

KEY POINTS

- The Guizhou Chishui River Basin Ecological Development Fund was designed by the Guizhou Environmental Protection Department and the Asian Development Bank. The fund can act as an important driver to match commercial finance with public finance.
- However, its establishment will not be sufficient to overcome structural funding challenges in the Chishui river basin. Therefore, three broad policy recommendations are proposed to guide future landscape financing in the basin.
- Strengthen governance mechanisms for effective eco-compensation and regulation enforcement. Planning and institutional coordination at the basin level will be essential to prioritizing landscape financing.
- Diversify and link various sources of finance. Linking existing funding to other public and private sources will be crucial to increase the size and scale of existing investments.
- Make efficient use of available funding. Improving the function of existing eco-compensation programs through strengthening program design and monitoring will be essential.

Landscape Financing in the Chishui River Basin

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SUMMARY

The Chishui River is one of the most important tributaries of the upper Yangtze River and a global biodiversity hotspot. While the basin's ecological protection and green development are central to the People's Republic of China (PRC) economy, the river system faces tremendous environmental pressures. Rapid deforestation and land conversion for agricultural, industrial, and urban development are major threats to biodiversity and local livelihoods. Income gaps between urban and rural areas in the basin are large, especially in the upper and middle reaches. Chishui is a complex watershed landscape where stakeholder groups strongly compete for limited natural resources, land uses, and economic opportunities. Adopting a landscape approach can support solutions that generate multiple co-benefits such as economic growth, sustainable agricultural production, reduction of biodiversity loss, water security, and climate change mitigation and adaptation. Recognizing the challenges of integrating water and land management, the Government of the PRC has initiated landscape financing, which has grown exponentially, with the major source of investment in the basin coming from the Guizhou province. Despite the increased investment, projects remain siloed and spatially uncoordinated. Accessing or mobilizing financing for landscape projects that present a bankable business case and an investment opportunity is difficult due to their nature and the enabling investment challenges. To tackle these issues, the Guizhou Environmental Protection Department (GEPD) and the Asian Development Bank (ADB) designed the Guizhou Chishui River Basin Ecological Development (CRBED) Fund as a blended finance mechanism for leveraging and enabling landscape projects. The goal is to make the projects sustainable over time. The CRBED was envisioned as a solution-oriented service provider (or a "matchmaker") that brings together stakeholders with different risk preferences through a combination of commercial and concessional finance.

Notes:

ADB recognizes "China" as the People's Republic of China.

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CHISHUI RIVER BASIN: WATERSHED ECOSYSTEMS AT RISK

The Chishui River Basin is a key ecoregion in the upper reaches of the Yangtze River Basin (Map).¹ It crosses three provinces—Yunnan, Guizhou, and Sichuan—with a total population of around 6 million. Chishui is the largest branch in the upper Yangtze without dams, retaining its free-flowing conditions and maintaining key ecological processes. Lying within the Upper Yangtze Freshwater Ecoregion and the Guizhou Plateau Broadleaf and Mixed Forests Ecoregion, the basin is a global biodiversity hotspot. It is a vital habitat for hundreds of fish species and 32 protected areas. About 400 species of flora and fauna are considered rare or endangered.²

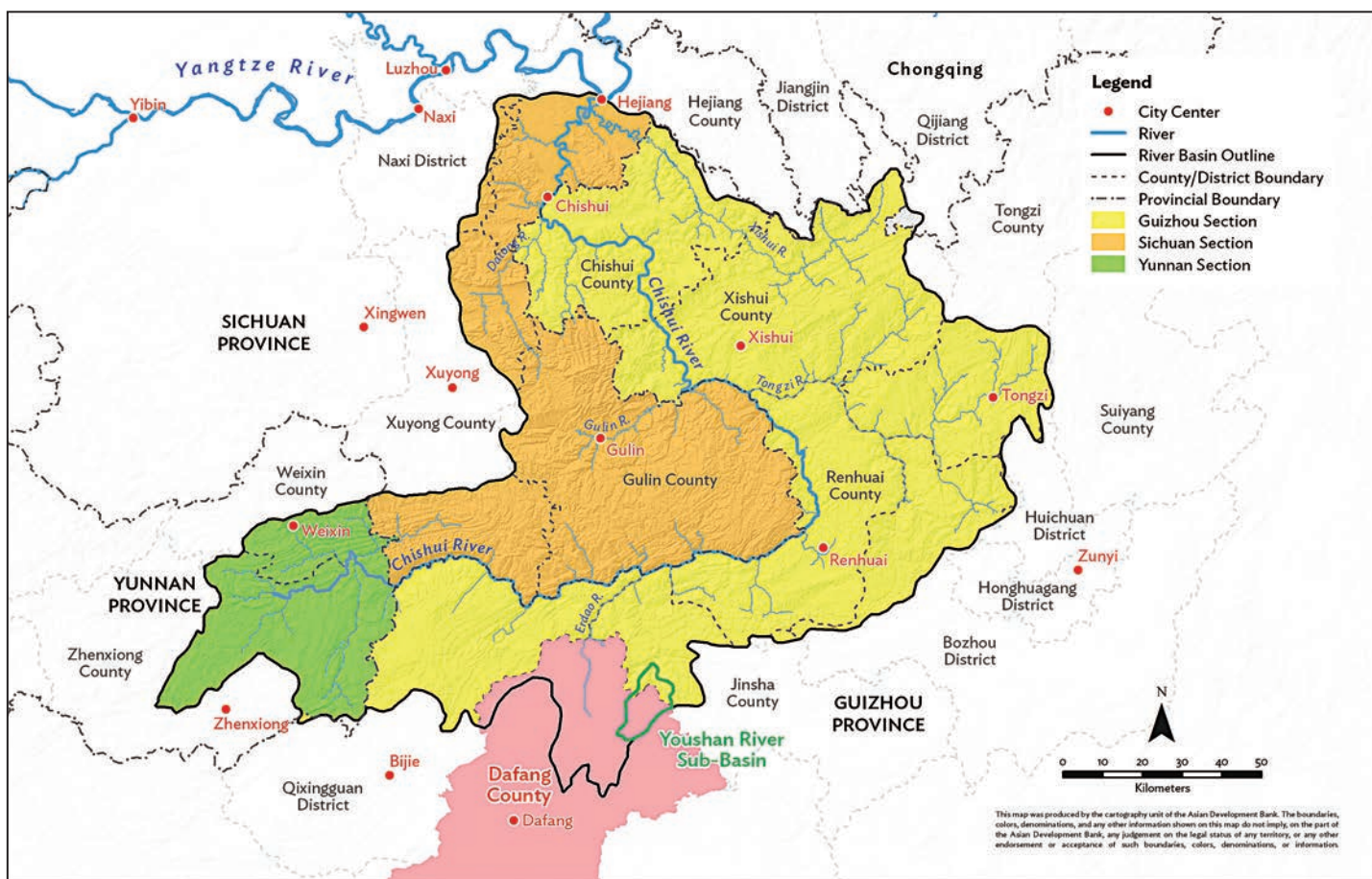
The climatic, geographical, and geomorphological complexity of the basin’s river system underpins various microclimates and diverse ecosystems. Forests and grasslands play a vital role in

reducing soil erosion, as well as storing and sequestering carbon. All these processes have a direct impact on global climate change. Therefore, protecting the basin is vital for the Yangtze’s ecological security and regional and global public goods.

The Chishui River system faces tremendous environmental pressures due to rapid deforestation and agricultural, industrial, and urban development. Cultivation of sorghum for local wine production and extensive farming on steep slopes are a profitable business but carry a high environmental footprint. Land degradation, desertification, and loss of habitats are some of the most visible impacts.

A growing concern is water pollution, which is due to a combination of wastewater discharged illegally by the local breweries, chemical pesticides used for growing crops, domestic sewage, and solid waste. Traditional farming is severely impinging on water quality. Moreover, plastics are not safely disposed or recycled, polluting the soil and the water streams.

Map: The Chishui River Basin in the People’s Republic of China



Source: Asian Development Bank.

¹ The Yangtze River is the longest river in the PRC and is home to 459 million people, about one-third of the PRC’s total population. The basin provides about 35% of the country’s freshwater resources, supports food production, and contributes about 45% of the national gross domestic product.

² United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention. China Danxia. <https://whc.unesco.org/en/list/1335>.

LANDSCAPE APPROACH FOR SUSTAINABLE BASIN MANAGEMENT

Preserving ecosystems is key for watershed protection, biodiversity conservation, sustainable agriculture, and rural livelihoods. Chishui is a complex watershed landscape³ where stakeholder groups strongly compete for limited natural resources, land uses, economic opportunities, and the ecosystem services the river basin provides.⁴ A landscape approach is a spatial planning process to enable sustainable basin management by simultaneously meeting the needs of diverse stakeholders and sectors. In doing so, it ensures water availability for households, farmers, businesses, and ecological processes, promoting local livelihoods and contributing to green development. Adopting a landscape approach can support solutions that generate multiple co-benefits such as economic growth, sustainable agricultural production, reduction of biodiversity loss, water security, and climate change mitigation and adaptation. Recognizing the challenges of integrating water and land management, the government has initiated landscape financing, which can be an opportunity to leverage investment.

Landscape financing is a strategy for investing in landscape approaches through interlinked projects that generate co-benefits by strengthening each other. In the context of the Chishui River Basin, landscape projects are categorized either as environmental protection (Figure 1, left column) or projects benefiting from ecosystem services (Figure 1, right column).⁵ The central column shows how ecosystem services (structures and functions) can be restored with the right interventions and are essential to supply services to the economy.

Other than advancing collaboration among a wide range of stakeholders (e.g., farmers, businesses, and domestic users), adopting a landscape approach can improve the efficiencies of policies and institutional interventions. Governments tend to operate in sectoral and administrative silos, with parallel planning processes undertaken at national, subnational, and local scales. A landscape approach mindset can support intersectoral planning for agricultural production, watershed management, forestry, biodiversity, and climate change mitigation and adaptation. Overall, landscape financing can support resilient and sustainable green development by spurring economic growth while protecting the environment.

The Guizhou provincial government alone has invested more than CNY2 billion (approximately \$315 million) in landscape projects since 2018. Despite the size of the investments and a growing

recognition of their importance, projects tend to remain siloed and spatially uncoordinated. Accessing or mobilizing financing for landscape projects that present a bankable business case and an investment opportunity, which can generate an internal rate of return (IRR), is difficult due to the nature of landscape projects and the enabling investment challenges.⁶

Landscape Project Challenges

The three major constraints to mobilizing private finance for landscape projects are the following:

- (i) **Time horizon.** Investors look for quick returns, whereas they will have to wait longer for landscape projects before they receive a return on their investment. This is one of the most significant barriers to raising funds for early-stage landscape projects.
- (ii) **Investment size.** There is a mismatch between the stake and the size of investment opportunities. Investment at the landscape scale tends to be piecemeal, and institutional investors often find the average deal sizes too small to engage.
- (iii) **Risk/return ratio.** Most landscape projects are still too risky for investors and present low or negative IRRs. This risk is due to the lack of a business model and bankability of such projects. For urban pollution control, project developers build sewage treatment facilities with central or provincial government funding. Treatment fees are borne by user payments and are too small to cover operations and maintenance costs. In rural areas (especially upstream counties), households are not connected to a centralized pipe network, and the domestic water supply relies on mountain springs. Water tariffs are low or fully subsidized by the local government if the residents cannot afford them. Similarly, rural wastewater and waste management projects are heavily funded by the central and local governments along the entire supply chain. Industrial wastewater can be treated in-house (large companies such as Maotai have their own treatment plants) through shared facilities (among medium-sized enterprises) or is not treated at all (the smaller distilleries tend to discharge their effluents directly into the environment, generating high pollution loads). Landscape projects that are less infrastructure-heavy and more focused on watershed protection, improvement of soil conservation, and ecological restoration are even riskier and less able to generate revenues, and their beneficiaries are more difficult to identify.

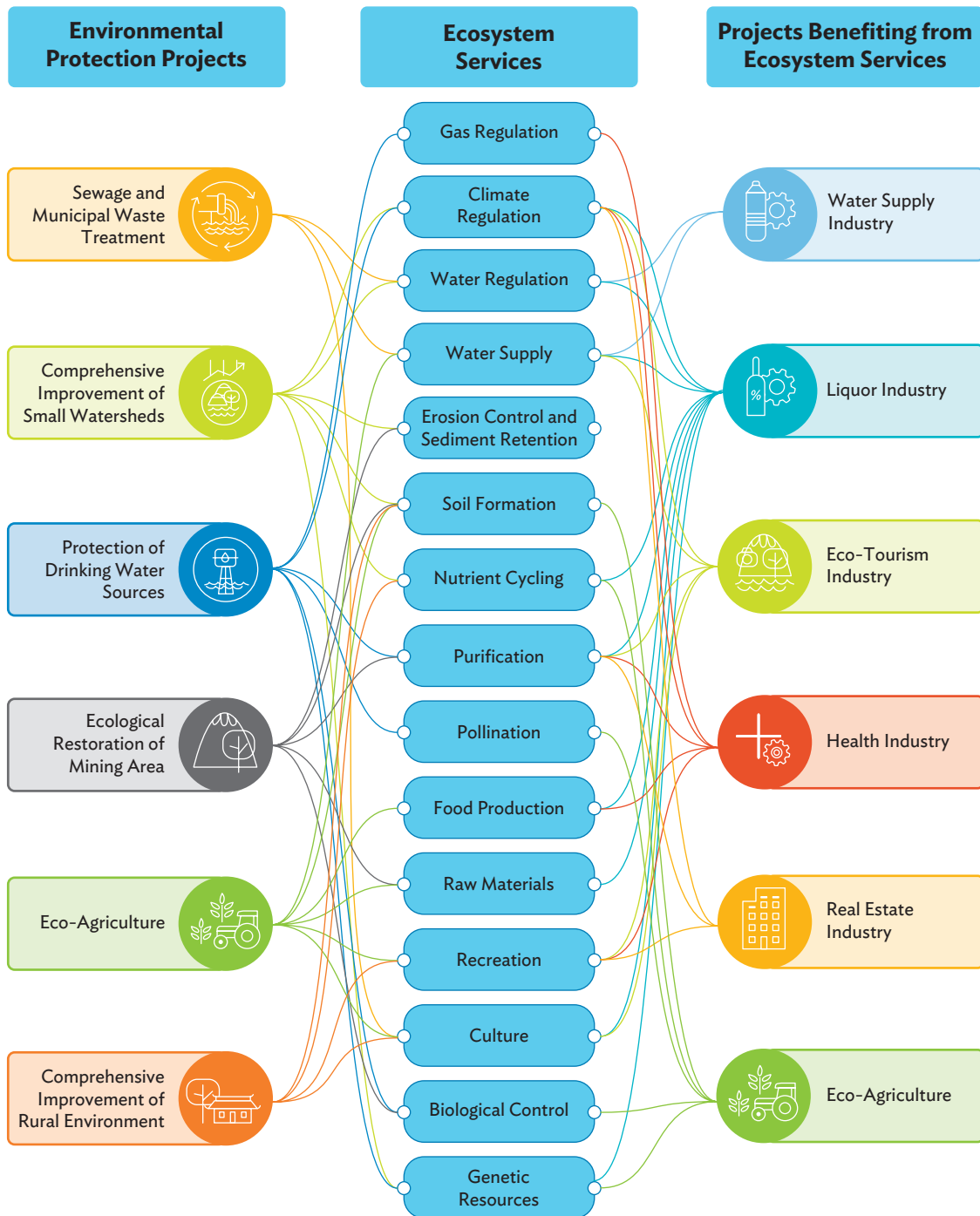
³ A “landscape” is a socioecological system that consists of natural and/or human modified ecosystems, whose topography, vegetation, land use, and settlements are influenced by the ecological, historical, economic, and cultural activities of the area.

⁴ Ecosystem services benefit agriculture, forestry, biodiversity, industry, and urban development.

⁵ Eco-agriculture projects, due to their seasonal operating cycles, long-term return of profits, and multiple landscape objectives, can fall under both categories.

⁶ The IRR is a financial metric used to estimate how profitable potential investments are. It is calculated based on the future cash flows that an investment will generate. In general, the higher a project’s IRR, the more desirable it is to invest in. External factors, such as cost of capital or inflation, are left out of the calculation.

Figure 1: Landscape Projects in the Chishui River Basin



Source: Author.

Enabling Investment Challenges

Enabling investments in environmental public policies, regulatory frameworks, and institutional arrangements face the following challenges:

- (i) **Incoherent environmental regulatory frameworks and lack of enforcement.** The complexities of implementing a landscape approach can be mitigated when laws and regulations are supportive and coherent within the basin. The Guizhou Environmental Protection Department (GEPD) manages the provincial section of the Chishui River Basin through the design of standards, regulations, and policies. The Guizhou Chishui River Basin Environmental Protection Plan (2013–2020) divided the basin into three areas: (a) ecological and environmental protection area (from Bijie to Wuma River outlet of the Chishui mainstream, accounting for 27% of the Chishui River Basin); (b) ecological and environmental rehabilitation area (from Wuma River outlet to Tongzi River outlet, accounting for 61% of the Chishui River Basin); and (c) ecological and environmental control area (from Xi River outlet to Chishui City, accounting for 12% of the Chishui River Basin). In the ecological and environmental protection area, upstream of the Maotai company, any development of polluting industries (including winemaking and mining) is prohibited. The provincial government also encourages sustainable land-use practices, providing subsidies to promote organic farming while reducing the use of chemicals and agricultural plastics. Municipal governments must comply with provincial standards and build monitoring stations to strengthen water quality monitoring with regular inspections. However, institutional challenges remain unaddressed. Sub-provincial public agencies lack adequate planning, systematic monitoring tools, technical and financial capacity to enforce environmental regulations effectively. As a result, enterprises are rarely fined for illegal discharges of untreated wastewater. In addition, agricultural policies are often not consistent with those environmental policies designed for abating nonpoint source pollution. With 8% of the world's total arable land, the PRC still accounts for 32% of the world's total consumption of chemical fertilizers and 43% of pesticides.⁷
- (ii) **Undiversified finance sources.** Guizhou is the only province in the Chishui River Basin heavily investing in

landscape projects. Sub-provincial administrations and other provinces in the basin should also support landscape approaches through their own fiscal budget. However, their contribution has been minimal so far due to their limited financial and technical capacity.

- (iii) **Ineffective eco-compensation programs as a source of public sector finance.**⁸ The basin adopts both vertical and horizontal eco-compensation programs.⁹ The vertical scheme was established in 2011 by the Guizhou provincial government with the sub-provincial governments. Under this scheme, Bijie (upstream) and Zunyi (downstream) set up water quality targets to reduce water pollution at their cross-sections. If targets are met, Zunyi compensates Bijie with CNY10 million (\$1.6 million) a year. However, the scheme has at least three design flaws. First, water quality data collection is not standardized, and data are not published or shared widely, which makes monitoring problematic. Second, farmers and domestic users are not fully engaged in the design of watershed eco-compensation schemes. Therefore, their willingness to pay and ownership is low. Third, existing eco-compensation programs are not market-based. Transaction costs for selling water rights or trading pollution emissions are still too high and not adequately regulated. Maotai, the largest liquor company in the region, incentivizes farmers to reduce nonpoint source pollution and use organic fertilizers produced from liquor residues.¹⁰ However, its scope and geographic reach are limited, covering only the cultivated areas near its operations plants.

The horizontal eco-compensation scheme supports river basin eco-compensation among Guizhou, Yunnan, and Sichuan. The three provinces signed a tripartite agreement on eco-compensation, including a governance framework for implementation in 2018, jointly setting up a CNY200 million (\$30.7 million) fund for water pollution reduction.¹¹ The utilization of funds by the three provinces is tied to ecological restoration and pollution control activities. Transfers are made based on water quality performance indicators.¹² The provinces set up an annual coordination meeting to report on and monitor the use of funds. The water fund's main capital source of expenditure is public funding, except for Maotai's donations.¹³ While the water fund represents an institutional innovation, being the first multi-provincial eco-compensation agreement in the PRC,

⁷ Y. Wu, E. Wang, and C. Miao. 2019. Fertilizer Use in China: The Role of Agricultural Support Policies. *Sustainability*. 11 (6). <https://commons.und.edu/geo-fac/11/>.

⁸ Eco-compensation is a set of public policy instruments to provide adjusted relations between stakeholders to duly factor in opportunity costs of foregone development by internalizing environmental externalities and valuing nature's ecosystem services. It refers to both incentives (through a reward mechanism based on the "beneficiary pays" principle) and disincentives (charges for the loss or damage of ecosystems through regulations based on the "polluters pay" principle).

⁹ Vertical eco-compensation programs are top-down fiscal transfer between different levels of government. Horizontal programs involve transfers between equal levels of government (such as interprovincial watershed programs).

¹⁰ Farmers are asked to pay only CNY20 (\$3.1) per bag, while Maotai covers the other costs, which is around CNY60 (\$9.3). The organic fertilizers are not for sale on the market.

¹¹ To which Yunnan contributed CNY20 million (\$3.0 million), Guizhou CNY100 million (\$15.3 million), and Sichuan CNY80 million (\$12.3 million).

¹² Calculating water quality targets is based on the permanganate index, ammonia nitrogen, and total phosphorous. The annual average water quality indicators at the Qingshuiipu section in Yunnan and Lianyuxi in Guizhou need to meet the Class II requirements. Assessments are conducted based on the water quality monitoring data from the China National Environmental Monitoring Center, jointly monitored by the three provinces.

¹³ Maotai has donated CNY0.5 billion (\$76.9 million) since 2014. Maotai's funds support water conservation projects in the Guizhou's section of the basin, focusing on changing farmer behaviors and agricultural and land-use practices.

compensation allocations should be adjusted by factoring effectiveness and equity factors across payment designs.¹⁴

SOLUTIONS TO SCALE UP LANDSCAPE FINANCING

Based on these bottlenecks, at least three key aspects should be considered for scaling up landscape financing.

First, the sole provision of adequate financing mechanisms is insufficient to attract and enable landscape projects at the scale needed in the Chishui River Basin. Focusing only on providing financial mechanisms to attract additional private capital underestimates the importance of the enabling environment and the limited number of viable bankable projects.

Second, ensuring a project's commercial viability is key to matching investor expectations. The attractiveness of landscape projects to investors goes far beyond innovative financial mechanisms. Investors look at the fundamentals of the business (cost recovery, vision, culture, innovation, customers, and market strategies) at least as much as they look for de-risking financing tools (such as blended finance). Project preparation is crucial to improve financial viability and meet eligibility criteria.

Third, additional public finance support, backed by development finance, is still needed to drive transformational changes rather than pure commercial transactional activities.¹⁵ Landscape projects need to generate environmental and societal co-benefits, which are not the main targets of commercial investors. Government and financial institutions (like ADB) can be the anchors to leverage the capabilities, scale, and scope of private investors to achieve environmental protection and green development.

Although the government plays a decisive role in enabling the environment to attract more investment, the finance gap experienced by the Chishui River Basin is still very wide. Guizhou province needs an additional CNY230.8 billion¹⁶ (\$33.0 billion) for 2021–2025¹⁷ to achieve its environmental protection targets. Such a gap will not be closed without a high injection of private sector capital. However, raising financing from a single commercial source may be difficult, at least in the first

phase of project development. Therefore, raising capital from a combination of commercial and concessional capital investors can be a more viable solution.

Guizhou Chishui River Basin Ecological Development Fund

Against this backdrop, ADB supported the GEPD in designing the Guizhou Chishui River Basin Ecological Development (CRBED) Fund (Figure 2) in 2020¹⁸ as a blended finance mechanism¹⁹ for leveraging and enabling landscape projects to make them financially sustainable over time. The CRBED was envisioned as a solution-oriented service provider (or a “match-maker”). Through a combination of commercial and concessional finance, the CRBED can bring together stakeholders with different risk preferences acting as a de-risking mechanism.

- Chishui River Basin Ecological Development shareholders.** The CRBED comprises a fund management company or trust as general partner (GP) or GP inferior, the Guizhou provincial government and medium-sized enterprises²⁰ as limited partners (LPs) or inferior LPs, and large corporations (such as real estate developers or tourism companies), and institutional investors (such as wealth funds or insurance companies) as superior LPs. The fund's management company or GP inferior is the fund's administrator (including handling day-to-day operations, making investment decisions, and raising capital from the LPs). LP investors bear limited liabilities and can be superior or inferior based on the volume of their investment. As the name implies, superior LPs receive a preferred distribution of returns, often a fixed amount, with the remaining returns going to the inferior LPs. Local commercial banks are the financial intermediaries channeling their financing through the special purpose vehicle and can be supported by multilateral development banks like ADB or other CRBED's concessional co-financing partners.
- Multilayered approach.** The fund has a three-tiered approach. The first tier represents the governance structure, where shareholders can decide to be limited to inferior or superior partners. The second tier is represented by the project company or special purpose vehicle, which enables project transactions. The third tier is the portfolio level, the pipeline of landscape projects eligible for funding.

¹⁴ With the current allocation, more economically developed counties may be prioritized because they face more difficult tasks in pollution reduction as well as higher foregone opportunity costs. However, this creates concerns over equity issues, as the less developed counties need the funding the most to protect their relatively good environment.

¹⁵ A. Lardoux de Pazzis and A. Muret. 2021. The Role of Intermediaries to Facilitate Water-Related Investment. *OECD Environment Working Papers*. No. 180. Paris: OECD Publishing.

¹⁶ Data from Guizhou Environment and Engineering Appraisal Center, a public institution directly under Guizhou Provincial Environmental Protection Department (2018 statistics).

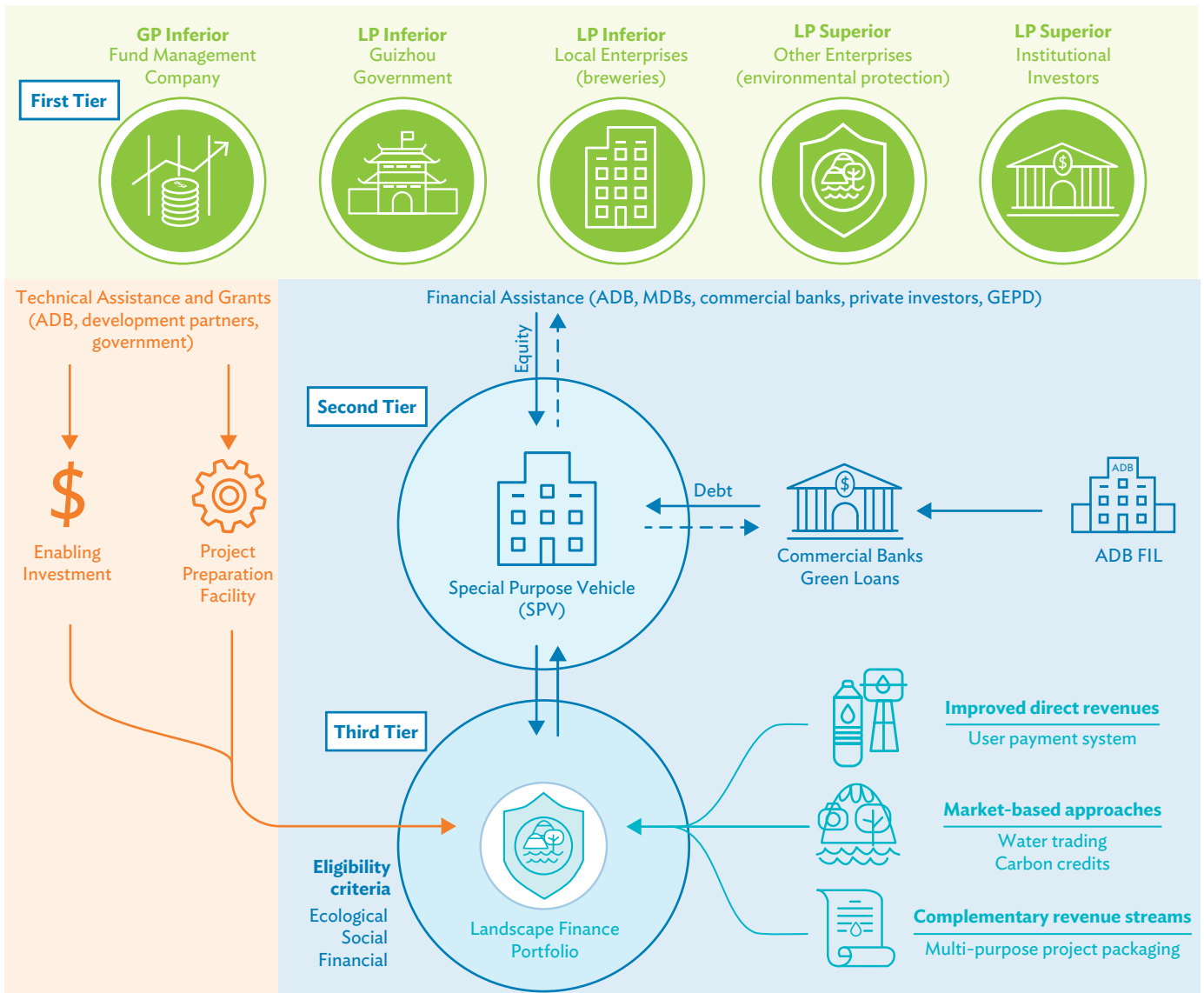
¹⁷ Guizhou Provincial Government. The Implementation Plan for Coordinated Promotion of Ecological Priority and Green Development of the Chishui River (2021–2025).

¹⁸ ADB. 2018. *People's Republic of China: Policy Research on Ecological Protection and Rural Vitalization for Supporting Green Development in the Yangtze River Economic Belt: Public-Private Financing Mechanism for Chishui Watershed Protection (Subproject 1)*. Manila.

¹⁹ Blended finance is the strategic use of development or concessional finance to mobilize private capital flows (commercial finance) to emerging and frontier markets.

²⁰ Local enterprises comprise the liquor and brewery enterprises and water utilities.

Figure 2: Proposed Design for Guizhou Chishui River Basin Ecological Development Fund Structure



ADB = Asian Development Bank, FIL = financial intermediary loan, GEPD= Guizhou Environmental Provincial Department, GP = general partner, LP = limited partner, MDB = multilateral development bank.

Source: Author.

- Blended finance.** This finance modality was proposed to attract a wider range of investors with different risk preferences with a leveraging effect. Provincial government participation as an LP inferior can enhance creditworthiness, de-risk investments, and help attract LP superiors who are more risk averse. Diverse types of capital sources can be considered under a blended finance model. Equity is applicable in cases where investments need to be made in capital-intensive assets that take an extended period to earn back. Equity investors (such as LP superiors)

may also become strategic partners, bringing specific skills and knowledge to support the project business model development and enhance project bankability. Financial intermediaries can provide debt through small concessional loans in case the project can generate sufficient operating cash flow to pay the interest as well as repay the loan during its tenor. Grants are used as enabling investments in assets or activities that do not initially generate an IRR. Guarantees can be provided by highly creditworthy companies or institutions (public or private) and

are used to guarantee creditworthiness so that another lender is willing to extend financing if a project lacks an attractive IRR.

- **Project preparation facility.** The CRBED Fund will establish a project preparation facility that can receive assistance from ADB, other donors, and the government. The facility can be led by the GP and a team of specialists, including at least one scientific partner and a financial expert, to screen projects against set eligibility criteria. The project preparation facility under the fund shall be used to develop bankable investment-ready projects. Such support can cover a wide range of activities including undertaking project feasibility studies (e.g., value-for-money analyses), developing procurement documents and project concessional agreements, conducting social and environmental studies, and creating awareness among the stakeholders. It can also provide financial, legal, and technical advisory services required to facilitate private investment into infrastructure projects.²¹

Eligibility Criteria and Principles to Select Projects

To be eligible for financing under the CRBED, projects need to (i) generate ecological benefits, (ii) produce social benefits and contribute to the well-being of their beneficiaries, and (iii) be financially viable. The three eligibility criteria’s specific indicators are summarized in Table 1.

Develop High-Quality Business Models to Enhance Project Bankability

A high-level business model should be developed before landscape projects are included in the CRBED portfolio. It is crucial that each project has an adequate scale and can generate sufficient revenue streams to realize a profit. Assessing the profitability potential is essential for IRR.

- **Define a revenue model through improved direct revenues.** To be bankable, projects should have a positive financial IRR over their lifecycle. Returns can be tied or partially tied to direct end-user charges such as cash flows to the project directly from selling services, products, or other activities. Potential (improved) revenue streams for sustainable agriculture may include increased crop yields due to sustainable farming; higher quality produce or product premium with green certifications; carbon credits through healthier soils; and lower costs due to the decrease in use of fertilizers, pesticides, and water. For water treatment facilities, direct revenue streams can be generated through the sale of clean drinking or irrigation water, and cost savings due to the reduction of water usage and feed-in tariff of the government (e.g., selling of green produce on the market).
- **Generate indirect revenues through market-based instruments.** Indirect revenues are cash flows to the project that do not come directly from selling services, products, or activities. They can support the business model but will not form a major part of the revenue stream. Examples include water pollution or emission trading. Through these schemes, enterprises with high abatement costs can purchase pollution discharge reductions from enterprises with lower abatement costs. Enterprises that reduce emissions can sell unused permits to others within a certain cap,²² providing a dynamic financial incentive to improve efficiency.²³ The pilot project in the Chishui River Basin can focus on the brewery industries, which are large-scale point source emitters of industrial wastewater high in organic matter and ammonia. If the pilots are successful, the focus can be shifted to nonpoint source emissions (such as those coming from agricultural activities), which are more diffused and thus challenging to regulate within a market structure. Carbon credits are another growing market-based

Table 1: Chishui River Basin Ecological Development Criteria for Landscape Projects

Criteria	Indicators
Ecological benefits	<ul style="list-style-type: none"> • Improvement of terrestrial ecosystems (e.g., soil fertility, soil erosion control, sustainable land uses) • Improvement of water ecosystems (e.g., control and reduction of sewage discharge, increase of water purification capacity, protection of aquatic species) • Ecosystem services’ co-benefits (e.g., landscape and basin-wide co-benefits of upstream-downstream interventions that contribute to or benefit from the protection of ecosystem services)
Social benefits	<ul style="list-style-type: none"> • Enhancement of the living environment • Access to safe and affordable water and sanitation services • Social protection and reduction of regional inequalities
Financial benefits	<ul style="list-style-type: none"> • Direct revenues (user payment system) • Indirect revenues (through market-based instruments) • Complementary revenue streams (through multipurpose project packaging)

Source: Author.

²¹ Marsh. 2017. *Emerging Risks in Construction: Expert Perspectives on the Construction Industry*. <https://www.marsh.com/content/dam/marsh/Documents/PDF/UK-en/emerging-risks-in-construction.pdf>.

²² Emission markets do not require the government to set up the price of permits. Prices are determined by the markets based on the demand for permits among the companies and their supply (cap).

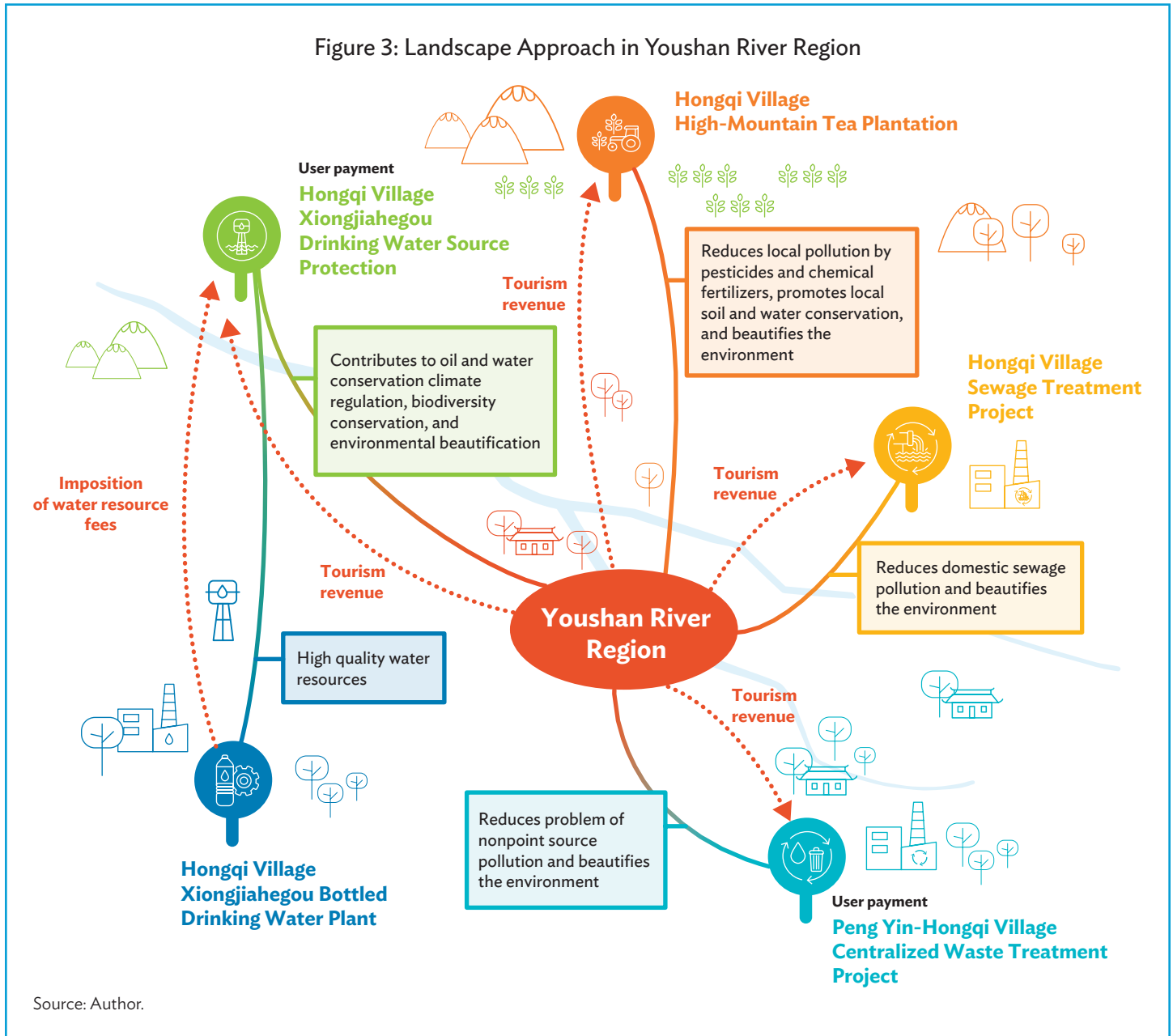
²³ Shanghai embarked on the PRC’s first water quality trading pilot in 1987, with a system of transferable permits for chemical oxygen demand emissions for 60 large emitters along the Huangpu River. The program in Tai Lake was introduced by the Jiangsu provincial government in 2010, covering 1,357 enterprises with annual chemical oxygen demand discharges of more than 100 tons.

mechanism through which public and private stakeholders can purchase credits to meet regulatory or voluntary commitments to carbon emission reduction. They can generate indirect revenues but are difficult to design, and they need ambitious standards and strong monitoring, reporting, and verification systems to be effective.

- **Integrate complementary revenue streams.** By packaging multipurpose and multisector projects, a variety of complementary revenue streams for many beneficiaries

can developed. A case study analysis was conducted in the Youshan River region, a sub-watershed within the Chishui River, in the northeastern part of Dafang County (Bijie, upstream). The region presents favorable environmental and socioeconomic characteristics for piloting landscape financing (Figure 3). Combining five types of landscape, projects in Hongqi village can multiply ecological and social benefits, raise complementary revenue streams, and generate higher IRR compared with those raised by separate project interventions.²⁴

Figure 3: Landscape Approach in Youshan River Region



²⁴ The five types of landscape are ecological agriculture, drinking water source protection, sewage treatment, rural waste treatment, and mineral water plant and eco-tourism.

Three of the proposed interventions (sewage treatment, waste treatment, and drinking water source protection projects) may reduce water pollution, providing various ecosystem services (such as water purification, climate regulation, and recreation) in the sub-watershed. Direct revenues are generated through user payments and backed by government subsidies. The five projects shown in Figure 3 are included in the Guizhou province's five-year plan for ecological development but require a larger amount of investment that public finance alone cannot meet (footnote 17). The high-mountain tea plantation project is both a supplier and a beneficiary of improved ecosystem services. The conversion of maize planting to tea reduces environmental pressures and enhances soil conservation. In the first phase, the project can receive funding with investments channeled to build the rural infrastructure and train farmers in agro-forestry and organic farming. In the second phase, the project has the potential to become financially viable with the sale of green produce on the market. The bottled drinking water plant project, a profit-making business, can provide complementary revenue or indirect support to the drinking water source protection project by compensating upstream watershed conservation activities.

Using the CRBED design structure, the Guizhou provincial government established the Guizhou Provincial Ecological Development Fund in 2021, with an initial investment of CNY1 billion (\$155 million). The fund is managed by the GEPD. The fund structure reflects the proposed CRBED design, but investments cover a wider range of sectors including not only landscape projects (as defined in Figure 1) but also renewable energy projects (electric vehicles, photovoltaic power generation, wind power generation) and circular economy projects (waste recycling and clean production).

WAY FORWARD AND POLICY RECOMMENDATIONS

Three broad policy recommendations are proposed to scale up landscape project financing not only in Guizhou province but also in the two other provinces of the Chishui River Basin.

(i) Strengthen governance mechanisms for effective eco-compensation and regulation enforcement. Integrated planning and institutional coordination at the basin level are essential to prioritizing landscape financing. The Chishui River Alliance across Yunnan, Guizhou, and Sichuan provinces is planned

to be established as a multi-stakeholder mechanism supported by ADB's technical assistance.²⁵ The Chishui River Alliance will also support a novel eco-compensation monitoring system using gross ecosystem product indicators and agricultural plastic pollution control activities in close collaboration with the National Development and Reform Commission and other government agencies.²⁶ In the longer term, this could cement the capacity to address governance issues at the watershed scale beyond administrative boundaries. To make regulation enforcement more effective, local administration can leverage the river chief system. This is an institutional innovation widely used in the PRC since 2007 to control water pollution discharges, organize inspections to prevent illegal wastewater discharge, supervise the performance of relevant departments, and strengthen incentives and accountability.²⁷

(ii) Diversify and link various sources of finance. Linking existing funding sources to new ones will be crucial to increase the size and scale of existing investments. The newly established Guizhou Fund is designed to match public finance with private equity investments. Additional domestic finance can also be raised by channeling ADB concessional loans to financial intermediaries (e.g., through local commercial banks).

(iii) Make efficient use of available funding. Improving the function of existing eco-compensation programs through strengthening program design and monitoring will be essential. Sub-provincial level eco-compensation pilots can be used effectively through monitoring results to inform scaling and subsequent refinements. Greater data transparency, combined with the compilation of lessons from the ground, would allow for the development of a complete picture of ongoing programs and a greater ability to link their performance with the broader basin's development outcome. Evaluating impacts is useful for analyzing how socioeconomic, institutional, and ecological contexts influence and interact with program design elements to deliver targeted outcomes. Improving water quality performance indicators and adjusting eco-compensation rates can help incentivize farmers to shift to greener practices, generating tangible impacts on the ground.

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²⁵ ADB. Forthcoming. *Innovating Eco-Compensation Mechanisms in the Yangtze River Basin*. Manila.

²⁶ Gross ecosystem product is the aggregated value of final ecosystem goods and services supplied annually to people in each region, province, and/or county in the PRC.

²⁷ B. Wang, J. Wan, and Y. Zhu. 2021. River Chief System: An Institutional Analysis to Address Watershed Governance in China. *Water Policy*. 23 (6). pp. 1435-1444. <https://iwaponline.com/wp/article/23/6/1435/84468>.

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