

ECOLOGICAL PROTECTION IN THE PEOPLE'S REPUBLIC OF CHINA

PILOT CASE STUDIES ON COMPREHENSIVE
ECO-COMPENSATION, POVERTY ALLEVIATION,
AND GREEN DEVELOPMENT

Au Shion Yee, Silvia Cardascia, and Xueliang Cai

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Ecological Protection in the People's Republic of China: Pilot Case Studies on Comprehensive Eco-Compensation, Poverty Alleviation, and Green Development

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ABBREVIATIONS

ADB	Asian Development Bank
CAT	Common Asset Trust
CCFP	Conversion of Cropland to Forests Program
FECF	Forest Ecological Benefit Compensation Fund
GDP	gross domestic product
KEFZ	key ecological function zone
PES	Payment for Ecosystem Services
PRC	People's Republic of China
SLCP	Sloping Land Conversion Program

ABSTRACT

The People's Republic of China (PRC) has implemented several county-level pilot programs for ecological compensation. The government initiative has helped develop incentive-based policies and contributed to sustainable livelihood transitions for local communities. It has included promoting the integration of poverty alleviation targets into eco-compensation programs at considerable scale. However, the pilot schemes still face challenges in diversifying operational mechanisms, facilitating horizontal cooperation, and encouraging private sector participation. The PRC's experience in innovative eco-compensation programs and policies to achieve dual environmental and social co-benefits can offer useful insights to countries facing similar challenges in environmental management in the Asia and Pacific region and beyond.

I. INTRODUCTION

The People's Republic of China (PRC) has made great strides in developing the regulatory and policy underpinnings for improved ecological protection and environmental management. This includes establishing national institutional and regulatory reforms, building capacity for local governments, investing in scientific and technical capability, and promoting new sectors to foster sustainability and benefit local livelihoods. Ecological compensation is a key tool to realize the Government of the PRC's vision to refine its ecological management regime, and to transition to a sustainable growth model. Building on the country's unparalleled record of economic development, the government is focused on ensuring that this transition contributes to robust and inclusive growth.

Poverty in the PRC has been reduced at an unprecedented rate: from 97.5% in 1978, absolute poverty stood at only 0.6% in 2019 (World Bank Group and Development Research Center of the State Council, the PRC 2022). In line with its ambitious target of eradicating absolute poverty by 2020, the government formulated a targeted poverty reduction strategy. Eco-compensation programs complement the government's focus of promoting resilient agriculture, protecting water resources, and linking poverty alleviation with environmental policies. As an innovative and promising financing tool, eco-compensation is also being used to develop integrated solutions in ecological conservation while ensuring sustainable and inclusive development by addressing community livelihood needs.

A. Development of Eco-Compensation in the People's Republic of China

Eco-compensation has become an important policy framework in the PRC, which encompasses a wide range of programs for addressing conservation and environmental restoration while supporting local livelihoods. The concept comprises a package of incentive-based policy and regulatory instruments with the primary objective of internalizing negative environmental externalities such as water pollution, biodiversity loss, land degradation, or deforestation.

Eco-compensation programs were first initiated in the aftermath of severe droughts and floods in the Yellow and Yangtze River watersheds and Northeast PRC during 1997–1998. The Yellow River failed to reach the sea for almost 9 months in 1997, whereas severe flooding in the Yangtze River basin and Northeast PRC in 1998 caused over 3,600 deaths, 4.5 million destroyed homes, and millions of dollars in lost economic output. Severe degradation of the upper watershed areas due to unsustainable forestry and land use practices is thought to have exacerbated the gravity of these events.

In response, the government launched the Six Key Forestry Programs to transition the forestry sector away from its previously resource-extractive model toward greater focus on the rehabilitation and provision of forest-based ecosystem services. The two largest of these were the Natural Forest Protection Program and the Conversion of Cropland to Forests Program (CCFP).¹ The objective of the CCFP has been to reduce soil erosion from sloped, degraded, and marginal croplands by converting these areas into forest or grassland cover. First piloted in Gansu, Shanxi, and Sichuan provinces during 1999–2000 (i.e., in key areas in the Yangtze and Yellow River watersheds), the program was formally launched in 2001 as a national strategy (Bennett 2008; Bullock and King 2011). The CCFP was innovative in that it directly engaged rural households as stewards of ecosystem services, providing subsidy payments to retire and afforest their sloping or marginal cropland, and to manage the planted trees to ensure survival (Bennett et al. 2014).

¹ Internationally, this is also sometimes referred to as the Sloping Land Conversion Program or “Grain-for-Green” Program.

Another important forestry program—the Forest Ecological Benefit Compensation Fund (FECF)—was piloted in 2001 and formally launched in 2004. Under this program, annual subsidies were paid to the owners of targeted forests to compensate them for rezoning these areas as a “key ecological public benefit forest.” This program banned the use of the trees on such land for timber, fuelwood, or nontimber forest products. The initial funding was \$150 million with the pilot covering \$13.33 million and covering 685 counties and 24 national reserves. Provincial and other local governments also created their own funds to complement the FECF (Zuo et al. 2005). By 2010, the program had expanded to 30 provinces and almost 70 million hectares with annual payments of CNY7.59 billion (\$1.12 billion) (World Bank 2021).

The sheer scale of the CCFP and FECF, spread across the rural PRC, entailed a vast exercise in local capacity building and awareness-raising as local officials and rural households endeavored to operationalize program goals efficiently and effectively. These programs were arguably a critical catalyst to the development of ecological compensation as a policy concept and instrument, and to its subsequent expansion in scope and scale, now covering watersheds, wetlands, grasslands, coastal areas, and agricultural land.

Since the PRC’s Eleventh Five-Year Plan (2006–2010), eco-compensation has been prominent in all subsequent 5-year plans. Many of the government’s policy documents call for improving preexisting programs; promoting further institutional innovation, including more effective interagency and interregional coordination mechanisms; creating a formalized system for calculating eco-compensation subsidy standards; promoting the development of horizontal eco-compensation programs (i.e., between the same level of government); and utilizing diversified forms of compensation beyond cash transfers.

In 2008, a new program on public financial transfers to key ecological function zones (KEFZs) was launched. This represented a novel approach to eco-compensation in the PRC since it is not based on specific sectors, but on regions that are considered a priority for conservation. Public fiscal transfers expanded under this program: from CNY6.0 billion (\$899.5 million) transferred to 221 KEFZs (i.e., counties or districts) in 2008 to CNY83.0 billion (\$12.4 billion) to 818 KEFZs in 2019 (Jin et al. 2016; World Bank 2021).

At present, the government is focused on promoting “comprehensive eco-compensation.” While policy documents remain vague on its definition, document wording suggests that the central government wishes to incentivize provincial government actors to innovate so as to consolidate and strengthen preexisting programs to better capture synergies and avoid redundancies and conflicts in targeted ecosystem services. This is to improve efficiency and effectiveness and to diversify funding channels to engage a wider spectrum of economic actors in funding conservation, since eco-compensation still remains primarily supported by the government.

The 2019 National Development and Reform Commission definition of “comprehensive eco-compensation” highlights

- (i) local government’s implementation of multiple eco-compensation programs in coordination with various sectors and agencies of higher-level governments,
- (ii) coordination that might involve pooling some of the funds from different sources and investing in a priority area of the county or implementing various eco-compensation programs in the county, and
- (iii) that comprehensive eco-compensation by the local government focuses on improving the environment as a foundation for green economic growth.

Furthermore, recent legislative frameworks, such as the National Climate Change Adaptation Strategy 2035 or the Yangtze River Protection Law, also identify eco-compensation as a mechanism for achieving environmental and ecological protection objectives in key river basins. The Yangtze River Protection

Law came into force in March 2021 and incorporates provisions on the application of policy measures for ecological compensation (Yee and Guo 2021). These involve (i) establishing a compensation system for ecological protection, (ii) increasing financial transfer payments to compensate areas of ecological importance (e.g., sources of the Yangtze River mainstream and its major tributaries and key water conservation areas in the upper reaches), and (iii) mandating the development of specific market-based measures to support policy reforms.

B. Eco-Compensation Co-Benefits for Rural Livelihoods

The government has also been promoting the important goal of better integrating rural welfare co-benefits into comprehensive eco-compensation approaches. This is a complex task as low-income communities in the PRC are often situated in remote, ecologically fragile, and protected areas—far from main business centers. Since natural resources are often an important safety net for the rural poor, addressing poverty as part of conservation and ecological restoration interventions is often seen as an essential component to avoid creating natural resource poverty traps—a situation where, due to external environmental or economic shocks, poor rural households that depend on natural resources fall into a cycle of co-reinforced poverty and natural resource degradation.

Global evidence suggests that poverty and environmental degradation can reinforce each other. Many of the world's rural poor are concentrated in remote areas with natural resources that are only capable of providing limited economic benefits (Barbier 2012). These conditions can result in “spatial poverty traps” that are predicted to persist, given global rural population and poverty trends (Barrett 2008; Bird, Higgins, and Harris 2010; Jalan and Ravallion 1997, 2002; Kanbur and Venables 2005; Chen and Ravallion 2007; Dercon 2009; Population Division of the United Nations 2008). However, the underlying drivers of poverty and the linkages and feedback loops between poverty and the environment can be complex and diverse. Hence, program design that looks at these interlinkages must be approached with caution. In general, adverse poverty–environment interactions can occur via four processes that are not necessarily mutually exclusive: dependency; shared vulnerabilities; failure of social institutions; and lack of informed, adaptive management (Barrett, Travis, and Dasgupta 2011).

Integration of Ecological Protection and Green Development with Eco-Compensation

In collaboration with the China Council for International Cooperation on Environment and Development, the Asian Development Bank (ADB) initiated a Special Policy Study project on Ecological Compensation and Green Development Institutional Reform in the Yangtze River Economic Belt in 2018.² The project aims to promote eco-compensation and green development in the region. Moving forward—and using the knowledge and experience of the Yangtze River Economic Belt on accounting instruments for natural ecological capital, including green financing tools, and innovations—the government will examine innovative ways to design an operational nationwide eco-compensation framework for ecological conservation and green development.

² For more information about the project, see China Council for International Cooperation on Environment and Development. Ecological Compensation and Green Development Institutional Reform in the Yangtze River Economic Belt.

II. ECOLOGICAL AND ENVIRONMENTAL MANAGEMENT REFORMS IN THE PEOPLE'S REPUBLIC OF CHINA

Ecological civilization. Sustainability is the centerpiece of the Government of the PRC's development and reform agenda. This is captured in the concept of "ecological civilization," which embodies the goal of restructuring economic planning to better integrate it with strengthened environmental management to transition to a more sustainable development path, based on the recognition that environmental degradation undermines long-term economic growth and human development. Central to this concept is the goal of reframing and reorienting the country's economic development paradigm to incorporate the value of ecosystem services and natural capital into investment decisions.

Key ecological function zones. Comprehensive eco-compensation targets to protect and enhance priority areas deemed to provide critical ecosystem services. This includes the entire basins of the Yangtze and Yellow rivers. Beginning in 2010 with the State Council's *National Main Function Zoning Plan*, the government has designated these priority areas as national KEFZs and, as a result, imposed development restrictions on them and expanded a system of national fiscal support to the governments of these zones.

Piloting comprehensive eco-compensation. Substantial progress has been made in building the policy and regulatory framework for eco-compensation within KEFZs. However, much work remains to be done to upgrade the system and ensure that investments in ecological and environmental management are achieving targeted outcomes. The National Development and Reform Commission issued the *Pilot Scheme for Comprehensive Eco-compensation* in 2019. Under this scheme, the government selected 50 national pilot counties across 10 provinces to achieve the following eco-compensation goals:

- (i) better alignment of preexisting eco-compensation funding streams of agencies and sectors to improve efficiency;
- (ii) better identification of synergies and avoidance of trade-offs in the provision of ecological and environmental services;
- (iii) greater financial support and effort by local governments for ecological and environmental protection, management, and restoration; and
- (iv) development of innovative, sustainable economic activities across sectors to facilitate transitions to alternative livelihoods for communities within these zones and beyond.

Capturing poverty-environment synergies. In 2016, the State Council issued the *Opinion on Improving Eco-compensation Mechanisms*, where eco-compensation is proposed as a policy tool to be implemented in coordination with other environmental economic policies, for achieving outcomes on poverty alleviation and environmental enhancement. The linkages between poverty, the economy, and the environment can be complex and diverse. Poverty alleviation programs can facilitate engagement in sustainable environmental practices such as use of clean energy, green tourism, or certified agricultural produce. If environmental protection is not considered when addressing poverty reduction and economic development, it can adversely affect development prospects, escalate environmental and climate change risks, and result in unintended consequences or failure of reforms. It is, therefore, important to identify areas of strategic value for jointly targeting poverty alleviation and environmental protection.

I. Piloting Comprehensive Eco-Compensation in Response to National Policies: Local Case Studies

As is the standard approach for program development in the PRC, while piloting of eco-compensation was officially launched in 2019, many of the local governments were already developing pilots promoting eco-compensation to improve ecological and environmental management and financing as part of the government's longer-term call to action, and in hopes of being selected as national pilots. This section examines case studies on eco-compensation sourced from different studies conducted by ADB to analyze three sets of programs, with a focus on the important innovative elements and ongoing constraints:

(i) Comprehensive eco-compensation methods

The analysis on comprehensive eco-compensation programs referred to three case studies: Jianchuan County in Dali Bai Prefecture, Yunnan Province; Xiuning County in Huangshan Municipality, Anhui Province; and Zixi County in Fuzhou Municipality, Jiangxi Province (Figure 1). Innovative practices and practical aspects of improving the effectiveness of eco-compensation programs, including integrating local development into ecological conservation programs, were considered in these case studies.

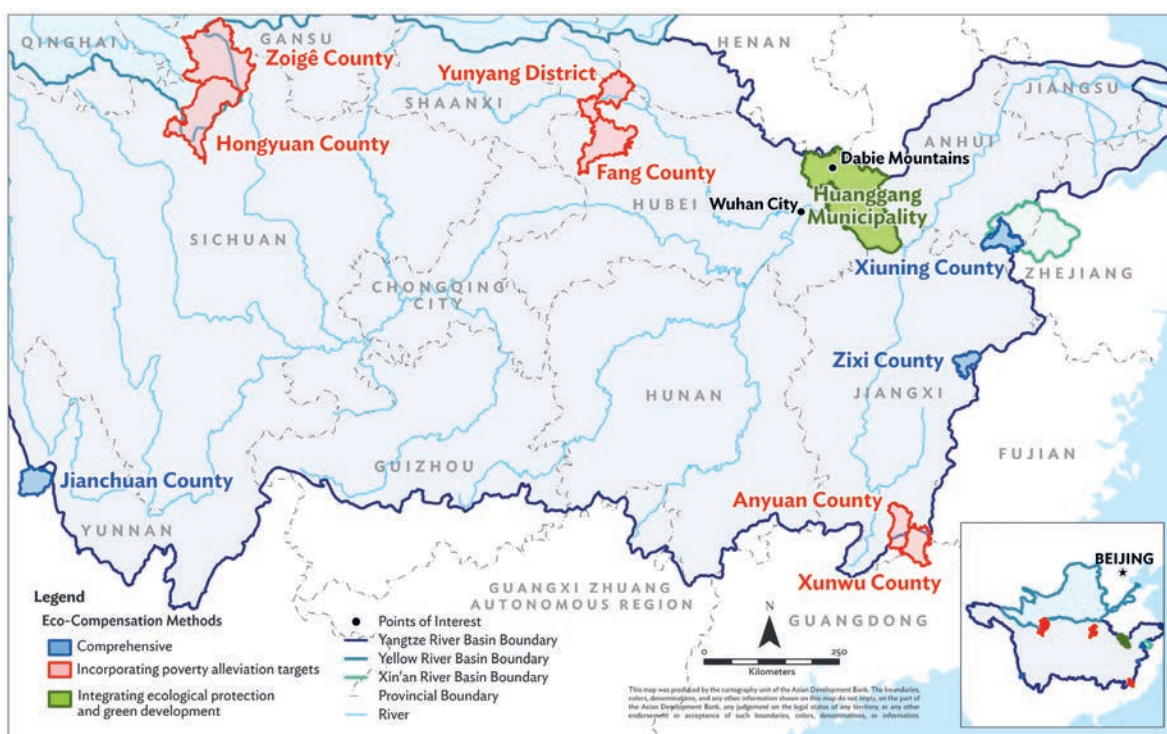
(ii) Incorporating poverty alleviation targets into eco-compensation programs

For this set of programs, case studies implemented in six counties across three provinces were examined: (i) Fang County and Yunyang County in Hubei Province; (ii) Anyuan County and Xunwu County in Jiangxi Province; and (iii) Hongyuan County and Ruoergai County in Sichuan Province. The case studies discussed five eco-compensation programs targeting poverty alleviation and improvement in rural welfare.

(iii) Integrating ecological protection and green development

A case study on developing an operational framework for sustainable ecological conservation and green development focused on an eco-compensation mechanism for the Dabie Mountain in Huanggang Municipality, Hubei Province was reviewed for the analysis.

Figure 1: Location of Case Studies for Piloting Comprehensive Eco-Compensation, Poverty Alleviation, and Green Development



Source: Asian Development Bank (Sustainable Development and Climate Change Department-Digital Technology).

A. Comprehensive Eco-Compensation Methods

1. Characteristics of the Case Study Counties

Figure 1 shows the location of the three counties in Yangtze River basin, which are also part of the national government's Yangtze River Economic Belt Plan.³ These counties vary considerably along several dimensions (Table 1). Xiuning County in Anhui has the highest population density and largest per capita gross domestic product (GDP), while Zixi County in Jiangxi Province has the lowest population, GDP, and GDP per capita. Per capita GDP for these counties highlights their relative lack of development in comparison with the 2019 per capita GDP nationwide at CNY70,588 (\$10,582). The case study counties also demonstrate regional income disparities between upstream and downstream counties. All counties are rich in natural resources such as high-value specialty agriculture products (including tea), bamboo and other forest resources, and mineral resources (including iron, copper, tungsten, aluminum, zinc, uranium, and rare earths); have delineated protected areas (including national parks); and provide important ecosystem services (including watershed services, biodiversity, and climate mitigation, and adaptation).

³ These case studies were conducted under ADB's technical assistance project, PRC: Policy Research on Ecological Protection and Rural Vitalization for Supporting Green Development in the Yangtze River Economic Belt – Study on the Comprehensive Eco-Compensation Mechanism (Subproject 3).

Table 1: Key Facts and Figures—Comprehensive Eco-Compensation Case Study Counties

County	Population	Population Density (people/km ²)	Land Area (km ²)	GDP (CNY million)	GDP per Capita (CNY)	Forest Cover (%)
Jianchuan	160,471 (2020)	69.2	2,318	5,897 (2020)	36,615 (2020)	70.3
Xiuning	268,900 (2019)	125.0	2,151	11,632 (2020)	54,741 (2020)	83.0
Zixi	116,000 (2014)	92.7	1,251	4,497 (2020)	35,992 (2020)	87.7

CNY = Chinese yuan, GDP = gross domestic product, km² = square kilometer.

Sources: Census and Economic Information Center. CEIC China Database (accessed 6 September 2022); and M. T. Bennett. 2021. China's Quest for Conservation Efficiency and Effectiveness: Case Studies of Comprehensive Eco-compensation Pilots (draft report prepared for the Asian Development Bank).

2. Innovative Approaches and Key Results

The three case study counties use eco-compensation funding to undertake a wide range of interventions for advancing ecological protection and green development. These encompass (i) transitioning to greener economies through sustainable farming and ecotourism; (ii) promoting conservation, environmental protection, and restoration practices through forest management, resource management, and watershed protection; (iii) enabling regulatory and institutional reforms for integrated water resources management; and (iv) supporting fiscal and financial reforms and interventions (Bennett 2021).

Promoting Resource Conservation and Environmental Restoration Interventions

The counties of Jianchuan, Xiuning, and Zixi promote forestry management and conservation to advance the ecological forest industry. This includes ensuring that all activities that damage natural and managed forests are prohibited, and that the respective rules are enforced. Jianchuan employs the forest chief system—whereby local government officials are made explicitly responsible for managing the forests within their jurisdictions—to delineate more clearly the responsibilities of townships and villages that are related to natural resource management. As an example of local innovation under the broad national framework of the FECF, Zixi was selected as one of the first counties to pilot a forestry-based conservation easement approach to “ecological public benefit forests,” whereby the county can purchase the rights for nonstate-owned commercial forests in key ecological sites and rezone them as “ecological public benefit forests,” whereby timber harvesting is prohibited. This system also includes the piloting of forest insurance to protect against disasters.

Xiuning County is strengthening the management and restoration of important wetlands, aquatic vegetation, bird habitat, and terrestrial vegetation. In line with the national policy on “ecological redline areas,” the county is also rescinding mining rights in key ecological conservation areas. Xiuning County is an important upstream area within the Xin'an River watershed. This is why managing agricultural nonpoint source pollution with regenerative agriculture is a core element of the Anhui–Zhejiang trans-provincial eco-compensation scheme (Lopez and Bennett 2017). To this end, the county centralized and standardized the local pesticide distribution system to raise pesticide quality, modernize technology, and optimize application. It also strengthened regulations for the control and remediation of pollution from husbandry and poultry operations, including use of livestock and poultry manure for organic fertilizer production.

Xiuning County has also developed an innovative mechanism for addressing rural solid waste management and recycling more effectively while delivering rural welfare co-benefits: the county established a chain of 100 “ecological beauty supermarkets” which serve as safe solid waste collection points. Rural residents can bring and sort their garbage for recycling to obtain “points” with which they can purchase household items. Since being established, these supermarkets have collected 1,609,800 pesticide packages; 30,831,000 plastic bags; 16,800 used batteries; 5,597,300 plastic bottles; 1,348,000 cans; and 346,000 cups, boxes, and cartons full of cigarette butts (Bennett 2021). This approach has substantially reduced rural solid waste and agriculture residue pollution, and directly benefits 39,616 people across 7,416 households. The supermarkets also serve as a venue for the rural poor to showcase and sell their green agriculture products, for offering employment, and for raising public awareness for environmental protection and public health.

Similarly, the counties of Jianchuan and Xiuning launched measures to strengthen and expand the management and treatment of rural household solid waste and sewage. These involve the construction of an integrated wastewater treatment facility, development of artificial wetlands for water purification, establishment of distributed small-scale treatment facilities, and promotion of household-specific infrastructure (e.g., septic and biogas tanks).

Enabling Regulatory and Institutional Reforms

Ongoing reforms in the three counties aim to strengthen the legal system and regulatory framework for ecological protection, including for forests, grasslands, wetlands, and watersheds. These involve better integration of the river chief and forest chief systems as practiced in Jianchuan and Xiuning counties. The use of eco-compensation funds has been standardized and operationalized based on performance indicators such as on the quality of air and surface water; efficiency of land, water, and energy use; rates of domestic sewage and solid waste treatment; and ecological health.

Jianchuan established regulations to facilitate eco-compensation mechanisms for its administrative river sections, while Zixi has been developing cross-border watershed eco-compensation between administrative sections along the same river. Zixi clarified rights over riverbed ownership, management, and use for all river sections in the county. Competitive bidding is used to determine the granting of use rights, often for sand dredging, but with responsibilities for riverbed protection and ecological management. Xiuning developed a regulatory framework to strengthen pollution inspection and control, improve monitoring of nonpoint source pollution, and ban fishing in key ecological areas (such as a 10-year fishing ban on the Yangtze River).

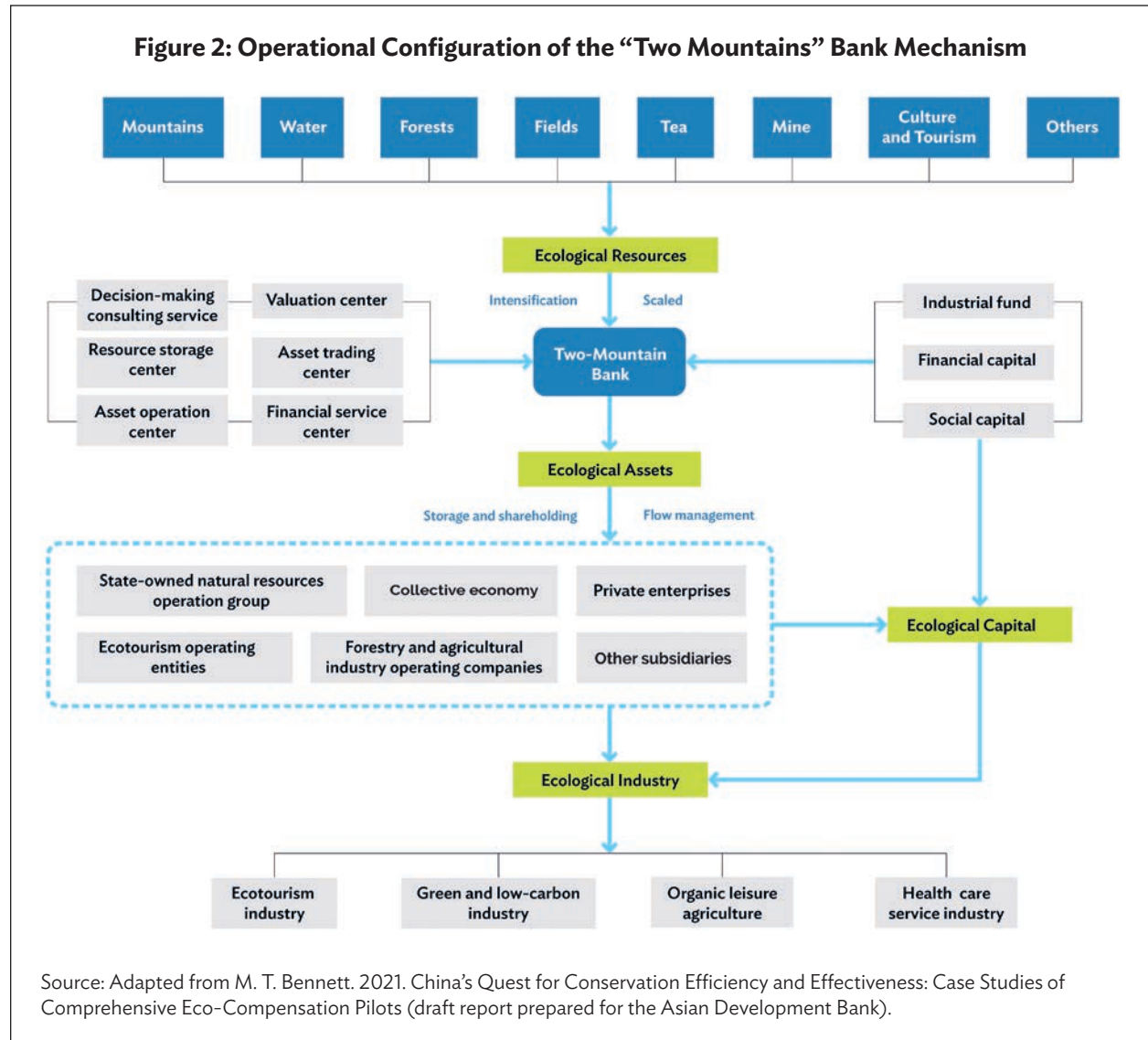
Supporting Fiscal and Financial Reforms and Interventions

Jianchuan, Xiuning, and Zixi counties have increased their efforts to integrate and streamline their respective eco-compensation funding streams and conservation investments across departments, including agriculture, forestry, and water; and the development and reform commission. Zixi is formulating a composite index on ecological performance to assess investments of these integrated funding streams.

The three counties are also diversifying their funding sources to support green development by tapping into state-owned enterprises and private sector financing through a range of financial intermediaries established for this purpose, such as Zixi’s County Investment Corporation. The corporation established a range of companies engaged in the development of nature parks and respective infrastructure; purchase and storage of ecological resources; operation and transaction of green assets; and financing and guarantee of capital, among others. Xiuning has been successful in bringing in investors to its organic tea and agriculture sectors, which helped build the foundations for green growth. Currently, it receives eco-compensation and related environmental management payments from upper-level programs (e.g., special use funds for agriculture, forestry, and water; special use funds for energy conservation

and environmental management; transfer payments for national KEFZs; and Xin’an River watershed interprovincial eco-compensation scheme).

Zixi also put forward a more unified conservation finance framework with the development of the “two mountains” bank mechanism.⁴ Not an actual bank, this is fundamentally a conceptual, institutional platform for realizing the value of Zixi’s ecological asset base and for offering alternative financing options (Figure 2).



⁴ The “two mountains” is in reference to President Xi Jinping’s statement about natural capital in his keynote speech during the opening ceremony of the B20 Summit in Hangzhou, the PRC on 3 September 2016: “Lucid rivers and lush mountains are as valuable as mountains of gold and silver.”

The “two mountains” bank framework successfully brought investors into Zixi’s tourism sector through the innovative use of natural capital ownership shares and park revenue-sharing agreements. An example is the Dajue Mountain Tourism Area (Box 1).

Box 1: Financing Ecotourism Development in Zixi County— The Dajue Mountain Tourism Area

Located in the northwestern foothills of the Wuyi Mountains, the Dajue Mountain Tourism Area is the first private sector, 5A-rated scenic spot in the country. Spanning 20,400 hectares—98% of which are virgin forests that provide important biodiversity habitat and local climate and air quality services—this scenic area has a comprehensive range of amenities and opportunities for vacationing and leisure. In collaboration with the Zixi County Government, the Industrial and Commercial Bank of China formed a financial consortium in 2019 to invest CNY780 million (\$113 million) in the scenic spot. This is to strengthen the county’s business and financial models and develop its infrastructure and tourism amenities, including the completed construction of a scenic monorail. Returns to investors are generated via park entrance, ropeway, tour car, and monorail fee revenues, and from ownership shares in the park’s natural assets.

As a new conservation finance approach in the People’s Republic of China, the financial consortium helped resolve longstanding management and financial barriers to realizing the potential of the Dajue Mountain Tourism Area in an ecologically sustainable fashion. Zixi County built on this success by advancing a countywide ecotourism strategy that leverages this key scenic spot to create spillovers into other scenic areas in the county, boosting investor interest in the development of its ecotourism sector.

CNY = Chinese yuan.

Source: M. T. Bennett. 2021. China’s Quest for Conservation Efficiency and Effectiveness: Case Studies of Comprehensive Eco-compensation Pilots (draft report prepared for the Asian Development Bank).

Transitioning to Greener Economies

The development of a green and organic agriculture sector focuses on tea cultivation (e.g., Zixi’s white tea) and sector-wide interventions to increase returns to producers. This includes the establishment of pilot parks to demonstrate the approach and help facilitate the uptake of organic agricultural farming technologies. An example is Xiuning County’s 1,667 hectares of organic tea demonstration zones in three townships to provide training and technical support to local tea growers.

Another intervention is the regulation and control of highly polluting sectors such as river sand mining. The auctioned rights to sand mining are now tied to riverbed cleaning and protection responsibilities. Other highly polluting industries, including pesticide plants, paper mills, chemical plants, and more than 180 quarries, have been limited in their operations or closed entirely in Zixi. Ecotourism is a principal focus and includes the promotion of touristic highlights such as the Jianchuan County’s mountain national scenic spots, wood carving art township, the Zixi’s County Dajue Mountain Tourism Area, and Fashui hot springs. Respective investments to develop the amenities and infrastructure for these projects are also undertaken. Ecotourism provides important employment opportunities for local communities.

3. Challenges

The three pilot counties identified a common range of issues that created barriers for improving the effectiveness and efficiency of their conservation efforts. The challenges encountered cut across design, financing, and implementation of eco-compensation projects.

Design. County governments often lack the scientific and technical expertise and capacity to design effective eco-compensation policies and funding approaches. These involve best practices in the design of performance-based policy instruments; ecological valuation and cost-benefit methodologies to inform subsidy rates; local community engagement and partnership-building when targeting ecological and environmental management issues in rural areas, and when conducting rigorous science-based assessments of ecological outcomes of programs; and approaches in conservation finance (Bennett 2021). Many counties indicate that they face major funding gaps in addressing some of their more fundamental environmental management challenges such as building the necessary infrastructure for rural solid waste and sewage treatment.

Financing. Much of the PRC's financial sector remains under state control, with considerable restrictions on the nature and types of financial instruments that can be developed, and types of financial intermediaries that can exist. This creates challenges for county governments in their efforts to develop local conservation finance and diversify eco-compensation funding (Bennett 2021). Limited coordination capacity of county governments complicates financing of projects further. County governments struggle to pool eco-compensation funds from various sectors since each have their respective focus areas, fund management rules, and performance evaluation methods mandated by the upper level, from respective ministries down to the line agencies of the county. This means that they are not in the position to directly negotiate with other similar levels of government in shared watersheds to create horizontal eco-compensation mechanisms. Additionally, the nature of eco-compensation, with its cross-border administrative coverage, requires integrated management and planning at a broader level such as river basin or mountain region.

Implementation. Development restrictions due to their categorization as KEFZs have been difficult to manage. The county governments noted that government revenue from tax receipts was substantially reduced due to industries having to shut down, which required significant financial and governmental resources. This, combined with substantial funding increases needed to improve capacity for ecological management and green industry transition, meant that the county governments are even more reliant on provincial and national government fiscal support to achieve national policy goals, despite calls for increasing finance capacity for local conservation.

B. Incorporating Poverty Alleviation Targets into Eco-Compensation Programs

To assess the rural welfare impacts of eco-compensation programs, the PRC's major eco-compensation programs were examined using a combination of secondary data via academic literature and statistical data collected from six counties in three provinces in 2020.⁵

1. Characteristics of the Case Study Counties

All six counties in the three provinces are nationally designated as poverty-stricken counties (Bennett 2008). In Hubei Province, Fang and Yunyang counties are environmentally sensitive as they are situated in the immediate catchment of Danjiangkou Reservoir—the source of drinking water for Beijing, Tianjin, and other cities in the northern region of the PRC through the 2,000-kilometer South-to-North Water Diversion Project. Approximately 78% of Fang County and 61% of Yunyang County are covered by forests. In Jiangxi Province, Anyuan and Xunwu counties are considered of high conservation value as they are in the source areas of the Dong River, which provides water downstream to affluent Guangdong Province and Hong Kong, China. These counties are hilly, with more than 80% forest coverage. In

⁵ These case studies were conducted under ADB's technical assistance project, PRC: Policy Study on Integrating Poverty Alleviation and Rural Welfare Improvement with Ecological Conservation (Subproject 2).

Sichuan Province, Hongyuan and Ruoergai counties are highland and grassland areas with large shares of wetlands. They are deemed environmentally fragile as they are water source areas of the Yellow River, the second largest river of the PRC that traverses 5,464 kilometers. Table 2 presents the key facts and figures of the six case study counties.

Table 2: Key Facts and Figures—Poverty Alleviation Case Study Counties

County	Population	Population Density (people/km ²)	Land Area (km ²)	GDP (CNY million)	GDP per Capita (CNY)	Forest Cover (%)
Hubei Province						
Fang	487,000 (2014)	95.3	5,110.0	12,045.7 (2020)	19,468.4 (2016)	78.0
Yunyang	1,331,400 (2020)	366.4	3,634.0	46,258.6 (2020)	49,845.0 (2020)	61.0
Jiangxi Province						
Anyuan	386,000 (2014)	162.6	2,374.6	9,211.5 (2020)	8,598.0 (2010)	>80.0
Xunwu	326,000 (2014)	141.1	2,311.0	10,268.2 (2020)	10,555.0 (2010)	>80.0
Sichuan Province						
Hongyuan	47,300 (2014)	5.6	8,398.0	1,828.9 (2020)	38,103.0 (2020)	No data
Ruoergai	78,400 (2014)	7.4	10,620.0	3,008.4 (2020)	39,584.0 (2020)	No data

CNY = Chinese yuan, GDP = gross domestic product, km² = square kilometer.

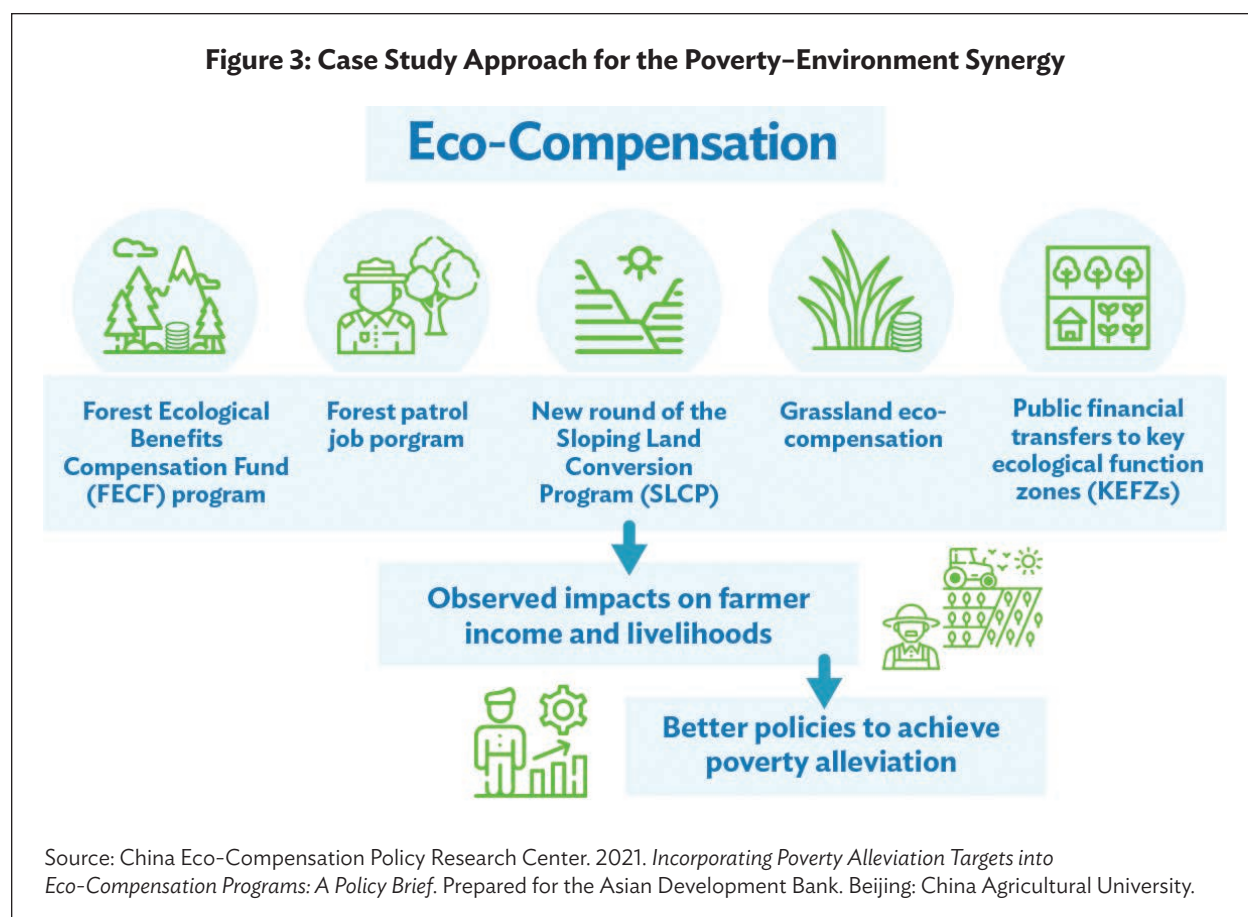
Source: Census and Economic Information Center. CEIC China Database (accessed 6 September 2022).

2. Innovative Approaches and Key Results

Five eco-compensation programs were analyzed to assess their impact on poverty alleviation: (i) FECF program, (ii) new round of the Sloping Land Conversion Program (SLCP), (iii) forest patrol job program, (iv) grassland eco-compensation, and (v) public financial transfers to KEFZs. Figure 3 illustrates the case study approach.

Poverty is closely related to natural resources and environmental conditions. Respective interventions need to break this nexus. Poverty incidence in the six poverty-stricken counties, for example, tends to be higher in areas with higher environment quality and lower in areas with lower environment quality, which constitutes gray rather than green growth. This is to be avoided within eco-compensation programs.

While several programs have poverty reduction impacts, their performance in terms of poverty alleviation varies. The ranking of the eco-compensation programs by positive impact on poverty reduction, from high (1) to low (4), is as follows: (1) forest patrol job program, (2) new round of the SLCP, (3) grassland eco-compensation, and (4) FECF program. The ranking is based on how many income percentile groups in the household samples are positively and significantly impacted by a given eco-compensation program. The program on public financial transfers to KEFZs has no direct poverty alleviation effect, but enhances infrastructure, which has an outreach impact on poverty alleviation.



Eco-compensation programs have different impacts on income groups of rural households. For example, the programs on forest patrol jobs and grassland eco-compensation provide more benefits to lower-income groups. Salaries of forest patrols account for 12.7%–25.9% of household income. These results show that the poverty reduction impacts of forest patrol compensation significantly vary over income groups, with the proportion being higher in poorer farming households. For most herders, eco-compensation for grasslands accounts for less than 20% of their household income: the poverty reduction impact is significantly positive for the extremely poor, but negative for middle-, and high-income groups because of pressure to reduce the number of their livestock.

The poverty reduction impacts of the eco-compensation programs may result not from compensation per se, but from alternative livelihoods supported by the program. The participation of households in the new round of the SLCP has a positive impact on net household income per capita (Le and Jin 2020). The poverty reduction effects of the program are mainly reflected in the economic benefits of the newly planted cash trees, change of livelihood activities, and SLCP subsidies. For every *mu* equivalent increase in SLCP land, net income per capita increases by 22.5%.⁶

In 2019, the annual public financial transfers to KEFZs in the six counties amounted from CNY42.9 million (\$6.4 million) to CNY167.4 million (\$25.1 million). These transfers were important for the protection of the environment and improvement of livelihoods in poor areas. However, this program was not targeted to poor households and had no direct correlation with any other farming and herding households.

⁶ A *mu* is a Chinese unit of measurement (1 *mu* = 666.67 square meters).

3. Challenges

While the initial results of these pilot programs generally demonstrate positive outcomes, more work is needed to better understand the drivers and linkages between eco-compensation policies and actual mechanisms for achieving higher incomes to support wider poverty reduction goals. As with many eco-compensation programs, funding challenges persist, with many counties facing competing priorities for scarce funds to manage local environmental problems. Equally challenging is the need to raise awareness and provide environmental education to rural communities on the linkages between adopting environment-friendly farming practices and increased rural incomes, albeit modest. As environmental gains typically represent a medium- to long-term endeavor, it is important that programs which are demonstrating positive impact are continually supported financially and through other means (e.g., training and extension). The pilot programs provide important findings for ongoing targeted support and offer avenues for refinement of the design of future programs in other regions.

C. Developing an Operational Framework for Sustainable Ecological Conservation and Green Development

Huanggang Municipality in Hubei Province, with focus on the Dabie Mountain, was chosen as the case study site for developing a municipal-wide, integrated, and operational eco-compensation framework for sustainable ecological conservation and green development.⁷

1. Characteristics of the Case Study Municipality

While part of the central Hubei Province, the Huanggang Municipality sits in the Dabie Mountain Ridge and borders the provinces of Henan, Anhui, and Jiangxi. Near the City of Wuhan, it is a relatively underdeveloped area with several counties designated as poverty-stricken until 2020. The Dabie Mountain Ridge is home to a national nature reserve (a designated global geopark of the United Nations Educational, Scientific and Cultural Organization) and more than 60 protected areas, including some internationally important wetlands for the East Asian–Australasian Flyway. It is on the priority list for ecosystem protection in the National Biodiversity Conservation Strategy and Action Plan (2011–2030). Huanggang has six tributaries flowing into the Yangtze River. Eco-compensation is expected to be established for all these tributaries by 2024. Table 3 presents the key facts and figures of Huanggang Municipality.

Table 3: Key Facts and Figures—Green Development Case Study Municipality

Municipality	Population	Population Density (people/km ²)	Land Area (km ²)	GDP (CNY million)	GDP per Capita (CNY)	Forest Cover (%)	Water per Capita (m ³)
Huanggang	5,882,719 (2020)	337.0	17,457.0 (2020)	254,131.0 (2021)	36,685.0 (2019)	...	70.5 (2009)

... = not available, CNY = Chinese yuan, GDP = gross domestic product, km² = square kilometer, m³ = cubic meter.
Source: Census and Economic Information Center. CEIC China Database (accessed 6 September 2022).

⁷ The case study is conducted under ADB's technical assistance project, PRC: Developing an Eco-Compensation Framework for Green Development in the Dabie Mountain.

2. Innovative Approaches and Key Results

The municipal government of Huanggang actively promotes biodiversity and ecological conservation—it has developed a suite of conservation policies, guidelines, and departmental rules, and regulations to protect its natural capital. From 2018, the municipality piloted two watershed-based eco-compensation schemes in the Ba River and Bailian River, which were heavily focused on water quality and had funding from the municipal and other local governments. The municipal government also focuses on restoring the forest in the Dabie Mountain, which provides important water, and soil conservation services in the middle reaches of the Yangtze River Basin.

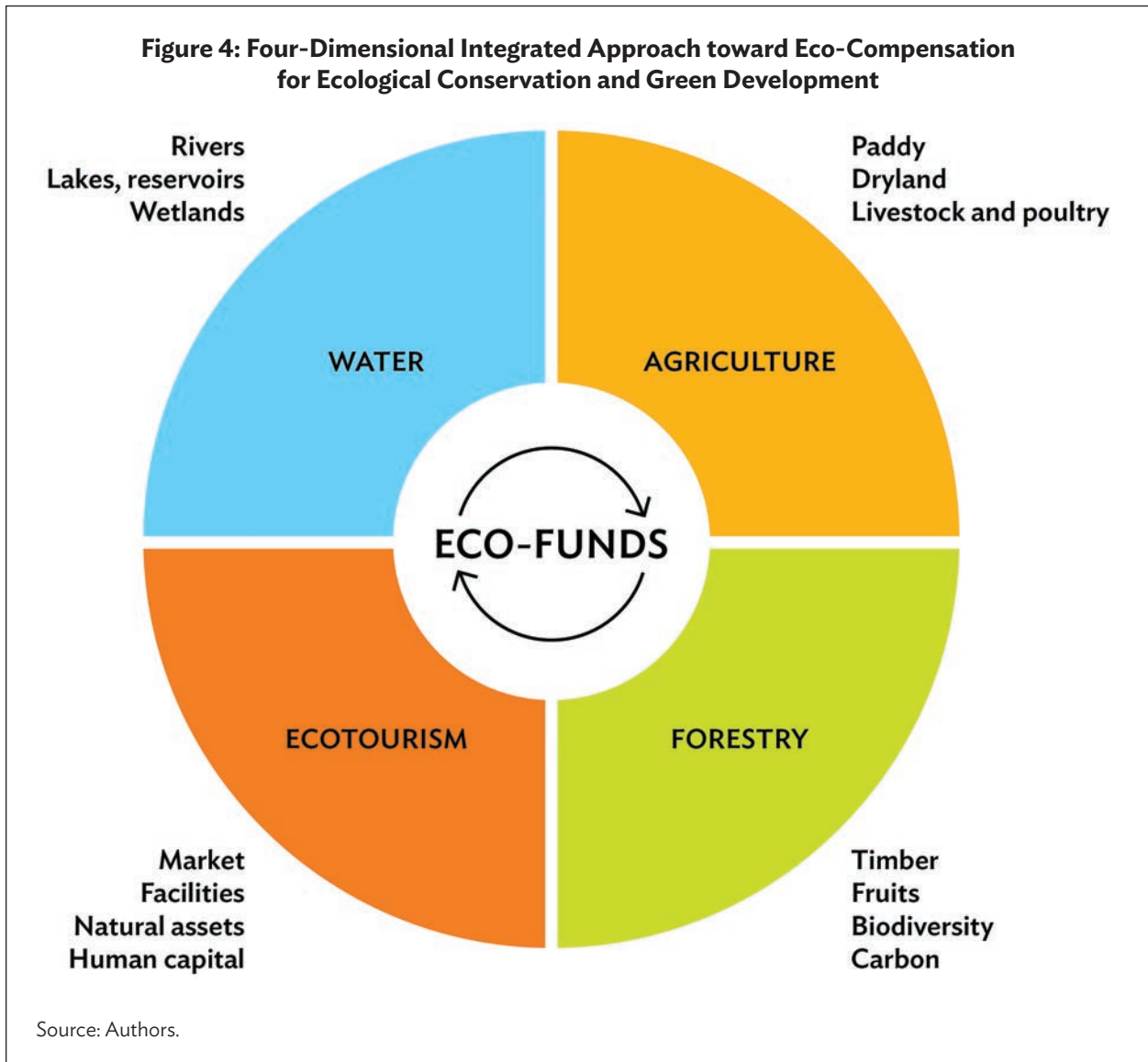


Figure 4 illustrates the integrated, multisector approach for the case study. The operational framework aims to establish a set of interconnected funds (eco-funds) for the water, agriculture, forestry, and ecotourism sectors. The eco-funds fuse funding from different sources, including the public, and private sectors and individuals, through voluntary, and mandatory contributions. Within each sector, respective eco-funds will be set up according to the nature of the sector, market development, and prevailing policy, and economic conditions. As an example, a proposed wetland bank aims to raise funding from peer cities through conservation and expansion of wetland areas in Huanggang (Box 2).

Box 2: Wetland Bank

Wetland bank, or wetland mitigation bank, is a concept that originated in the United States. It refers to a system that recognizes restored, enhanced, or newly developed wetlands that can then be traded in monetary terms or credits in the market to other developers, who redevelop other, geographically distant wetlands, often for housing or industry purposes. The objective of wetland banks is to improve wetland protection in economic development. The concept is like the farmland requisition–compensation balance system in the People’s Republic of China, where cities can convert farmland into nonfarmland, provided they purchase newly developed farmland to make up the loss from a seller in another region, usually within the same province, which helps maintain total farmland areas. Huanggang Municipality in Hubei Province has many wetlands, including some protected wetlands of national and provincial importance. The municipality has the potential to leverage its experience in wetland protection and expand wetlands, with the aim of trading in money or credits with other cities, such as Wuhan, where rapid urban expansion has a negative impact on wetland resources.

Source: Authors.

The framework builds on the level of guarantee in water supply to agriculture and quality of runoff water from agriculture. Water, forestry, and agriculture contribute to creating an inviting ecotourism environment. In turn, the ecotourism sector has the responsibility of strengthening and contributing to water and forest conservation and agriculture practices.

3. Challenges

The operational eco-compensation framework is being considered in a proposed ADB investment project. However, a full-scale rollout of the framework faces challenges:

Plenty of policy support, but lack of regulatory environment and implementation support. The central government has rolled out a series of policies and guidelines aimed at promoting eco-compensation, especially at horizontal scale. There are, however, critical gaps in the willingness to compensate across administrative boundaries. The regulatory environment varies across regions, and there are often insufficient incentives to pay, made worse by the lack of tools and instruments for implementation.

Lack of an enhanced and transparent monitoring, evaluation, and reporting mechanism, and data system. A functional and accepted data and evaluation system will be the foundation to conduct results-based eco-compensation. Gross ecological products have rapidly grown in concept and applications in the PRC, but remain distant from being used as basis for eco-compensation due to differences in evaluations. Developing a commonly accepted data and monitoring system is still a major technical challenge.

Financing gaps. Still wanting is the participation of the private sector. From being government programs, eco-compensation needs to be opened up to wider participation to ensure financial viability and long-term sustainability of ecosystem protection.

Low public awareness and stakeholder engagement. Even as public awareness grows, turning such awareness into willingness to pay and individual actions remains at the starting point, complicating implementation and uptake of conservation practices and linkage of sector activities, such as ecosystem protection and ecotourism development.

III. LESSONS LEARNED FROM THE COMMON ASSET TRUST PROGRAM OF COSTA RICA

What is called “eco-compensation” in the PRC embodies many policy instruments that are given distinct labels in international policy discourse. This section draws from Costa Rica’s experience which may help further refine current conservation investments in the PRC and the Asia and Pacific region as a whole.

Costa Rica had one of the highest deforestation rates during the second half of the 20th century. In 1950, it had a forest coverage of 72% and by 1987, it had fallen drastically to 21% due to a boom in agriculture and livestock that supported much of the country’s development during that period. To stop and reverse deforestation, Costa Rica has implemented a series of conservation policies and programs in recent decades, such as its National System of Conservation Areas (SINAC by its Spanish acronym), which now has 140 protected areas that cover 26% of the continental territory. In addition, the country instituted a new landmark Forestry Law in 1996, which, among other important improvements to national forest management, established two key measures: prohibiting land use change (i.e., deforestation) and the creation of a nationwide Payment for Ecosystem Services (PES) program.

As one of the first PES schemes in the world, the Costa Rican program contributed to halting deforestation and reversed the trend. The government is the sole buyer of ecosystem services (and, therefore, of their property rights), thereby creating a monopsony, i.e., a single buyer controlling most of the market. It is an intermediary between the sellers (i.e., farm owners who implement conservation and restoration activities that provide the targeted ecosystem services) and the beneficiaries, which can vary significantly, from local to global scales.

The program is marked by broad involvement of societal groups, including representatives from the private sector, forestry producers, and small business. It is funded by a mix of mandatory contributions such as fixed shares of incomes from fuel tax, water consumption fee, and timber tax; and voluntary contributions from donors, private businesses, or international organizations. Roughly 88% of revenues originate from contributions from the country’s fuel tax.

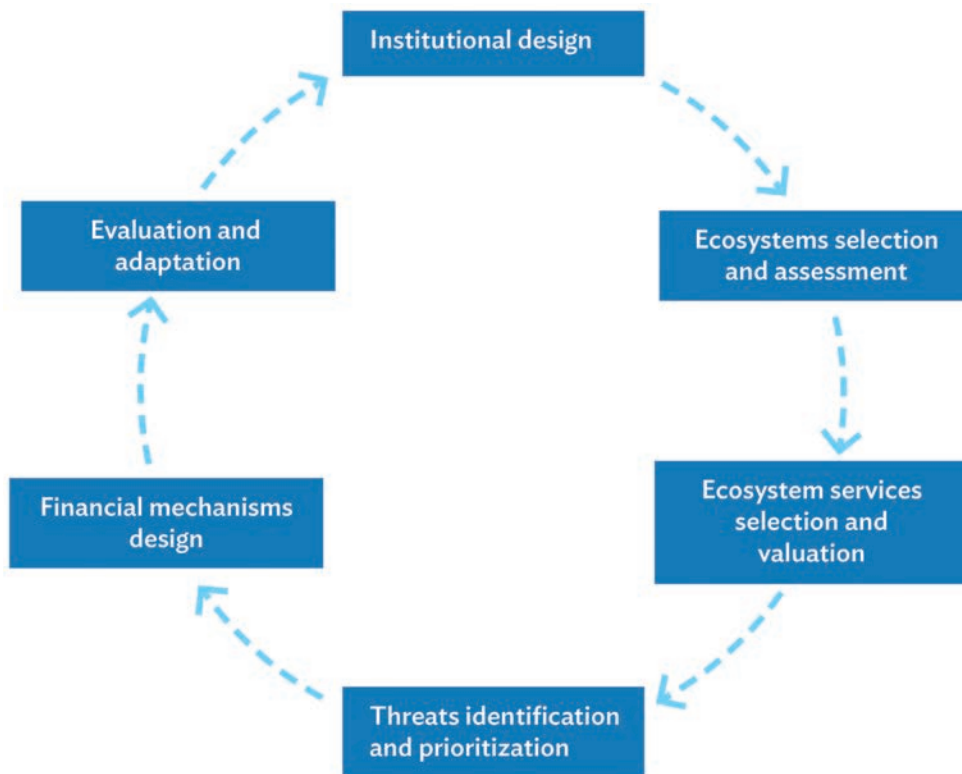
The PES scheme in Costa Rica is input-based, meaning that payments are based on the implementation of conservation and restoration activities rather than specific ecosystem services. Payments are bundled to protect, improve, or restore four ecosystem services (carbon sequestration, water provision, scenic beauty, and biodiversity protection) rather than separate payments for each service.

Recently and in a major institutional shift, the decades-old program was transitioned into a Common Asset Trust (CAT) to accommodate the increased size of the scheme and to put the program on a more sustainable footing. A CAT is a legal entity with explicit obligations to protect, manage, and create common assets for the common good of present and future generations. Trusts are frequently used and created as legal mechanisms to protect and manage assets on behalf of specific beneficiaries. In the case of Costa Rica, the concept of trusts is being extended to the management and protection of natural capital such as forests, wetlands, and oceans (Costanza et al. 2021). This institutional change also reflects a meaningful shift in ambition since the program’s inception; instead of merely protecting private forests, the revised aim is to protect all of Costa Rica’s natural capital.

Following the example of Costa Rica’s CAT, the PRC could consider using the CAT framework to update or improve core elements of eco-compensation schemes—i.e., public natural capital—more effectively, generating funding, identifying the conservation and restoration activities that would be funded, and thereby increasing overall adoption and stakeholder participation. Some of the actions that could be taken are summarized as follows:

- (i) **Target public natural capital.** Costa Rica's CAT is specifically designed to manage public natural capital, which is commonly owned, and often excluded from eco-compensation programs. In fact, the majority of the PRC's programs focus on conservation and restoration activities on private lands such as farms. Thus, expanding the application of these programs to public lands at the PRC would be beneficial for both the environment and social welfare. An example of how this could work already exists in the PRC with the Forest Patrol Program. According to the China Agricultural University (2021), this program has the highest positive impact on poverty alleviation from the pool of programs assessed in the study and operates on both private and public or common property (i.e., public forest). Furthermore, the PRC still has significant potential to develop eco-compensation programs for coastal and marine ecosystems, which are typically public or common property.
- (ii) **Generate funding.** An important lesson from Costa Rica is the need for a solid and diversified set of funding sources that can reduce the vulnerability of their PES schemes (or different eco-compensation programs in the PRC) to unexpected changes. In a CAT, funding sources can come from internalizing negative externalities from different economic and revenue-generating sectors such as industry, agriculture, and fisheries. In fact, the participation of the private sector in protecting and restoring natural capital in the PRC has been identified as a key factor, since most market-based initiatives in the country are government-funded (Bennett 2009).
- (iii) **Refine programs and conservation activities.** Eco-compensation programs in the PRC are already providing incentives to enhance ecosystem services and have a positive impact on poverty alleviation, as reported by China Agricultural University (2021). The expansion of the current programs under a CAT to other ecosystems can open the possibility for a wide portfolio of new investment opportunities (i.e., activities to fund), that at the same time will expand the current participation of different actors. For example, in Costa Rica, if the new PES scheme can incorporate activities in public property in accordance with the CAT framework, ecosystems such as mangroves can be part of the program. This will create new opportunities for coastal community associations, which typically have low per capita income, to participate in restoration activities and generate blue and green jobs.

Overall, the CAT framework could be a valuable tool for the PRC to improve its eco-compensation programs, considering the country's unique characteristics such as the public natural capital, the valuation of its natural capital, and the participation of different actors, including the private sector and rural communities participating in the schemes.

Figure 5: Development Cycle of Eco-Compensation Programs

Source: China Eco-Compensation Policy Research Center. 2021. *Incorporating Poverty Alleviation Targets into Eco-Compensation Programs: A Policy Brief*. Prepared for ADB. Beijing: China Agricultural University.

IV. POLICY RECOMMENDATIONS

National pilots have adopted a wide array of approaches toward operationalizing comprehensive eco-compensation to support local innovation while alleviating poverty and promoting green development. These approaches range from basic investments in improving capacity for ecological protection and environmental management to experimentation with models for financing and catalyzing eco-industry development. These also involve advancing market-based eco-compensation approaches to manage natural resources in line with national guidelines such as horizontal upstream–downstream eco-compensation (i.e., eco-compensation between same levels of regional government to improve management of shared watersheds), forestry eco-compensation, and wetlands eco-compensation.

Nonetheless, several important gaps still need to be addressed to ensure that local governments can develop and refine effective, efficient, and fit-for-purpose eco-compensation programs. The following set of recommendations is provided to improve national eco-compensation policies and programs to better support local innovations and strengthen their impacts on poverty alleviation and green development.

A. Key Takeaways

Define the Appropriate Scope of Piloting

An important issue in piloting is defining the appropriate scope. If nature conservation, economic development, or livelihood improvement is one of the policy objectives in an eco-compensation program, the objectives should be built explicitly into the program during the design stage to achieve the expected outcome. This is a principal consideration in comprehensive eco-compensation. Although KEFZs are delineated at county government level, broadening the scope for pilots should be considered. This issue underlies many of the challenges faced by county governments. Some dimensions of reforms and innovations encouraged by the national government's comprehensive eco-compensation piloting scheme are beyond the institutional and regulatory mandate or scientific and technical capacity of county governments. Institutional and capacity reforms and policy support conducted at higher levels of government (such as the municipality or province where the KEFZ in question is situated, or the national government) or at broader coverage areas (such as river basin or mountain region) are potentially more important to realizing effective conservation outcomes for these KEFZs, and in helping them transition to sustainable, green industries, and livelihoods.

Focus on Areas in Need of Stronger Government Support

The following are the areas where stronger national and provincial government support are needed:

- (i) **Scientific, technical, and capacity building support.** Although the national government's guidelines for comprehensive eco-compensation welcome flexibility for local governments to experiment and innovate, there remains a need to better inform local officials and provide technical expertise to develop local capacity. Knowledge areas for training encompass green industry development and conservation finance, market-based policy instruments for environmental management, protocols for rural community engagement, and linkages between land uses and environmental impacts.
- (ii) **Institutional and regulatory support.** In the absence of a clearer understanding of the larger regulatory and public expenditure framework for comprehensive eco-compensation, incentive-based policies and economic instruments targeting specific environmental outcomes could be weakened or nullified by countervailing policies or economic incentives. Besides the ongoing rationalization of the regulatory framework, the national, and provincial governments can provide support in conducting a public environmental expenditure review, i.e., an analysis of the allocation, management, and effectiveness of all public expenditures targeting environmental outcomes.
- (iii) **Fiscal and financial support.** Innovative conservation finance approaches are generated not only by strongly enforced and equitably applied environmental mandates, but also by the existence of a relatively open and flexible financial sector. In the PRC, strict financial sector controls create significant barriers to the ability of local governments to innovate on how to fund conservation and how to diversify funding sources for eco-compensation. While it is not expected that the financial sector will become less regulated, the national government can still provide locales with options for financing conservation, e.g., the creation of a national "green bank" that would focus exclusively on supporting local conservation initiatives and has the flexibility to provide low-interest loans to programs of varying scales and scope.
- (iv) **Environmental planning, monitoring, and assessment.** Establishment of an effective and comprehensive system of meaningful ecological and environmental indicators, baselines, and monitoring with which to evaluate outcomes remains a work in progress. The development of a "gross ecological product" metric is envisioned to eventually supplant the current system of local government performance evaluation that is based on standard

economic measures (e.g., GDP). A science-based environmental monitoring framework, including indicators for measuring changes in ecosystems and ecosystem services, will strengthen the local environmental monitoring system, create more outcome-based funding incentives, and improve the ability to evaluate efficiency (e.g., units of conservation achieved per CNY).

- (v) **Cross-boundary cooperation.** A primary element will be to look at beneficiaries and participants beyond county, municipal, or even provincial boundaries. Coordination from higher-level governments will help bring stakeholders to the table and start cooperation.

B. Challenges Specific to Current Eco-Compensation Programs

Review and Reform Eco-Compensation Programs to Better Assimilate and Achieve Poverty Reduction Targets

- (i) **Forest Ecological Benefit Compensation Fund program.** While many provincial and other local governments that have the financial wherewithal to do this have been steadily raising the rates for their provincial and subprovincial FECFs to complement the national program, governments in high-poverty areas generally have less resources available to do this. The national government could help to strengthen the rural welfare improvement capacity of this program by providing greater national support, combined with higher subsidy rates, to poverty areas where the national program is being implemented.
- (ii) **New round of the sloping land conversion program.** The poverty reduction impact of the new round of the SLCP primarily arises from the program's economic forest benefits and other livelihood activities. Therefore, improving the management of forested land can magnify the poverty reduction outcomes of the program. Promoting and strengthening the participation of cooperatives and the private sector in forestland management can help achieve this. Given that the compensation rate of the new round of the SLCP is noncompetitive (hence, unattractive), differentiating this rate in the counties can also improve the poverty reduction impact of the program.
- (iii) **Forest patrol job program.** With the slow, but gradual progress of eradicating absolute poverty, there may be a need to identify new suitable forest patrols. This would entail upgrading and reformulating the selection criteria for suitable forest patrols to prevent "elite capture" (i.e., local elites usurping the benefits of targeted welfare programs) or to remove ineligible position holders.
- (iv) **Grassland eco-compensation.** To increase the poverty reduction impact of grassland eco-compensation, consider delegating the authority to establish compensation rates to county governments.
- (v) **Public financial transfers to key ecological function zones.** Although the program does not directly provide compensation to households, its activities generate enabling conditions for protecting the environment, developing the industry sector, and improving infrastructure. This program should continue and increase transfer payments to poor counties in KEFZs.

V. CONCLUSION

The PRC's ambitious efforts to address its environmental management challenges through the development of innovative eco-compensation programs and policies that also target poverty reduction offer valuable insights to countries facing similar problems. Little is known about these eco-compensation initiatives outside the PRC, making knowledge sharing to close this gap important. Many countries deal with similar challenges as they attempt to reconcile economic growth and development, preservation and conservation of nature, and improved welfare and health of their people.

At the same time, the PRC still has much that it can adopt and adapt from international best practice. While no approach is without challenges, the international experience and best practices developed can offer the PRC and the rest of the world a wealth of publicly available information which helps incentivize a more sustainable, safe, and resilient use of public goods that provide vital ecosystem services to society. If tapped into more fully, such a knowledge base can significantly shorten program development and implementation time, improve conservation, increase poverty reduction outcomes, and strengthen financial sustainability of programs.

Eco-compensation has already achieved significant scale and encouraging results across the PRC. Nonetheless, much can still be done to further improve how these programs achieve their targets, including poverty reduction and green development. Central pillars for how governments can jointly target poverty reduction, and responsibly and sustainably manage their natural capital via eco-compensation include the following:

- (i) A sound political, institutional, and regulatory enabling environment with clear aims and assessments protocols.
- (ii) Realistic and comprehensive poverty–environment mapping to improve targeting and program design.
- (iii) Safeguards to ensure that conservation targets are achieved with no adverse welfare impacts to concerned rural communities, or that poverty alleviation targets are achieved without creating additional conservation pressures or challenges.
- (iv) Comprehensive community consultation through all phases of program design and implementation, which includes giving communities and households autonomy over the choice to participate.
- (v) Resource-based income–enhancement schemes to focus on more comprehensive interventions across the whole value chain to ensure that rural land users fully benefit from better production practices and access to new markets.
- (vi) Targeted funding flows as determinants of success, including the role of earmarked and mandatory funding in guaranteeing sufficient and constant funding.

REFERENCES

- Barbier, E. B. 2012. Natural Capital, Ecological Scarcity and Rural Poverty. *World Bank Policy Research Working Paper Series*. No. 6232. Washington, DC: World Bank.
- Barrett, C. B. 2008. Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa. *Food Policy*. 33 (4). pp. 299–317.
- Barrett, C. B., A. J. Travis, and P. Dasgupta. 2011. On Biodiversity Conservation and Poverty Traps. *Proceedings of the National Academy of Sciences*. 108 (34). pp. 13907–13912.
- Bennett, M. T. 2008. China's Sloping Land Conversion Program: Institutional Innovation or Business as Usual. *Ecological Economics*. 65(4). pp. 699–711.
- Bennett, M. T. et al. 2014. China's conversion of cropland to forest program for household delivery of ecosystem services: how important is a local implementation regime to survival rate outcomes? *Forests*. 5(9). pp. 2345–2376.
- Bennett, M. T. 2021. China's Quest for Conservation Efficiency and Effectiveness: Case Studies of Comprehensive Eco-Compensation Pilots (draft report prepared for the Asian Development Bank).
- Bird, K., K. Higgins, and D. Harris. 2010. Spatial Poverty Traps: An Overview. *ODI Working Paper Series*. No. 321. London: Overseas Development Institute.
- Bullock, A. and B. King. 2011. Evaluating China's Slope Land Conversion Program as Sustainable Management in Tianquan and Wuqi Counties. *Journal of Environmental Management*. 92 (8). pp. 1916–1922.
- Chen, S. and M. Ravallion. 2007. Absolute Poverty Measures for the Developing World, 1981–2004. *Proceedings of the National Academy of Sciences*. 104 (43). pp. 16757–16762.
- China Agricultural University. 2021. Policy Study on Integrating Poverty Alleviation and Rural Welfare Improvement with Ecological Conservation. Asian Development Bank.
- China Eco-Compensation Policy Research Center (CEPRC). 2021. *Incorporating Poverty Alleviation Targets into Eco-Compensation Programs: A Policy Brief*. Prepared for the Asian Development Bank. Beijing: China Agricultural University.
- Costanza, Robert, Paul W. B. Atkins, Marcello Hernandez-Blanco, and Ida Kubiszewski. 2021. Common Asset Trusts to Effectively Steward Natural Capital and Ecosystem Services at Multiple Scales. *Journal of Environmental Management*. 280 (111801).
- Dercon, S. 2009. Rural Poverty: Old Challenges in New Contexts. *The World Bank Research Observer*. 24 (1). pp. 1–28.
- Government of the People's Republic of China, National Development and Reform Commission (NRDC). 2019. Pilot Scheme for Comprehensive Ecological Compensation. *NRDC Issue No. 1793*. Beijing (in Chinese).
- Hyde, W., B. Belcher, and J. Xu, eds. 2003. *China's Forests: Global Lessons from Market Reforms*. Washington, DC: Resources for the Future.

- Jalan, J. and M. Ravallion. 1997. Spatial Poverty Traps? *World Bank Policy Research Working Paper Series*. No. 1798. Washington, DC: World Bank.
- Jalan, J. and M. Ravallion. 2002. Geographic Poverty Traps? A Micro Model of Consumption Growth in Rural China. *Journal of Applied Econometrics*. 17 (4). pp. 329–346.
- Jin, L. et al. 2016. *Advances of Eco-Compensation in China in All Sectors*. Beijing: Economic Press.
- Kanbur, R. and A. J. Venables, eds. 2005. *Spatial Inequality and Development*. Oxford: Oxford University Press.
- Le, W. and J. Leshan. 2020. How eco-compensation contribute to poverty reduction: A perspective from different income group of rural households in Guizhou, China. *Journal of Cleaner Production*. 275 (122962).
- Liu, C. 2002. An Economic and Environmental Evaluation of the Natural Forest Protection Program. Working paper. Beijing: National Forest Economics and Development Research Center (FEDRC), State Forestry Administration (SFA).
- Lopez, A. and M. T. Bennett. 2017. Improving Watershed Management through Eco-Compensation. *Development Asia*. 15 August.
- Sunderlin, W. et al. 2008. Why Forests are Important for Global Poverty Alleviation: A Spatial Explanation. *Ecology and Society*. 13 (2). Article 24.
- Swanson, E., M. T. Bennett, and T. Male. 2019. *Financing Mechanisms for Ecological Restoration: International Comparative Study and Recommendations for Adoption in China*. Prepared for the Ministry of Natural Resources, People's Republic of China. Chicago: The Paulson Institute.
- United Nations Population Division. 2008. *World Urbanization Prospects: The 2007 Revision: Executive Summary*. New York: United Nations.
- World Bank. 2021. *Ecological Compensation in China: Trends and Opportunities for Incentive-Based Policies Towards a Greener China*. Washington, DC. Figure 3.2. p. 42.
- World Bank Group and Development Research Center of the State Council, People's Republic of China. 2022. *Four Decades of Poverty Reduction in China: Drivers, Insights for the World, and the Way Ahead*. Conference Edition. Washington, DC: World Bank. Table 2.1. p. 5.
- Yee, A. S. and D. Guo. 2021. Yangtze River Protection Law of the People's Republic of China: Overview of Key Provisions and Policy Recommendations. *ADB Briefs*. No. 191. Manila: Asian Development Bank.
- Zuo, T. et al. 2005. Moving Towards a Market-Oriented Approach: Case Study of Forest Ecological Compensation Program in Miluo Watershed, Hunan, China. IIED Payment for Watershed Services—China Diagnostic Study, Case Study Report.

Ecological Protection in the People’s Republic of China

Pilot Case Studies on Comprehensive Eco-Compensation, Poverty Alleviation, and Green Development

The working paper provides county-level case studies of ecological compensation in the People’s Republic of China (PRC). Eco-compensation has become an important policy framework in the PRC, involving a wide range of programs that promote conservation and environmental restoration while supporting local livelihoods and poverty alleviation. It uses a package of incentive-based policies and regulatory instruments to tackle environmental issues such as water pollution, biodiversity loss, land degradation, or deforestation. The PRC’s experience can offer useful insights to other countries facing similar challenges in environmental management.

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