Report and Recommendation of the President to the Board of Directors

Project Number: 52025-001
September 2020

Proposed Loan
People's Republic of China: Yunnan Sayu River Basin Rural Water Pollution Management and Eco-Compensation Demonstration Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 5 August 2020)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1434
$1.00	=	CNY6.9736

ABBREVIATIONS

ADB	–	Asian Development Bank
COD	–	chemical oxygen demand
COVID-19	–	coronavirus disease
EFMC	–	eco-compensation fund management committee
EMP	–	environmental management plan
ESMS	–	environmental and social management system
IWRM	–	integrated water resources management
LCG	–	Ludian County Government
mu	–	a Chinese unit of measurement (1 *mu* = 666.67 square meters)
NH_3-N	–	ammoniacal nitrogen
NPS	–	nonpoint source
O&M	–	operation and maintenance
PAM	–	project administration manual
PMO	–	project management office
PRC	–	People's Republic of China
YREB	–	Yangtze River Economic Belt
YWPCO	–	Yudong Reservoir Water Resources Protection Committee Office
ZCG	–	Zhaotong City Government
ZDG	–	Zhaoyang District Government

NOTE

In this report, "$" refers to United States dollars.

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CONTENTS

PROJECT AT A GLANCE

1. Basic Data

Project Number: 52025-001

Project Name	Yunnan Sayu River Basin Rural Water Pollution Management and Eco-Compensation Demonstration Project
Country	China, People's Republic of
Borrower	People's Republic of China
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=52025-001-CEI
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=52025-001-PortAtaGlance
Department/Division	EARD/EAER
Executing Agency	Zhaotong City Government

2. Sector

	Subsector(s)	ADB Financing ($ million)
✓ **Agriculture, natural resources and rural development**	Agricultural drainage	3.88
	Forestry	2.82
	Irrigation	3.88
	Rural sanitation	33.55
	Rural solid waste management	6.04
	Rural water policy, institutional and capacity development	5.02
	Water-based natural resources management	44.81
	Total	**100.00**

3. Operational Priorities

- ✓ Addressing remaining poverty and reducing inequalities
- ✓ Accelerating progress in gender equality
- ✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- ✓ Promoting rural development and food security
- ✓ Strengthening governance and institutional capacity

Climate Change Information[1]

GHG reductions (tons per annum)	2,393
Climate Change impact on the Project	Medium

ADB Financing

Adaptation ($ million)	9.72
Mitigation ($ million)	12.89

Cofinancing

Adaptation ($ million)	0.00
Mitigation ($ million)	0.00

Sustainable Development Goals

SDG 1.5
SDG 2.4
SDG 3.9
SDG 5.5
SDG 6.2, 6.3
SDG 12.4, 12.5
SDG 13.a
SDG 15.2

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

Poverty Targeting

General Intervention on Poverty ✓

4. Risk Categorization: Complex

5. Safeguard Categorization

Environment: A **Involuntary Resettlement:** A **Indigenous Peoples:** B

6. Financing

Modality and Sources	Amount ($ million)
ADB	**100.00**
Sovereign Project (Regular Loan): Ordinary capital resources	100.00
Cofinancing	**0.00**
None	0.00
Counterpart	**134.61**
Government	134.61
Total	**234.61**

Currency of ADB Financing: US Dollar

Source: Asian Development Bank

PROJECT AT A GLANCE

[1] The project reduces greenhouse gas emissions. However, it does not fall under the eligibility criteria for climate mitigation finance as defined by the joint multilateral development bank methodology on tracking climate finance, which notes that not all activities that reduce greenhouse gases in the short term are eligible to be counted towards climate mitigation finance. Accordingly, greenfield fossil fuel projects are excluded, and climate mitigation finance is considered zero.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Yunnan Sayu River Basin Rural Water Pollution Management and Eco-Compensation Demonstration Project.[1] The project will improve the condition of water resources and the environment by (i) strengthening wastewater management and pollution control with innovative technologies and arrangements; (ii) improving water resources management with innovative information technologies; (iii) establishing eco-compensation mechanisms; and (iv) strengthening education, capacity, and public awareness for water pollution management. The project is envisaged to (i) play a demonstrative role for rural areas with water pollution; (ii) promote regional public goods by reversing the negative impacts of pollution; and (iii) reduce the risk of future epidemics, which is strongly required after the coronavirus disease (COVID-19) pandemic.

II. THE PROJECT

A. Rationale

2. The Yangtze River Economic Belt (YREB) covers nine provinces and two specially administered cities in the Yangtze River Basin. It accounts for more than 40% of the PRC's population and has 40% of the freshwater resources. It also serves as the drinking water source for 400 million people, provides 60% of the total fisheries production, has 20% of the total wetland area, and contributes about 45% of the PRC's economic output. The YREB has been earmarked as one of three key growth engines to ensure the PRC's future economic development.[2]

3. The YREB has benefited from extensive development since the 1990s. Yet, economic growth in the middle and upper reaches of the Yangtze River Basin is lagging and below its potential capacity. The middle and upper reaches of the Yangtze River Basin still face significant development challenges because of (i) slow transformation for green development and economic diversification; (ii) limited integration of waterways, ports, and intermodal logistics; (iii) increasing pollution and pressure on natural resources; and (iv) weak institutional coordination for strategic planning.[3] The YREB faces a growing imbalance between economic achievements and the quality of the environment. For example, since 1980, water pollution in the Yangtze River Basin has risen by 73% because of the discharge of waste;[4] soil erosion, which is critical in small watersheds;[5] and agriculture-related nonpoint source (NPS) pollution.

4. To address these challenges, the Government of the PRC formulated the YREB Development Plan, 2016–2030,[6] which stipulates the prioritization of ecological protection and the promotion of green development as the guiding principle for the YREB development.[7] In

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[1] Eco-compensation is a payment and incentive system that supports sustainable ecosystems, provides stable financing for conservation, and—when strategically designed—can address livelihood issues for the rural poor.

[2] The other flagship projects are the Belt and Road Initiative and the Beijing–Tianjin–Hebei Integrated Regional Development Strategy.

[3] Asian Development Bank (ADB). 2016. *Yangtze River Economic Belt Environmental Protection and Rehabilitation Project—A Preliminary Study*. Consultant's report. Manila (TA 9044-PRC).

[4] The upper and middle reaches of the Yangtze River Basin account for 80% of the YREB's wastewater discharge, and the tributaries have the worst water quality in the basin. Among the rural villages in the YREB, about 40% do not have garbage collection facilities and about 80% lack basic sewage treatment.

[5] Every year, the Yangtze River Basin loses 2.24 billion tons of soil, damaging 67,000 hectares of farmland because of soil erosion.

[6] Government of the PRC. 2016. *Outline of the Yangtze River Economic Belt Development Plan, 2016–2030*. Beijing.

[7] Green development aims to (i) change the traditional development model to a sustainable development model, (ii) address the challenges of rapid urbanization, and (iii) serve as a guide to socioeconomic development.

relation to this, the Asian Development Bank (ADB) and the government agreed to adopt a framework approach, providing about $2.0 billion of funding in the YREB during 2018–2020 to strategically program ADB's lending support for development initiatives in the YREB, prioritizing the following four areas: (i) ecosystem restoration, environmental protection, and water resources management; (ii) green and inclusive industrial transformation; (iii) construction of an integrated multimodal transport corridor; and (iv) institutional strengthening and policy reform.

5. Zhaotong City of Yunnan Province has been selected to demonstrate water pollution reduction in the Sayu River Basin. Zhaotong has one district, one county-level city, and nine counties, of which the district and all counties are nationally designated poverty areas. Zhaotong has 1,336,700 poor people—the largest poor population in Yunnan (as of 2016). The Sayu River is a 186-kilometer long tertiary tributary of the Yangtze River. The Sayu River Basin, covering 3,558 square kilometers, is an important area for ecological protection in the upper Yangtze River Basin. It is the only centralized drinking water source in Zhaotong. Urban drinking water is primarily provided from the Yudong Reservoir. The entire Yudong Reservoir Basin is part of Ludian County and Zhaoyang District in Zhaotong. Water in the Sayu River Basin, including the Yudong Reservoir, is polluted because of (i) waste discharging in the Sayu River Basin, (ii) high sediment runoff into the Sayu River because of soil erosion, and (iii) agriculture-related NPS pollution. In many locations of the Sayu River, the water quality is worse than the Class III national standard, which is unfit for drinking.[8] Local people living around the Sayu River Basin, particularly women and the poor, suffer from water pollution. Poor water quality also increases the time spent by women seeking clean water for their families.

6. Rural domestic wastewater, solid waste, and human and animal wastes pollute the water in the Sayu River Basin because of inadequate waste management. Rural domestic wastewater and solid waste contribute 27% of the chemical oxygen demand (COD), 9% of the total nitrogen, 16% of the total phosphorus, and 22% of the ammoniacal nitrogen (NH_3-N) in the Sayu River.[9] Human and animal wastes contribute 39% of the COD, 25% of the total nitrogen, 52% of the total phosphorus, and 48% of the NH_3-N in the Sayu River (footnote 9). Since forest coverage in the Sayu River Basin is only 30.2% because of the expansion of farmland, which is significantly smaller than the 60%−70% appropriate for centralized drinking water sources, soil erosion is quite serious in this basin. About 57.9% of the Sayu River Basin is prone to soil erosion, providing 1.1 million tons of soil per year. High sediment runoff caused by soil erosion contributes 34% of the COD, 21% of the total nitrogen, 11% of the total phosphorus, and 18% of the NH_3-N in the Sayu River (footnote 9). Water in the Sayu River Basin is further deteriorated by agriculture-related NPS pollution because of inadequate waste management systems, uncontrolled fertilizer release, and outdated production systems. Agriculture-related NPS pollution (e.g., farmland solid waste and fertilizer) contributes 45% of the total nitrogen, 21% of the total phosphorus, and 12% of the NH_3-N in the Sayu River (footnote 9). It also contributes to climate change through direct and indirect emission of greenhouse gases. This situation may be aggravated by intensified and more frequent rainfall events induced by global climatic changes, which contribute to soil erosion and agriculture-related pollution to water systems.

[8] Following the PRC's Environmental Water Quality Standard (GB 3838-2002).

[9] Zhaotong City Government. 2015. *Zhaotong Yudong Reservoir Water Resources Protection Special Remediation Plan, 2015–202*0. Zhaotong. In 2013, the Sayu River had 14,345.51 tons of the COD, 75,655 tons of total nitrogen, 3,818.98 tons of total phosphorus, and 185.12 tons of the NH_3-N.

7. Capacity is lacking for holistic planning, financing, and implementing of water pollution reduction activities.[10] Public awareness of water pollution problems, particularly interlinkages between household and economic activities and water quality, is also insufficient. As Zhaotong is considered a poor city, it urgently needs a sustainable financing mechanism for investments to address water pollution sustainably.

8. In 2006, the Zhaotong City Government (ZCG) established a fund for ecological restoration and remediation of water source protection areas of the Yudong Reservoir. The ZCG provided CNY3 million to the fund every year from 2006 to 2014. Since 2015, the fund has received CNY17 million annually.[11] Deficiencies of this fund include the small contribution from beneficiaries—only CNY2 million out of CNY17 million annually (footnote 11); and lack of operational procedures of a committee managing the fund, including criteria for screening of activities proposed for financing from the fund. The ZCG would like to upgrade the fund to a new eco-compensation fund, incorporating international good practices for sustainable financing mechanisms. In 2018, the ZCG established a district- and county-level horizontal (i.e., between the same levels of local government) eco-compensation mechanism, which consists of 14 horizontal eco-compensation agreements for 17 river sections crossing the borders of Zhaotong's one district, one county-level city, and nine counties.[12] However, these agreements have not yet been implemented because of lack of water quality monitoring facilities.

9. In February 2018, the State Council of the PRC promulgated a policy on rural vitalization as a driver for the PRC's modernization goals and for building a moderately prosperous society. The policy targets establishing an institutional framework by 2020, modernizing rural areas by 2035, and beautifying the countryside by 2050. Local governments will formulate and start implementing their plans, aimed at improving public services and promoting environmental protection, during 2018–2022. Yunnan Province, particularly Zhaotong, will be a government priority for this policy implementation.[13]

10. **COVID-19 pandemic.** The COVID-19 pandemic has amplified the effects of interlinkages between biodiversity, public health, and ecosystem-dependent global supply chains. COVID-19 is being contained in the PRC, but it remains a risk. With COVID-19 as a trigger, the need for measures to prevent the spread of future infectious diseases is attracting attention.

11. **Strategic fit.** The project aims to demonstrate water pollution management in the Sayu River Basin. This will contribute to the PRC's goal of building a harmonious and prosperous society through environmentally sustainable growth; and is consistent with (i) the PRC's

[10] An example is the "river chief" system. The "river chief" system was introduced in the PRC in 2017. It assigns each part of a river and lake to a certain official. Currently, river chiefs have difficulties collecting the data and information necessary for river management.

[11] This comprises CNY8 million from the ZCG, CNY5 million from the Zhaoyang District Government (ZDG), CNY2 million from the Ludian County Government (LCG), and CNY2 million of water resources utilization fees from a downstream hydropower station every year. Zhaoyang District and Ludian County are in Zhaotong City, and the LCG and the ZDG are the project implementing agencies (Table 3).

[12] Each agreement is for one to three river sections crossing the border. Compensation is paid based on the water quality at the border. Of the 14 agreements, one is for the Longshu River in the Sayu River Basin and two other rivers outside the Sayu River Basin, signed by the LCG and the ZDG. Each of them provides CNY2.0 million per year; CNY2.4 million is allocated to the upstream LCG and CNY1.6 million to the downstream ZDG. At the border of Zhaoyang District and Ludian County, the water quality of the Longshu River and two other rivers in the Sayu River Basin is measured monthly (36 sets of monitoring data/year). Every year, CNY2.4 million multiplied by the ratio of monitoring data number which did not meet the standard agreed between the LCG and the ZDG is deducted from the LCG and added to the ZDG.

[13] State Council of the PRC. 2018. *Policies Released on China's Rural Vitalization*. News release. 4 February. Beijing.

Thirteenth Five-Year Plan, 2016–2020, which aims to realize "ecological civilization;"[14] (ii) the YREB Development Plan, 2016–2030 (footnote 6), which emphasizes green development, environmental protection, rehabilitation, and management of water resources; (iii) the PRC's policy to vitalize rural areas (para. 9); (iv) ADB's Strategy 2030, which emphasizes the importance of environmentally sustainable and inclusive growth;[15] (v) ADB's country partnership strategy, 2016–2020 for the PRC, which aims to improve the PRC's environment and manage climate change by realizing "ecological civilization;"[16] and (vi) ADB's Water Operational Plan, 2011–2020, which emphasizes the integrated water resources management (IWRM).[17] It is also in line with the Sustainable Development Goals 1, 2, 3, 5, 6, 12, 13, and 15.[18]

B. Project Description

12. The project is aligned with the following impact: quality of life and sustainable aquatic ecosystem in the Yangtze River Basin improved (footnote 6). The project will have the following outcome: condition of water resources and environment in the Sayu River Basin improved.[19]

13. **Output 1: Wastewater management and pollution control in the Sayu River Basin strengthened.** This includes (i) the development of waste management systems, particularly distributed systems, which have advantages over the traditional centralized system (e.g., lower operational cost); (ii) the development of solid waste management systems, including garbage pyrolysis facilities, with capacity and institutional development for garbage classification and collection; (iii) the development of pilot eco-villages to reduce emissions through environmental protection activities, education, and publicity; (iv) wetland construction to reduce NPS pollution, introducing new types of artificial wetlands combined with wastewater treatment facilities; (v) afforestation and the establishment of a quantifiable soil and water conservation model to estimate afforestation's effects on soil and water conservation based on tree species, planting density, age of trees, and slope degrees; and (vi) the promotion of low-emission agriculture with innovative technologies (ecological drainage ditches, gridded surface source pollution monitoring platforms, and measures to estimate at least necessary fertilizer volume) and incentives (establishing green and organic crop brands). The project will conduct baseline and "endline" surveys to compare the amount of time women spend on waste and solid waste management before and after the project.[20]

14. **Output 2: Water resources management in the Sayu River improved.** This includes (i) the establishment of a smart water integrated management platform by constructing monitoring facilities and integrating them with the existing irrigation area information system for real-time monitoring and actions in the event of water quality deterioration; and (ii) the establishment of a river protection model that links the existing river chief system in the PRC, a real-time water quality monitoring system (a subsystem of the smart water integrated management platform), and facilities to protect rivers from pollution (e.g., ecological embankments).

15. **Output 3: Eco-compensation mechanism for the Sayu River Basin established.** This includes (i) the implementation of the horizontal eco-compensation agreement between the

[14] Government of the PRC. 2015. Outline of the Thirteenth Five-Year Plan on National Economic and Social Development, 2016–2020. Beijing.
[15] ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and Pacific*. Manila.
[16] ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila.
[17] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.
[18] United Nations. Sustainable Development Goals.
[19] The design and monitoring framework is in Appendix 1.
[20] An "endline" survey aims to measure the effects at the end of the project.

Ludian County Government (LCG) and the Zhaoyang District Government (ZDG) (footnote 12); (ii) the establishment and implementation of new town- and township-level horizontal eco-compensation mechanisms, consisting of six agreements; and (iii) the establishment and implementation of an eco-compensation fund that will contribute to sustainable water pollution management.

16. For the implementation of the horizontal eco-compensation agreement and new town- and township-level horizontal eco-compensation mechanisms, water quality monitoring will be conducted to judge whether water quality targets set in the agreements were achieved, which will be the basis for compensation.

17. While the horizontal eco-compensation agreements incentivize good upper basin management and cost-sharing between upstream and downstream governments, (i) they lack the involvement of ecosystem services providers and beneficiaries and value flow between the ecosystem service providers and beneficiaries; and (ii) compensation amounts to upstream governments are small and insufficient for interventions needed in the upstream areas. The eco-compensation fund will make up for these shortcomings of the horizontal eco-compensation agreements. It will be established by improving the fund for ecological restoration and remediation of water source protection areas of the Yudong Reservoir (para. 8). The eco-compensation fund will provide grants to relevant government agencies and private companies,[21] for (i) activities under Output 1, including wastewater management, solid waste management, pilot eco-villages, operation and maintenance (O&M) of the constructed wetlands, compensation for the farmland-to-forest conversion, and promotion of low-emission agriculture; (ii) the operation of the river protection model established under Output 2; (iii) the implementation of the seven horizontal eco-compensation agreements under Output 3 (para. 15); and (iv) management of the eco-compensation fund, excluding any civil works. The fund will be initially supported by the ZCG, LCG, ZDG, ADB, and a beneficiary,[22] with the longer-term goal of collecting more funding from beneficiaries,[23] to improve the sustainability of the fund and strengthen the direct linkage between upstream eco-service providers and downstream beneficiaries, following the principle that those who benefit should compensate. Assurances are included in the project agreement to ensure and increase contributions to the fund, particularly from beneficiaries. An eco-compensation fund management committee (EFMC), of which women will comprise at least 35%, will be established in the ZCG.[24] The EFMC will conduct screening of activities proposed for financing from the eco-compensation fund, following an environmental and social management system (ESMS, paras. 38−40). The Yudong Reservoir Water Resources Protection Committee Office (YWPCO) in the ZCG will open and manage an account for the eco-compensation fund; and manage the fund, following the decisions of the EFMC.[25]

18. **Output 4: Education, capacity, and public awareness for water pollution management strengthened.** This includes (i) capacity development of government staff on rural

[21] Private companies will operate a wastewater treatment plant or conduct solid waste management based on contracts with the ZDG or the LCG.

[22] From 2023, annual contributions to the eco-compensation fund will be as follows: ZCG, CNY8 million; ZDG, CNY5 million; and LCG, CNY2 million. Some CNY2 million of water resources utilization fees from the downstream Baoho hydropower station will be contributed to the fund every year from 2023. An ADB loan of $5 million will be contributed to the fund during the project.

[23] Beneficiaries will include downstream water and hydropower users, irrigation water users, and the business sector.

[24] The chair of the EFMC will be the vice mayor of the ZCG; and the members will be the deputy directors general of about 10 ZCG agencies, including the Zhaotong City Development and Reform Committee, the Zhaotong City Finance Bureau, and the Zhaotong City Environment and Ecology Bureau.

[25] About 15 full-time staff of the YWPCO, which manages the fund for ecological restoration and remediation (para. 8), will manage the new eco-compensation fund.

water pollution management and eco-compensation; (ii) the education of students in rural water pollution management and eco-compensation; (iii) public awareness raising; and (iv) the dissemination and replication of project initiatives, with at least 40% participation by women.

19. **Lessons.** The project design has incorporated lessons from international practices and previous ADB-financed projects and studies on the IWRM and environmental and ecosystem improvement, such as the importance of (i) implementation arrangements for funds,[26] (ii) promoting the IWRM at river basin scale by prioritizing upstream–downstream and urban–rural linkages, (iii) promoting nature-based solutions, (iv) strengthening nonstructural measures, (v) supporting institutional reforms that contribute to sustainable IWRM, (vi) providing capacity development for project implementation and the O&M, and (vii) establishing an effective monitoring and evaluation system for project performance.

C. Value Added by ADB

20. The project has added value through integrated water pollution management, with innovations, including (i) distributed wastewater management systems with innovative information technology for operation and management, operated at low cost; (ii) animal feces collection tanks using a new material; (iii) garbage pyrolysis facilities with a shorter processing cycle, smaller floor space, and maximum volume reduction; (iv) pilot eco-villages to demonstrate integrated emissions management; (v) introducing new types of artificial wetlands; (vi) establishing a quantifiable soil and water conservation model, which will enable quantitative estimates of afforestation's effects on soil and water conservation; (vii) promoting low-emissions agriculture with innovative technologies and incentives; (viii) establishing a river protection model with innovative information technology and institutional development; and (ix) establishing and implementing horizontal eco-compensation mechanisms and an eco-compensation fund as a sustainable funding mechanism for water pollution management. Experience and knowledge gained through the project can be replicated in other small tributaries in the upper and middle reaches of the Yangtze River, which account for 80% of wastewater, and in other key river basins in Asia and the Pacific. Consultants will assist in the replication through workshops, publications, disclosure of project information on websites, submission of papers to academic associations, and proposing of the project as a model for eco-civilization and awards.

21. **Response to COVID-19 pandemic.** The project will contribute to the holistic development of the YREB by shifting traditional investments toward valuing nature and reducing inequalities in rural areas. This is part of the nature-positive stimulus package for recovery from the COVID-19 pandemic which will promote a greener and healthier growth model.

22. Although COVID-19 is being contained in the PRC, measures to prevent the spread of future infectious diseases are strongly required for the post-COVID-19 world. The project will reduce the risk of future epidemics by creating a safe and healthy living environment through strengthened wastewater and solid waste management and pollution control and improved quality of source water for water supply.

D. Summary Cost Estimates and Financing Plan

23. The project is estimated to cost $234.61 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).[27]

[26] ADB. 2019. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Anhui Huangshan Xin'an River Ecological Protection and Green Development Project.* Manila.

[27] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

The COVID-19 pandemic has not affected the cost estimates since (i) the epidemic is contained and economic activities are returning to previous levels in the PRC; and (ii) the ZCG, ZDG, and LCG have returned to normal operations.

Table 1: Summary Cost Estimates ($ million)

Item	Amount[a]
A. Base Cost[b]	
1. Wastewater management and pollution control in the Sayu River Basin strengthened	94.89
2. Water resources management in the Sayu River improved	84.21
3. Eco-compensation mechanism for the Sayu River Basin established	14.90
4. Education, capacity, and public awareness for water pollution management strengthened	1.14
Project management	17.59
Subtotal (A)	**212.73**
B. Contingencies[c]	**17.20**
C. Financial Charges During Implementation[d]	**4.68**
Total (A+B+C)	**234.61**

[a] Includes taxes and duties of $13.72 million. Such amount does not represent an excessive share of the project cost. The Asian Development Bank will finance taxes and duties of $7.86 million. The governments will finance taxes and duties of $5.86 million by cash contribution.
[b] In mid-2020 prices as of 1 May 2020.
[c] Physical and price contingencies, and a provision for exchange rate fluctuation are included.
[d] Includes interest, commitment, and other charges on all sources of financing.
Source: Asian Development Bank estimates.

24. The government has requested a regular loan of $100.0 million from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 6 years; an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; a commitment charge of 0.15% per year; and such other terms and conditions set forth in the draft loan and project agreements. Based on the annuity method, the average maturity is 18.53 years, and the maturity premium payable to ADB is 0.20% per year.

25. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to works, goods, the eco-compensation fund, capacity development, and consulting services. The government will finance the expenditures in relation to works, goods, the eco-compensation fund, project preparation, procurement, supervision, audit, environmental management, land acquisition and resettlement, ethnic minority development, education, capacity development, public awareness raising, and others. The government will ensure that counterpart funds are provided in a timely manner.

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	100.00	42.6
Government of the People's Republic of China	134.61	57.4
Total	**234.61**	**100.0**

Source: Asian Development Bank estimates.

26. Climate mitigation is estimated to cost $15.99 million and climate adaptation is estimated to cost $12.57 million. ADB will finance 80.6% of mitigation costs and 77.3% of adaptation costs. Details are in the climate change assessment.[28]

[28] Climate Change Assessment (accessible from the list of linked documents in Appendix 2).

E. Implementation Arrangements

27. The ZCG will be the executing agency. A project leading group has been established in the ZCG under which a project management office (PMO) has been established. The implementing agencies will be the YWPCO, ZDG, and LCG. In the ZDG and LCG, a local project leading group has been established under which a local PMO has also been established. Since the ZCG, including the YWPCO, LCG, and ZDG, do not have experience with the ADB projects, adequate training will be provided to relevant staff, particularly for social and safeguard measures. The implementation arrangements are summarized in Table 3 and described in detail in the PAM. These will not be affected by the COVID-19 pandemic (para. 23).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	November 2020–June 2026 (project completion date)		
Estimated completion date	30 June 2026		
Estimated loan closing date	31 December 2026		
Management			
(i) Oversight body	Project leading group Mayor, ZCG (chair) Vice mayor, ZCG (vice chair) Deputy secretary, ZCG; and representatives of relevant ZCG agencies (members)		
(ii) Executing agency	ZCG		
(iii) Key implementing agencies	Yudong Reservoir Water Resources Protection Committee Office, Zhaoyang District Government, and Ludian County Government		
(iv) Implementation unit	PMO in the ZCG, 31 staff Local PMO in Zhaoyang District Government, 36 staff Local PMO in Ludian County Government, 32 staff		
Procurement	Open competitive bidding (nationally advertised)	30 contracts	$113,071,721
Consulting services	Individual consultant selection	9.00 person-months, 3 contracts	$84,000
	CQS	41.00 person-months, 2 contracts	$314,000
	QCBS	133.75 person-months, 2 contracts	$1,802,000
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing will apply to consultants. Retroactive financing will be subject to a maximum amount equivalent to 20% of the loan amount for eligible expenditures incurred before loan effectiveness, but not earlier than 12 months before the loan agreement is signed.		
Disbursement	The loan proceeds will be disbursed following ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank, CQS = consultants' qualifications selection, PMO = project management office, QCBS = quality- and cost-based selection, ZCG = Zhaotong City Government.
Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

28. The original project design was prepared by licensed domestic design institutes, following the PRC's guidelines and regulations. Recommendations by ADB, including the addition of innovative technologies and arrangements, were incorporated in the project design. The technical feasibility was confirmed to be adequate after detailed examination of the project's compatibility with local conditions and local capacity for the O&M. The designs of wastewater correction pipes, manure collection tanks, artificial wetlands, afforestation, irrigation facilities, drainage ditches, ecological embankments, the smart water integrated management platform, capacity

development, and education were determined considering risks that may be caused by climate change, such as the increasing frequency and extent of heatwaves, floods, and droughts.

B. Economic and Financial Viability

29. The economic analysis for the project comprised least-cost and benefit–cost analyses, an evaluation of demand, and a poverty analysis. The least-cost analysis tested key project components: wastewater, animal feces, and solid waste management; wetland construction; and ecological embankment construction. The net present value of project benefits is CNY344.74 million. The economic internal rate of return is 12.2% for Output 1, which exceeds the 9% threshold; and 8.1% for Output 2 (focusing on instream water quality), which exceeds the lower environmental threshold of 6%. The results of the sensitivity analysis show that the project economic viability is sufficiently robust to several adverse scenarios. A poverty impact ratio of 0.32 was estimated in the benefit distribution and poverty impact analysis.[29]

30. The financial analysis focused on the project's financial sustainability. Incremental recurrent cost analyses for the ZDG and LCG, which are responsible for the O&M of the facilities constructed under the project, were conducted to determine the project's financial sustainability. The financial analysis confirmed the financial capacities of the two entities to cover the recurrent costs of the project to sustain the facilities. The project is considered financially sustainable.

C. Sustainability

31. Adequate consulting services will be provided during project implementation for the O&M of the facilities constructed under the project and the institutional and capacity development for water pollution management and eco-compensation. The eco-compensation mechanisms, particularly the eco-compensation fund, were designed to improve the sustainability of the project since the fund will be utilized for the O&M of the facilities constructed under the project, reducing the fiscal burden on governments' budgets. Conservative estimates of funding to the eco-compensation fund and planned investments from the fund confirmed the fund's sustainability.[30] Since the governments assured that they will provide the necessary counterpart funds to establish the eco-compensation fund, the risk to its financial sustainability is moderate.

D. Governance

32. The assessed pre-mitigation financial management risk is *moderate* because of key financial management risks, including the executing and implementing agencies' lack of experience with the ADB projects; and inadequate coordination between relevant agencies for effective financial management, which will be mitigated through the financial management action plan described in the PAM.[31]

33. The project procurement risk assessment confirms that the implementing agencies, which will conduct procurement through a procurement agency with the assistance of ADB and consultants, have adequate capacity to comply fully with the ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). Overall, the procurement risk is *low* after mitigation measures are considered.

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[29] Economic Analysis (accessible from the list of linked documents in Appendix 2).

[30] Cumulative contribution to the eco-compensation fund until 2030: at least CNY228.0 million; and cumulative investment from the fund until 2030: CNY153.4 million. Details are in Eco-Compensation Mechanism for the Sayu River Basin (accessible from the list of linked documents in Appendix 2).

[31] Financial Management Assessment (accessible from the list of linked documents in Appendix 2).

A market analysis confirms that an adequate number of qualified local suppliers and contractors have participated successfully in similar procurements. To achieve better value for money, the project will adopt open competitive bidding (nationally advertised) for all ADB-financed works and goods packages. Quality- and cost-based selection (internationally advertised) will be used only for two large consulting services packages for project management support and for rural water pollution management and eco-compensation. Procurement under the eco-compensation fund will be conducted based on local procurement procedures acceptable to ADB.[32]

34. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and the ZCG. The specific policy requirements and supplementary measures are described in the PAM.

E. Poverty, Social, and Gender

35. **Poverty and social.** The project is classified *general intervention* for poverty reduction. A poverty and social analysis was undertaken based on intensive stakeholder consultations and socioeconomic surveys. A total of 127,015 residents in the project area, including 59,697 women (47.0%) and 25,403 low-income people (20.0%), are expected to benefit directly from the project through reduced solid waste and water pollution, improved river management, and better ecological services. Other residents in Zhaoyang District and Ludian County of Zhaotong will also benefit indirectly from the improved environment. The project will create 1,834 jobs during project implementation and 372 jobs during project operation. A social development action plan prepared based on the poverty and social analysis has specific targets for poor and low-income people. Consultations were undertaken with local residents and other stakeholders. A consultation and participation plan for project implementation is included in the PAM.

36. **Gender.** The project is classified *effective gender mainstreaming,* following ADB's Guidelines for Gender Mainstreaming Categories of ADB Projects.[33] Gender analysis indicates that women are the primary caretakers of household wastewater and solid waste management, and initial estimates suggest that project investments will result in an important reduction in time (50%) spent on these tasks through improved systems. Migration is a key livelihood strategy in the area, especially among the young. However, nonmigrant women expressed interested in job opportunities to be created by the project, which will include skilled and unskilled positions for the construction and operation of facilities. A gender action plan has been prepared that will (i) measure results toward gender equality, particularly time savings as a result of improved waste management systems for women through baseline and endline surveys; (ii) set targets for women's participation in decision-making and in skilled and unskilled employment; (iii) set targets to ensure women farmers' participation in training to facilitate their transition to low-emissions agriculture; and (iv) set targets for ensuring the active participation of women in the EFMC responsible for screening and improvement of activities proposed to be financed from the fund.

F. Safeguards

37. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[34]

38. **Environment (category A).** An environmental impact assessment has been prepared

[32] For activities that will be financed from the eco-compensation fund, small amounts of equipment and materials will be purchased for the maintenance of facilities constructed under the project.
[33] ADB. 2012. *Guidelines for Gender Mainstreaming Categories of ADB Projects*. Manila.
[34] ADB. Safeguard Categories.

and disclosed on ADB's website. This includes (i) the environmental management plan (EMP), draft ESMS, and a project-specific grievance redress mechanism. The EMP will be applied to all project components, except the eco-compensation fund. For the eco-compensation fund, environmental and social safeguards will be managed under the ESMS. The environmental impact assessment, the EMP, and the ESMS are based on the domestic feasibility study and environmental assessment reports, site visits, and consultations with stakeholder. The ZCG, through the PMO and the EFMC, will be responsible for compliance with the EMP and the ESMS. The implementing agencies do not have experience with ADB's safeguard procedures; and so, the project design includes qualified safeguard staff and a training program. The project is expected to achieve significant environmental benefits, including (i) improved water quality through a reduction of water pollution sources and protection of water resources from pollution; (ii) improved designs and operational procedures for garbage pyrolysis plants (environmental and social assessments and safe management of pyrolysis by-products); (iii) reduced annual silt loads to the Sayu River; and (iv) the promotion of environmental management in the Sayu River Basin through the ESMS. Risks include (i) environmental and/or health impacts via air emissions from the garbage pyrolysis plants; (ii) improper management of leachate, slag, and/or flue ash from the garbage pyrolysis plants; and (iii) odors and leachate from garbage transfer stations. Mitigation measures and screening procedures to address these risks are included in the EMP and the ESMS, including measures for the safe treatment and disposal of flue ash, slag, and leachate; and the air and soil monitoring programs for early detection of environmental impacts.

39. **Involuntary resettlement (category A).** The land use of the project (for Outputs 1 and 2) will include (i) permanent acquisition of 743.38 *mu* of collective land; (ii) land user right transfer of 416.49 *mu* of collective land; (iii) land use for ecological farming or forestry of 25,765.59 *mu*; (iv) land use for rural public infrastructure of 15.40 *mu*; (v) state-owned land occupation of 1,973.88 *mu*; and (vi) temporary land occupation of 4,828.06 *mu*. The project will not involve any house or structure demolition. Permanent land acquisition will affect 1,257 households with 4,386 persons and is mainly related to widening or straightening of ecological embankments in some river sections. Households will not be physically relocated. A resettlement plan was prepared, following ADB's Safeguard Policy Statement and relevant PRC laws and regulations. It includes adequate measures for compensation, resettlement, and rehabilitation. It is based on surveys and consultations with affected people and will be updated through additional surveys and consultations during project implementation. A grievance redress mechanism has been established and incorporated into the resettlement plan. The ZCG, LCG, and ZDG have the capacity to implement domestically funded projects; and the consultants will strengthen their capacity to implement the resettlement plan in compliance with ADB's requirements. An external monitoring agency will be engaged to monitor the implementation of the resettlement plan and submit semiannual reports to ADB. Outputs 3 and 4 are not expected to involve involuntary land acquisition or resettlement impacts. The ESMS, prepared for the eco-compensation fund under Output 3, includes necessary measures for screening and avoidance of land acquisition and resettlement impacts, including any issues from past land acquisition or existing facilities.

40. **Indigenous peoples or ethnic minorities (category B)**. The Hui, Miao, and Yi ethnic minority groups in the project area will benefit from the project, including (i) improved wastewater and solid waste management; (ii) pilot development of eco-villages; (iii) job opportunities during construction and operation; (iv) livelihood support from the eco-compensation fund; and (v) capacity development. A social assessment revealed that the socioeconomic and livelihood systems of the ethnic minorities are not different from those of the Han majority. However, they maintain distinct cultural characteristics, such as traditional festivals and different religious beliefs. Project activities, such as pilot eco-village development in the ethnic minority villages, will consider such cultural characteristics. An ethnic minority development plan was prepared,

following ADB's Safeguard Policy Statement and relevant PRC laws and regulations. It includes actions related to awareness raising, consultations, and the participation of ethnic minority groups; monitoring and evaluation; and strengthening the capacities of the ZCG, LCG, and ZDG to implement and monitor the ethnic minority development plan. The ESMS includes measures for screening and avoiding adverse impacts on ethnic minorities.

41. **Capacity for social and safeguard measures.** The ZCG, LCG, and ZDG have experience in implementing domestic projects; but they do not have experience with the ADB projects. To implement the social and safeguard measures following ADB requirements, (i) the ZCG, LCG, and ZDG will each appoint focal social and safeguard staff; (ii) consultants for project management support will include environment, resettlement, social development, and gender specialists; (iii) staff of the ZCG, LCG, and ZDG will be trained on social and safeguard measures; and (iv) external monitoring agencies will be recruited for safeguard monitoring.

G. Summary of Risk Assessment and Risk Management Plan

42. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[35]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Population of the Sayu River Basin exceeds forecasts and exerts heavier pollution load on the Sayu River.	Additional water pollution management, such as increased capacity of the existing wastewater treatment plant (the plant has adequate land for additional capacity)
Changes in administrative procedure or budgetary process delay the provision of counterpart funds.	An assurance is included in the project agreement to ensure timely provision of counterpart funds.[a]

[a] Counterpart fund provision could still be delayed (e.g., by a rapid rise in prices).
Source: Asian Development Bank.

IV. ASSURANCES

43. The government and the ZCG have assured ADB that implementation of the project shall conform to all applicable ADB requirements, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and loan documents.

44. The government and the ZCG have agreed with ADB on certain covenants for the project, which are set forth in the draft loan and project agreements.

V. RECOMMENDATION

45. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of $100,000,000 to the People's Republic of China for the Yunnan Sayu River Basin Rural Water Pollution Management and Eco-Compensation Demonstration Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 6 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Masatsugu Asakawa
President

4 September 2020

[35] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned with Quality of life and sustainable aquatic ecosystem in the Yangtze River Basin improved (Yangtze River Economic Belt Development Plan, 2016–2030)[a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting Mechanisms**	**Risks**
Outcome Condition of water resources and environment in the Sayu River Basin improved	a. By 2027, monthly average total nitrogen in the Yudong Reservoir meets the Class III standard 10 times per year (2019 baseline: 9 times)[b] b. By 2027, monthly average total phosphorus in the Yudong Reservoir meets the Class II standard 10 times per year (2019 baseline: 8 times)[c]	a.–b. Zhatong City Water Resources Bureau's data	Population exerts heavier pollution load than forecast.
Outputs 1. Wastewater management and pollution control in the Sayu River Basin strengthened	1a. By 2023, wastewater treatment capacity in the Sayu River Basin increased to 2,738 m^3/day (2019 baseline: 2,535 m^3/day) 1b. By 2026, 15,359 households (including 59,286 people, of whom 47.0% are women) in the Sayu River Basin connected with wastewater facilities (2019 baseline: 0 households, 0% women) (OP 5.1) 1c. By 2023, 138,584 m^3/year of animal feces collected in tanks installed at 17,323 households (including 66,867 people, of whom 47.0% are women) in the Sayu River Basin (2019 baseline: not applicable, 0 households, 0 persons, 0% woman) 1d. By 2024, 84 tons/day of solid waste from 30,890 households (including 118,798 people, of whom 47.0% are women) in the Sayu River Basin treated (2019 baseline: 25 tons/day, 0 households, 0 persons, 0% woman)[d] 1e. By 2026, 60,000 women with increased time savings for wastewater, animal feces, and solid waste management (2019 baseline: not applicable) (OP 2.4.1) 1f. By 2026, 2,500 people (of whom 40% are women) in three pilot eco-villages participate in activities for and/or education on environmental protection (2019 baseline: not applicable) (OP 2.5.1) 1g. By 2025, six artificial wetlands operational to reduce nonpoint source pollution (2019 baseline: Not applicable) (OP 3.1.5) 1h. By 2026, the quantifiable soil and water conservation model tentatively established using available monitoring data (2019 baseline: not applicable)[e] (OP 3.3.4) 1i. By 2026, chemical fertilizer nitrogen loss reduced to 3.920 kg/ha; and phosphor loss reduced to 0.077 kg/ha in the low-emission agriculture pilot areas (2017 baseline: 5.670 kg/ha [nitrogen] and 0.110 kg/ha [phosphor])[f] 1j. 16,000 female farmers receive training and participate in the promotion of low-emission agriculture (2019 baseline: not applicable) (OP 2.2)	1a. Operation reports of the WWT plant and 44 WWT facilities 1b.–1c. and 1e. Surveys conducted by village committees 1d. Operation reports of the two pyrolysis plants 1f. and 1j. Project progress reports and/or external resettlement and social development M&E reports 1g. Environmental monitoring reports 1h. Surveys by consultants 1i. Reports of soil and fertilizer stations of Zhaotong City, Zhaoyang District, and Ludian County	Changes in administrative procedure or budgetary process delay the provision of counterpart funds.
2. Water resources management in the Sayu River improved	2a. By 2024, data on water quality in rivers in the Sayu River Basin automatically sent to mobile devices of the "river chiefs" in real time (2019 baseline: not applicable)[g]	2a. Surveys by consultants	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
3. Eco-compensation mechanism for the Sayu River Basin established	3a. By 2021, six eco-compensation agreements signed with Longshu, Shuimo, and Xinjie towns in Ludian County; and Leju and Sujia townships and Sayu Town in Zhaoyang District (2019 baseline: not applicable) (OP 3.3.2) 3b. By 2026, beneficiaries' cumulative payment into the eco-compensation fund exceeds CNY28.0 million (2019 baseline: not applicable) (OP 6.1) 3c. By 2023, at least 35% of the eco-compensation fund management committee members are women (2019 baseline: not applicable) (OP 2.3)	3a. Surveys by consultants 3b.–3c. Reports of the eco-compensation fund management committee and/or the Yudong Reservoir Water Resources Protection Committee Office	
4. Education, capacity, and public awareness for water pollution management strengthened	4a. By 2026, at least 12,550 students (of whom at least 40% are women) educated in water pollution management (2019 baseline: not applicable) (OP 2.2) 4b. By 2026, at least 200 people (of whom at least 40% are women) report enhanced knowledge and skills on water pollution management (2019 baseline: not applicable) (OP 2.2) 4c. By 2026, at least 32,750 people (of whom at least 40% are women) report enhanced awareness on water pollution management (2019 baseline: not applicable) 4d. By 2026, garbage classification conducted in 20% of households in the Sayu River Basin and upper Yudong Reservoir (2019 baseline: 0%) 4e. By 2026, at least five other projects referenced this project in their project documents (2019 baseline: 0)	4a.–4c. and 4e. Surveys by consultants and/or project progress reports 4d. Surveys by village committees	

Key Activities with Milestones

1. Wastewater management and pollution control in the Sayu River Basin strengthened

1.1 Land acquisition and resettlement for facilities to reduce water pollution sources (Q4 2020–Q1 2022)
1.2 Procurement for facilities to reduce water pollution sources (Q4 2020–Q3 2023, intermittent)
1.3 Construction of facilities to reduce water pollution sources (Q2 2021–Q2 2024, intermittent)
1.4 Technical assistance by consultants in the reduction of water pollution sources (Q1 2021–Q2 2026, intermittent)

2. Water resources management in the Sayu River improved

2.1 Land acquisition and resettlement for ecological embankment (Q4 2020–Q2 2023, intermittent)
2.2 Procurement for ecological embankment and smart water integrated management platform (Q2 2021–Q3 2023, intermittent)
2.3 Construction of ecological embankment and development of smart water integrated management platform (Q4 2021–Q2 2024, intermittent)
2.4 Technical assistance by consultants in the establishment of a river protection model and a smart water integrated management platform (Q4 2021–Q3 2026, intermittent)

3. Eco-compensation mechanism for the Sayu River Basin established

3.1 Implementation of the eco-compensation agreement between Ludian County and Zhaoyang District with consulting services (Q2 2021–Q4 2026, intermittent)
3.2 Establishment and implementation of new town- and township-level horizontal eco-compensation mechanisms with consulting services (Q2 2021–Q4 2026, intermittent)
3.3 Establishment and implementation of an eco-compensation fund (Q3 2022–Q4 2026, intermittent)

4. Education, capacity, and public awareness for water pollution management strengthened

4.1 Training, workshops, and domestic and overseas study visits and training for rural water pollution management and eco-compensation (Q1 2021–Q2 2026, intermittent)
4.2 Periodical special lectures at schools and study visits for students (Q1 2022–Q2 2026, intermittent)
4.3 Public awareness raising through publicity, handbook, brochures, media, internet, and campaigns. (Q1 2022–Q2 2026, intermittent)
4.4 Dissemination and replication of water pollution management and eco-compensation demonstrated under the project to other areas of the People's Republic of China and other countries (Q1 2024–Q4 2026, intermittent)

Project Management Activities
Recruit individual consultants for initial project management support (Q3 2020) Conduct initial project management with individual consultants' assistance (Q3 2020–Q2 2021) Recruit a consultant team for project management support (Q3 2020–Q2 2021) Conduct project management with consultant team's assistance (Q2 2021–Q4 2026) Recruit an external environmental monitoring agency (Q1 2021) Submit semiannual environmental monitoring reports to ADB (Q2 2021–Q2 2024) Recruit an external agency for external resettlement and social development M&E (Q3–Q4 2020) Submit semiannual external resettlement and social development M&E reports to ADB (Q2 2021–Q4 2025) Monitor and evaluate project impact, outcome, and outputs using the project performance management system; and submit quarterly project progress reports to ADB (Q1 2021–Q4 2026) Submit the project completion report to ADB (Q4 2026)
Inputs
ADB: $100.0 million (ordinary capital resources, regular loan) Government: $134.6 million
Assumptions for Partner Financing.
Not applicable

ADB = Asian Development Bank, CNY = Chinese yuan, DMF = design and monitoring framework, ha = hectare, kg = kilogram, m^3 = cubic meter, M&E = monitoring and evaluation, OP = operational priority, Q = quarter, WWT = wastewater treatment.

[a] Government of the People's Republic of China. 2016. *Outline of the Yangtze River Economic Belt Development Plan, 2016–2030*. Beijing.

[b] The monthly average total nitrogen met the Class III standard twice in 2017 and three times in 2018.

[c] The monthly average total phosphorus met the Class II standard four times in 2017 and five times in 2018.

[d] Some 25 tons/day of solid waste is being treated at four pyrolysis plants. However, all four plants will be closed; and by 2024, 84 tons/day of solid waste will be treated by new two pyrolysis plants constructed under the project.

[e] To complete the quantifiable soil and water conservation model, the effects of afforestation on soil and water conservation need to be measured in the fields for about 10 years.

[f] The chemical fertilizer nitrogen (phosphor) loss is the amount of nitrogen (phosphor) included in the chemical fertilizer that has not been absorbed by crops and remains in the water and deep soil. Data on chemical fertilizer nitrogen (phosphor) loss from the soil and fertilizer stations in 2017 are the latest (the stations do not conduct annual surveys).

[g] The "river chief" system was introduced in the People's Republic of China in 2017. It assigns each part of a river and lake to a certain official.

Contribution to Strategy 2030 Operational Priorities

Expected values and methodological details for all OP indicators to which this operation will contribute results are detailed in Contribution to Strategy 2030 Operational Priorities (accessible from the list of linked documents in Appendix 2 of the report and recommendation of the President). In addition to the OP indicators tagged in the DMF, this operation will contribute results for

OP 1.3: Poor and vulnerable people with improved standards of living (number)
OP 3.1.1: Additional climate finance mobilized ($ [United States dollars])
OP 3.3.1: Pollution control enhancing infrastructure assets established or improved (number)
OP 5.1.1: Rural infrastructure assets established or improved (number)

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=52025-001-3

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Agriculture, Natural Resources, and Rural Development
4. Project Administration Manual
5. Financial Analysis
6. Economic Analysis
7. Summary Poverty Reduction and Social Strategy
8. Risk Assessment and Risk Management Plan
9. Climate Change Assessment
10. Gender Action Plan
11. Environmental Impact Assessment
12. Resettlement Plan
13. Ethnic Minority Development Plan
14. Contribution to Strategy 2030 Operational Priorities

Supplementary Documents

15. Procurement Risk Assessment
16. Financial Management Assessment
17. Detailed Economic Analysis
18. Project Innovations and Knowledge Dissemination
19. Eco-Compensation Mechanism for the Sayu River Basin