be pledged. Carbon sinks represent a tangible ecological value, and practices utilizing forestry carbon sinks for financing are still in the early stages. As carbon sink systems and markets evolve, carbon sinks may become collateral or a future repayment source.

Source: Authors’ compilation.

Dimension 2: Financing Structure Model Design

- (i) **Key point:** Design a financing structure more conducive to risk diversification.
- (ii) **Main objective:** Risk allocation to diversify and reduce the risks borne by a single financial institution when providing financing.
- (iii) **Rationale for this initiative:** Whether it is a pure ecological restoration project or a comprehensive “ecological restoration + industry integration” project, such initiatives are often large scale and long term, involving various risks. These risks include insufficient application of ecological restoration technologies, increased ecological damage from climate change and disasters, and market demand fluctuations in eco-industrial sectors. From both a financing and risk mitigation perspective, therefore, diversifying financing risks is key to enhancing a project’s commercial viability.
- (iv) **Main practices:** The principal approaches to diversifying financing risks generally fall into the following three categories:
 - (a) Expanding funding sources: Leveraging the different risk appetites of various investors and collaborating across different stakeholders.
 - (b) Innovative collateral: Expanding use of natural rights or values as collateral, enriching the assets available for collateral, and better promoting the transformation of natural resources into natural capital (Box 2).
 - (c) Introducing insurance: Leveraging insurance to transfer risks, provide compensation, and prevent or mitigate disaster-related losses can strengthen risk dispersion for nature-based projects and encourage the participation of banks.

CASE STUDIES

Based on the two key dimensions to improve the financial viability of ecological projects, this section illustrates each dimension with three to four specific cases. Each case is intended to demonstrate the specific practices of the model in enhancing the financing viability of the project.

Cases on Project Model Design

Rationale for case selection. The cases here are mainly about how to design nature-based projects with greater commercial viability. By combining “restoration and protection” with “ecological utilization,” these projects tap into the diverse values of nature, increase the “commercial viability” of nature-based projects, diversify revenue sources, and improve project sustainability. Integrating ecological restoration with ecotourism and the agriculture and forestry industry represent prevalent models. These approaches leverage the aesthetic, scientific, and cultural values of ecosystems while promoting traditional industries. By enhancing financial viability, this model strengthens the self-sustainability of nature-based projects and broadens the sources of capital for ecological investment.

Typical examples in the PRC include the Land-Sea Protection and Tourism Eco-Environment Oriented Development Project in Shenzhen City (example 1); Water Environment Management + Rural Tourism Project in Suqian City, Jiangsu Province (example 2); Forestry Bio-Economy Industry Development Project in Anhui Province (example 3); and Ecological Fishery Farming Innovation Demonstration Zone Construction Project in Huzhou City, Zhejiang Province (Box 3).

Box 3: Ecological Fishery Farming Innovation Demonstration Zone Construction Project in Nanxun District, Huzhou City, Zhejiang Province

This project combines ecological principles with economic logic in its design, integrating ecological protection with agricultural development. The approach enhances the stability of the project's operations and increases the expected commercial returns, making it more likely to attract financing support.

Project Overview

Huzhou is rich in fishery resources, with freshwater fish production and output value accounting for one-third of Zhejiang Province's total, making it a key national freshwater fish production area. While aquaculture has good development prospects, it also poses environmental risks, such as contamination from fish farming wastewater, which directly damages water bodies and contributes to eutrophication. To address regional water environmental issues and enhance the sustainability of the aquaculture industry, the local government plans to launch the "Ecological Fishery Farming Innovation Demonstration Zone" project.

The project includes the construction of a model aquaculture zone, a digital fishery production base, and a fisheries industry platform. The model aquaculture zone uses the "raceway fish" farming model^a and will construct approximately 160 specialized fish ponds, with additional wastewater treatment systems. The digital fishery base includes digital fishery greenhouses and supports an integrated

"one-stop" supply chain for fisheries, including monitoring, sorting, and logistics. The fisheries industry platform will use an Internet of Things system to collect aquaculture data and provide consulting services, market information, and online purchasing services to farmers.

Project Financing

The total planned investment for the project is CNY821.59 million, with CNY640 million planned for bank loans and CNY181.59 million to be raised through self-financing. The primary revenue streams for the project will come from fresh fish sales, with an estimated total income of CNY2,614.04 million over the next 20 years. Additional revenue will come from fish fry sales (estimated at CNY626.63 million) and digital fish pond services (estimated at CNY318.90 million). The project also integrates aquaculture with agriculture, using aquaponics to purify fish farm wastewater, achieving zero discharge of pollutants and improving the regional water environment, which will generate positive environmental benefits.

The preliminary financial analysis over a 20-year period (including 2 years of construction) estimates a financial internal rate of return of 8.39%, with a net present value of CNY200.77 million, indicating positive financial viability for the project.

^a The raceway aquaculture model is a type of pond-based recirculating system that transforms traditional fish farming ponds. In this model, fish are no longer raised in a scattered manner but are instead concentrated in controlled, designated areas within the pond.

Source: Authors' compilation.

Example 1: Land-Sea Protection and Tourism Eco-Environment Oriented Development Project in Shenzhen City

- (i) **Model:** Ecological restoration + tourism.
- (ii) **Main content of the project:** This project makes full use of the unique resources in the Xiaomeisha area, including mountains, sea, cities, rivers, and lakes, and adopts an integrated "mountains, water, forests, fields, lakes, grasslands, and sand" management approach. Centered on the ecological environment management of Xiaomeisha, the project aims to develop the area into an "international urban seaside resort" through ecological tourism industry development.
- (iii) **Total investment:** This amounts to CNY756 million, with about 60% allocated to ecological environment management projects.
- (iv) **Financial structure:** Secured a loan of CNY520 million from the Agricultural Bank of China, at an interest rate of 2.9% for a 30-year term. During the operational period, the project is expected to generate various revenues with an estimated financial internal rate of return of 5.49%.
- (v) **Key design principles:** Integrated "mountains, water, forests, fields, lakes, grasslands, and sand" management combines ecological management with industrial development and uses tourism revenue for environmental restoration. During the operational period (2026–2053), the project is expected to generate external revenues from ticket sales, food and beverage income, beach product rentals, weddings, research and education expansion programs, and marine area revenue.

Example 2: Water Environment Management + Rural Tourism Project in Suqian City, Jiangsu Province

- (i) **Model:** Ecological restoration + tourism.
- (ii) **Main content of the project:** The project focuses on water body ecological restoration, coastal zone restoration, natural wetland restoration, and wetland protection. To attract private capital participation, the local government has introduced social capital investors to build an integrated “water environment management + rural tourism” project. Social capital investors use a combination of engineering, technology, and biological methods to systematically protect and restore various natural ecological elements, such as wetland water systems, soils, vegetation, and wildlife. Then, as the wetland environment is improved, it is utilized to develop and construct a multifunctional agriculture, cultural, and tourism industry, which includes eco-agriculture, a flower market, a water park, and homestays.
- (iii) **Total investment:** Total investment for the project is CNY269 million, with social capital investors covering most of the funding through self-financing and bank factoring loans. To date, the project has completed investments amounting to CNY268 million, of which CNY199 million have been allocated to water environment management, accounting for 74% of the completed investment.
- (iv) **Financial structure:** Project financing mainly consists of bank factoring loans, with CNY250 million already disbursed. Of this, CNY210 million was issued as a 1-year loan at a funding cost of 4.8% and CNY40 million as a 3-year loan at 4%.
- (v) **Specific manifestations of operability:** Repayment of the loan is sourced from project revenues and the company’s overall income. Within the first year of trial operations, the project has generated additional income of over CNY5 million and created more than 500 new jobs in the surrounding rural communities, yielding substantial socioeconomic returns.

Example 3: Forestry Bio-Economy Industry Development Project in Anhui Province

- (i) **Model:** Ecological restoration + forestry industry
- (ii) **Main content of the project:** In Mingguang City, Anhui Province, where forest coverage reaches 60%, the local government requires continuous financial investment to support the protection of forestry resources. To strengthen funding for forestry resource protection and better capitalize on forest value, the local government has focused on developing special forestry industries around the under-forest economy, forest cultivation, and forest carbon sinks. An example of this is the Zero Carbon Industrial Park’s forestry biomass multiproduction circular economy project in the area, which aims to improve the efficiency of using under-forest waste and promote the recycling of forestry resources.
- (iii) **Total investment:** Total planned investment for the project is CNY220 million.

- (iv) **Financial structure:** To date, actual investment has exceeded CNY112 million, CNY73 million of which has been provided by social capital investors, CNY27 million by government subsidies (from central budget investment), and CNY12 million by bank loans. The bank loan interest rate is 4.9%, with a loan term of 5 years.
- (v) **Specific manifestations of operability:** Once the project reaches full capacity, it is expected to purchase over 800,000 tons of wood and other under-forest waste annually, with an investment of about CNY300 million, achieving an output value exceeding CNY700 million and generating tax revenue of over CNY20 million. The revenue generated after the project is operational will serve as a crucial source for repayment of the bank loans.

Cases on Financing Model

Rationale for case selection. In this section, typical cases are selected based on three factors: expanding funding sources (example 4), innovative collateral (examples 5 and 6), and introducing insurance (example 7). These three approaches illustrate the utilization of a more risk-resilient financial model. Expanding funding sources increases the diversity of organizations, innovative collateral enriches the types of collateral, and insurance introduces the risk-guarantee function of insurance.

ADB’s work in related fields offers valuable insights, particularly for promoting diversification of financing structures through the utilization of blended finance. ADB’s support for sponge city initiatives—particularly in the PRC and Thailand—demonstrates the potential of urban nature-based solutions to enhance climate resilience and attract blended financing. In the PRC, sponge city pilots in cities such as Pingxiang, Jiangxi Province, have integrated wetland restoration, green infrastructure, and stormwater management into urban planning. Financing strategies in this case offer replicable frameworks for scaling urban nature-based solutions through public-private partnerships.⁵

Example 4: Black and White Water River Ecological Restoration Project, Lijiang City, Yunnan Province

- (i) **Model:** Expanding funding sources.
- (ii) **Main content of the project:** An ecological restoration project in Lijiang to preserve the water system and restore ecology due to groundwater over-extraction, water pollution, and ecological degradation threats in the Lijiang Basin.
- (iii) **Total planned investment:** CNY1.79 billion.
- (iv) **Financial structure:** The government plans to issue CNY530 million in special bonds, with CNY200 million allocated as the project’s equity and the remaining CNY330 million dedicated to project construction. The government’s equity contribution, combined with the CNY224 million from the project company, forms the project’s capital base required to meet the lending criteria of financial institutions. The remaining funding gap is planned to be covered by financing from banks.

⁵ See ADB (2015) and Rau (2022) for additional details.

Box 4: Black and White Water River Ecological Restoration Project, Lijiang Basin, Yunnan Province

Key Features

This project's financing structure incorporates a diversified funding base, including public funds from the government, self-financed funds from enterprises, and funds provided by financial institutions, including international development banks. This diversified funding structure mitigates project financing risks and facilitates substantial and effective financing.

Project Overview

The Lijiang Basin faces significant challenges to its water ecology, water culture, and landscape due to water pollution and ecological degradation. In addition, the local watershed is experiencing increased drought periods and earlier onset of dry seasons due to global climate change. In response, the Lijiang government plans to implement the Black and White Water River Ecological Restoration Project, which primarily consists of water diversion, storage, and replenishment works. This is a typical public welfare-oriented ecological project, with a total investment of nearly CNY1.8 billion. While some benefits can be derived from water sales in the future, the integration of public and private capital is the key feature of this project.

Project Financing

Total approved static investment for the project is CNY1,789.04 million, covering construction costs, electromechanical equipment, installation, land acquisition, environmental protection, and other associated expenses. The financing sources include

- bank loans, including loans from international financial institutions such as the Asian Development Bank,
- national subsidy funds, and
- self-financed funds from the implementing enterprise.

The preliminary estimate is that CNY1,379.93 million will come from bank loans (including loans from international financial institutions), CNY224.18 million from the project implementing agency, and CNY530 million through special government bonds (CNY200 million for project capital and CNY330 million for project construction).

The project's cash inflow will primarily come from water sales. The project's financial indicators are highly sensitive to water pricing. If the water price is set at CNY3.5 per cubic meter, the financial internal rate of return (IRR) is 3.2%, indicating marginal profitability. If the water price is reduced to CNY2.05 per cubic meter, the IRR drops to 0.02%, reaching breakeven. However, if the price increases to CNY6.70 per cubic meter, the IRR rises to 8.06%, surpassing the industry benchmark rate. The financial profitability of the project is thus largely dependent on the water pricing.

Additionally, the project has significant environmental benefits, such as preserving the cultural value of Lijiang Old Town, protecting biodiversity in the Lijiang Basin, and preventing soil erosion caused by riverbed drying. If these nonmonetary environmental benefits are included in the project's economic analysis, the project's financial viability would be further strengthened.

Source: Authors' compilation.

- (v) **Key to diversifying risks:** Expanding diversified funding sources through the "government special bonds + national subsidies + bank loans (including international loans)" model and establishing a multi-stakeholder financing structure (Box 4).

Example 5: Marine Carbon Sink Loan in Rongcheng, Shandong Province

- Model:** Using carbon sink revenue rights as collateral.
- Main content of the model:** In the Rongcheng area of Shandong Province, the local government supports the development of the blue economy and innovates the "marine carbon sink loan" product, using a company's future carbon sink revenue rights as collateral.
- Total investment:** Varies by project.
- Financial structure:** In this case, a company's future carbon sink revenue right was used as collateral, combined with marine use rights guarantees. The loan interest rate is 4.9% with a 1-year term, and the loan is for algae farming and marine ranch construction, repaid from regular business income.

- (v) **Key to diversifying risks:** By leveraging future carbon sink revenue rights in addition to traditional marine use rights, the scope of collateral is expanded. This effectively reduces the financing risks of enterprises, enabling relevant companies to increase their financing amounts.

Example 6: Public Forest Compensation Revenue Rights Pledge Loan in Ji'an City, Jiangxi Province

- Model:** Leverages the PRC's ecological compensation mechanism to create an innovative model for forest compensation revenue rights pledge loans.
- Main content of the model:** Borrowers can apply for a loan based on the compensation revenue rights for public forests, which are certified by forestry departments and registered with the national financing platform.
- Total investment:** Varies by project.
- Financial structure:** The loan amount can be expanded through a leverage effect, as the city's annual compensation funds amount to CNY130 million, enabling a loan scale of up to CNY2 billion. The funds can be used for forestry production

Box 5: Public Forest Compensation Revenue Rights Pledge Loan Project, Ji'an City, Jiangxi Province

Key Features

In terms of collateral innovation, this project leverages the ecological compensation mechanism of the People's Republic of China (PRC) to create an innovative model for forest compensation revenue rights pledge loans.

Project Overview

Ji'an City, located in a key southern collective forest area, has 6.42 billion square meters of public forests (natural commercial forests). Logging and development of these public forests are strictly restricted, and rights holders, apart from receiving fiscal subsidies, lack operating revenue. As a result, large amounts of ecological public forests have become dormant, unutilized resources. To address this, Ji'an introduced the public forest compensation revenue rights pledge loan model, which uses the stable and continuous compensation revenue of public forests as collateral to secure loans. This model converts future expected revenues into present-day asset rights, offering stable cash flows and controlled lending risks.

Project Financing

Under this financing model, the local Jiangxi Bank has expanded its credit line to 15 times the annual compensation funds, reaching the maximum allowed by policy. The overall loan limit is set at CNY 10 million, though for larger compensation amounts and longer subsidy periods, the loan limit may be increased. Loan terms are flexible, ranging from 1 to 5 years, and the loans are renewable. The interest rates are favorable, with a 1-year loan rate set at loan prime rate (LPR)^a + 50 basis points, increasing by 10 basis points for each additional year. This is about 1 percentage point lower than similar market rates. The funds can be used for forestry production, forestry economic development, and other purposes, with repayment terms that suit the seasonal and short-term funding needs of the forestry industry.

Eligible applicants for the loan include forestry operators who hold legal rights to public forest compensation and are willing to pledge these rights. The loan amount can be expanded through the leverage effect, as the city's annual compensation funds are CNY130 million, enabling a loan scale of up to CNY2 billion. The funds can be used for forestry production and operations. During the pledge period, financial institutions will closely monitor and supervise the pledgee, ensuring the strict implementation of public forest protection responsibilities to prevent deforestation, fire, pests, and other risks.

^a The LPR is an important benchmark interest rate in the PRC's financial market.

Source: Authors' compilation.

- and operations. During the pledge period, financial institutions will closely monitor and supervise the pledgee, ensuring the strict implementation of public forest protection responsibilities to prevent deforestation, fire, pests, and other risks.
 - (v) **Key to diversifying risks:** Transform the compensation funds that borrowers obtain based on natural resources into collateral for loan applications. The relatively certain compensation funds reduce the financing risks of borrowers (see Box 5).
 - (iii) **Total investment:** Varies by project.
 - (iv) **Financial structure:** In this case, farmers pledge carbon sink future revenue certificates and use insurance policies to secure loans. Loans have lower interest rates, and compensation is calculated according to relevant rules in case of insurance claims.
 - (v) **Key to diversifying risks:** Plays the role of insurance in risk management and financing. Insurance is used as a risk guarantee, combined with carbon sink certificates for pledge loans, which reduces loan interest rates, increases loan amounts, and diversifies risks for farmers and banks (see Box 6).
- Example 7: Forestry Carbon Sink + Bank + Insurance Cooperation Model in Lishui City, Zhejiang Province**
- (i) **Model:** Introducing carbon sink index insurance.
 - (ii) **Main content of the project:** In practice, insurance companies use remote sensing technology to track carbon sink changes over the past decade. If the actual carbon sink value of a forest is lower than the agreed-upon target due to disasters or pests, it is considered an insurance incident, and the insurer compensates according to the terms of the contract.

Box 6: “Forest Carbon + Bank + Insurance” Cooperation Model in Lishui City, Zhejiang Province

Key Features

In terms of risk management, this project combines financing with insurance, utilizing insurance as a risk guarantee mechanism to strengthen the creditworthiness of the financing entity, thereby facilitating financing.

Project Overview

Lishui, Zhejiang Province, is the largest forest area in the region and a key southern forest region in the People’s Republic of China (PRC). It has established a series of standards for carbon sink methodologies, transaction management, and industry technical specifications, and has piloted carbon sink projects on forest land. In 2023, a total of 73,300 *mu*^a of carbon sink forest land was developed, and 10,200 *mu* of afforestation carbon sink China Certified Emission Reduction (CCER) projects are being developed. The local government has also created the Zhejiang (Lishui) Ecological Product Trading Platform to explore internal trading of carbon sinks within the city.

To further enhance the sustainable protection and utilization of forestry projects, Lishui has piloted the “Forest Carbon Sink Loan” model. Farmers, cooperatives, and enterprises involved in forestry can apply for forest carbon sink certificates and calculate their loan eligibility via an online bank–enterprise matching platform. Additionally, insurance is introduced to innovate the “forest carbon sink insurance” model, combining insurance with credit and creating the “forest carbon sink certificate pledge + future revenue insurance loan” mechanism, which increases the viability of using carbon sinks for financing.

Project Financing

In the “forest carbon sink certificate pledge + future revenue insurance loan” model, farmers pledge their carbon sink future revenue certificates and use insurance policies, such as the “Forest Carbon Sink Insurance” and “Forest Carbon Sink Price Index Insurance” issued by the PRC Pacific Insurance, to secure loans. These loans have interest rates 50–100 basis points lower than ordinary loans and offer higher loan amounts. If a claim occurs under the insurance policy, compensation is calculated according to the relevant rules. For example, a local farmer insured the carbon sink of 60 *mu* of bamboo forest under the commercial bamboo forest carbon sink price index insurance. The insured area is 60 *mu*, with an insurance value of CNY1,357.2 and a premium of CNY87, translating to an insurance amount of CNY22.62 per *mu*, with the premium at only CNY1.45 per *mu*. If the carbon sink of the insured bamboo forest suffers a loss within the scope of the policy, the farmer can receive a compensation of CNY737.64 based on the terms of the “Zhejiang Province Commercial Bamboo Forest Carbon Sink Price Index Insurance (excluding Ningbo City).” This not only helps local farmers diversify their risks but also provides some support for sharing the risk of bank loans.

Additionally, bamboo is a strategic nature-based asset. Bamboo cultivation in the PRC exemplifies a sustainable approach to ecological restoration and climate resilience. With over 6.7 million hectares of bamboo forests and more than 860 species, bamboo is leveraged for carbon sequestration, land rehabilitation, and green industry development. Its rapid growth, regenerative capacity, and low maintenance make it ideal for nature-based financing schemes, as seen in Lishui’s carbon sink insurance model. These practices offer valuable lessons for other developing economies in Asia and the Pacific, where bamboo can serve as a strategic asset for ecosystem protection, rural livelihoods, and climate adaptation.

^a The *mu* is a traditional Chinese unit of area. One *mu* is equivalent to approximately 666.67 square meters.

Source: Authors’ compilation.

SYNTHESIS AND POLICY CONSIDERATIONS

Key Findings

The PRC’s experience and relevant case studies highlight the importance of integrating ecological restoration with industrial utilization in project design. This approach shifts the focus from purely ecological restoration to incorporating external economic sources through industry integration. A diversified financing structure, involving multiple funding sources and innovative collateral, meets long-term financial needs. Also, risk-sharing through insurance products mitigates risks while enhancing the project’s financial viability. Together, these strategies create a sustainable framework for nature-based projects.

While this brief primarily examines terrestrial and integrated ecological-industrial models within the PRC, the underlying principles demonstrate broader applicability. Notably, analogous approaches are increasingly being implemented in marine ecosystem management globally. For instance, the development of coral reef finance and insurance mechanisms—as evidenced in Fiji, Indonesia, the Philippines, and Solomon Islands—offers transferable insights for risk mitigation and sustainable financing in coastal ecosystems. These initiatives aim to enhance the resilience of coastal communities and ecosystems by leveraging risk transfer mechanisms and public–private partnerships. The application of insurance-linked instruments to coral reef protection illustrates the broader potential of nature-based solutions to attract innovative finance across diverse ecological contexts.

Policy Considerations

Building a policy framework encapsulating “goals + plans + detailed regulations + supervision” is necessary to support the project model design as well as the financing model design. A few related policy considerations are offered:

- (i) **Improve the policy framework for ecological conservation and industrial development.** Policies should be introduced to set restoration goals, outline restoration paths, clarify implementation guidelines, and strengthen process supervision. In the industry integration phase, policies should support industrial incubation, improve infrastructure, and increase public participation. Additionally, to improve the efficiency and security of funding usage, detailed implementation rules should be developed around project management, project initiation, execution assessment, and evaluation, playing a key role in optimizing governance structures and building local credit systems.
- (ii) **Create enabling conditions for innovative collateral.** Establish ecosystem valuation standards. Develop and adopt national or regional guidelines for valuing ecosystem services supporting the use of natural assets as collateral and enhance the attractiveness of nature-based projects to private investors. During the innovation of collateral mechanisms, policies should clearly define requirements to ensure the stability of these activities.
- (iii) **Build local financial capacity.** Invest in capacity building for local financial institutions and communities to manage nature-based financing tools, including insurance products and innovative collateral mechanisms, especially for decentralized projects and rural areas.
- (iv) **Facilitate multistakeholder collaboration.** Create platforms for engagement among government agencies, market entities, financial institutions, and civil society in the design, financing, and monitoring of complex nature-based projects, particularly under the Eco-Environment Oriented Development model.
- (v) **Integrate insurers early in project planning.** In the development of risk-sharing models, the government should collaborate with the insurance sector to refine policies for disaster risk prevention and related guarantees, ensuring comprehensive protection for the project. Meanwhile, to enhance the financing viability of the Eco-Environment Oriented Development model, insurers should be engaged from the project’s initial planning phase. Their involvement can help quantify the protective value of ecological assets against disaster and climate risks, inform risk-sensitive project design, and enable the development of tailored insurance products. This proactive approach would allow de-risking solutions to be embedded throughout the project life cycle, enhancing both financial viability and climate resilience.
- (vi) **Promote regional knowledge exchange.** Encourage cooperation among developing economies and regional learning events to share innovations in nature-based financing across Asia and the Pacific.

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