Board of Directors

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R118-19
5 November 2019

Proposed Loan
Henan Dengzhou Integrated River Restoration and Ecological Protection Project
(People's Republic of China)

1. The Report and Recommendation of the President (RRP: PRC 52023-001) on the proposed loan to the People's Republic of China for the Henan Dengzhou Integrated River Restoration and Ecological Protection Project is circulated herewith.

2. This Report and Recommendation should be read with *Country Operations Business Plan: People's Republic of China, 2019–2021*, which was circulated to the Board on 28 May 2019 (DOC.IN.92-19).

3. In the absence of any request for discussion and in the absence of a sufficient number of abstentions or oppositions (which should be communicated to The Secretary by the close of business on 26 November 2019), the recommendation in paragraph 39 of the paper will be deemed to have been approved, to be so recorded in the minutes of a subsequent Board meeting. Any notified abstentions or oppositions will also be recorded in the minutes.

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ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 52023-001
November 2019

Proposed Loan
People's Republic of China: Henan Dengzhou Integrated River Restoration and Ecological Protection Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 18 October 2019)

Currency unit	–	yuan (CNY)		
CNY1.00	=	$0.1412	or	€0.1264
$1.00	=	CNY7.0818	or	€0.9064
€1.00	=	CNY7.8133	or	$1.1172

ABBREVIATIONS

ADB	–	Asian Development Bank
DCG	–	Dengzhou City Government
EMP	–	environmental management plan
GAP	–	gender action plan
ha	–	hectare
IWRM	–	integrated water resources management
km	–	kilometer
m^3	–	cubic meter
O&M	–	operation and maintenance
PAM	–	project administration manual
PRC	–	People's Republic of China
YREB	–	Yangtze River Economic Belt

NOTE

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

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PROJECT AT A GLANCE

1. Basic Data

Project Number: 52023-001

Project Name	Henan Dengzhou Integrated River Restoration and Ecological Protection Project
Country	China, People's Republic of
Borrower	People's Republic of China
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=52023-001-CEI
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=52023-001-PortAtaGlance
Department/Division	EARD/EAER
Executing Agency	Dengzhou City Government

2. Sector

	Subsector(s)	ADB Financing ($ million)
✓ **Agriculture, natural resources and rural development**	Forestry	10.00
	Rural sanitation	28.00
	Rural water supply services	57.00
	Water-based natural resources management	80.00
Water and other urban infrastructure and services	Urban sewerage	25.00
	Total	**200.00**

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
- ✓ Making cities more livable
- ✓ Promoting rural development and food security
- ✓ Strengthening governance and institutional capacity

Climate Change Information

Climate Change impact on the Project	Medium

ADB Financing

Adaptation ($ million)	2.50
Mitigation ($ million)	19.58

Sustainable Development Goals

SDG 6.3, 6.4, 6.6, 6.a
SDG 11.6
SDG 13.a

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

Poverty Targeting

General Intervention on Poverty ✓

4. Risk Categorization: Complex

5. Safeguard Categorization

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

6. Financing

Modality and Sources	Amount ($ million)
ADB	**200.00**
Sovereign Project (Regular Loan): Ordinary capital resources	200.00
Cofinancing	**0.00**
None	0.00
Counterpart	**223.12**
Government	223.12
Total	**423.12**

Currency of ADB Financing: Euro

Source: Asian Development Bank

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 Henan Dengzhou Integrated River Restoration and Ecological Protection Project.

2. The project will help the Dengzhou City Government (DCG) restore the Tuan River ecosystem and improve water services with a well-balanced mix of structural and nonstructural interventions, leading to environmental sustainability and improved livelihoods. The project will adopt an integrated approach to enhance rural and urban water links that addresses a complex environmental problem in rapidly developing societies therefore serves as a demonstration model for the PRC and beyond.

II. THE PROJECT

A. Rationale

3. The Yangtze River Economic Belt (YREB) is one of the three key economic growth engines in the PRC. Its nine provinces and two specially administered municipalities account for more than 40% of the PRC's population, 40% of its freshwater resources, and about 45% of economic output. While the YREB has benefited from extensive development since the 1980s, economic growth in the middle and upper reaches of the Yangtze River Basin lags that of the coastal areas. These parts of the YREB still face significant challenges as a result of (i) weak institutional coordination for strategic planning; (ii) increasing pollution and pressure on natural resources; (iii) slow transformation to green development; and (iv) limited integration of waterways, ports, and intermodal logistics. To manage these challenges, the Government of the PRC formulated the Yangtze River Economic Belt Development Plan, 2016–2030.[1] The Asian Development Bank (ADB) and the government have agreed to adopt a framework approach to strategically program ADB's lending support for development initiatives in the YREB.[2] Priority is given to (i) institutional strengthening and policy reform; (ii) ecosystem restoration, environmental protection, and management of water resources; (iii) inclusive green industrial transformation; and (iv) construction of an integrated multimodal transport corridor.

4. Rural livelihoods in the YREB have lagged industrial production and urban livelihoods. As a result, income inequality and poverty persist in rural areas of the less-developed middle and upper reaches of the Yangtze River Basin. Most rural wastewater and solid waste is discharged directly to the water system without treatment and proper disposal.[3] As the rural economy expands, increasing regulatory, administrative, and environmental management challenges will require stronger institutional capacity. Against this background, the government formulated the National Strategic Plan for Rural Vitalization, 2018–2022 to promote poverty reduction, rural development, and green and inclusive growth.[4] The rural vitalization strategy focuses on governance reform, wastewater and solid waste management, rural–urban integration,

[1] Government of the PRC. 2016. *Outline of the Yangtze River Economic Belt Development Plan, 2016–2030*. Beijing.
[2] ADB. 2018. *Framework for the Asian Development Bank's Assistance for the Yangtze River Economic Belt Initiative: 2018–2020*. Manila.
[3] In 2017, only 25% of villages had appropriate sanitation facilities and only 60% had solid waste collection and disposal services, contributing to poor environmental conditions. In 2015, the Thirteenth Five-Year Plan, 2016–2020 mandated the installation of sanitation systems in at least 70% of the rural villages in the country by 2020 (Government of the PRC. 2016. *Outline of the Thirteenth Five-Year Plan for National Economic and Social Development, 2016–2020*. Beijing).
[4] Government of the PRC. 2018. *National Strategic Plan for Rural Vitalization, 2018–2022.* Beijing.

ecosystem protection, and rural development. The strategy prioritizes managing climate change and the environment to support ecological civilization and rural vitalization.

5. **Project area**. Dengzhou, a county-level city in Nanyang City, Henan Province, is poor and relatively rural. It has weak institutional capacity in environmental management and is strategically located at the sources of South–North Water Diversion Project.[5] As part of the Han River watershed in the Yangtze River Basin, Dengzhou City is a national key ecological function zone, as designated by the government. With 28 townships and 606 villages, the city has an area of 2,369 square kilometers and had a population of 1.78 million people in 2018, of which 60% are rural. The project area covers the townships and villages along the Tuan River, a tributary of the Han River in Dengzhou City. In 2018, most of the city's 32,465 poor people (with an annual per capita income of less than CNY3,208) were low-paid women. The Tuan River Basin has (i) a per capita freshwater availability of only 345 cubic meters (m^3) per year (less than 13% of the national average), (ii) the lowest water supply coverage that relies on polluted groundwater, and (iii) the highest disposal rate of untreated wastewater and solid wastes. Located in Henan Province, an ecological red-line area, Dengzhou City is part of a cluster of cities and counties surrounding the YREB that significantly contribute to the YREB's development goals.[6]

6. **Poor water quality**. Almost 100% of Dengzhou City's rural population and 30% of its urban population lacks proper access to water, wastewater, and solid waste management facilities. This results in poor health and creates heavy burden particularly for women, who play a major role in household water and waste management in the city. Despite experiencing an acute water scarcity, the city, as a source of water diversion project, helps resolve the water scarcity problems in the water-deprived northern region of the PRC. About 143,000 of the city's rural population relies for their drinking water supply on shallow groundwater that is contaminated by the heavily polluted Tuan River, untreated wastes, and chemical fertilizers used extensively on farmland. The city's groundwater quality is far below national standards.[7] From 2008 to 2018, there were 300,000 cases of waterborne diseases, affecting mainly women and children.[8] The Tuan River is heavily polluted from point sources, including 6 million m^3 of wastewater, and 300,000 tons of garbage directly disposed into the river annually; and nonpoint sources, mainly from farmlands; and water quality exceeds class V (the worst on the scale) in almost every section of the lower Tuan River.[9]

7. **Impaired water ecosystem services**. The untreated wastewater and accumulated solid waste in the Tuan River have severely impacted the aquatic life and impaired the entire water ecosystem. The river's hydrology, water environment, and geomorphology have also been substantially altered by water operation, urbanization, and climate change impacts, resulting in a degraded river corridor environment. Serious riverbank erosion has progressively damaged the productive farmlands. The undercutting of the riverbank and accumulation of construction wastes in various sections of the river have also exacerbated the degradation of the water environment and damaged the riverfront design in the urban area. Further, several of the city's natural wetlands and drainage channels, including small creeks of hydrological, environmental, and historical significance, have disappeared since 2010. The frequency of floods is on the rise because of morphological changes, urbanization on the floodplain, and climatic variability, therefore likely to

[5] South–North Water Diversion Project. http://www.china.org.cn/waterdiversion/index.htm.
[6] In 2015, PRC formulated a national policy, mandating local governments to establish ecosystems services assessments in land use planning, which is known as ecological redline policy.
[7] Government of the PRC. 2007. *National Drinking Water Quality Standard* (*GB 5749-2006*). Beijing.
[8] Dengzhou City Government. 2018. *Statistical Yearbook*. Dengzhou City.
[9] Above class III water is unfit for drinking according to the PRC's Environmental Water Quality Standard (GB 3838-2002).

pose a serious problem for the city. The 30-kilometer (km) river profile in the city is fully eutrophic, and the resulting persistent foul odor has impaired the living environment along the river reach.[10]

8. **Weak institution and capacity to manage water resources**. Since beginning operations in late 2014, the water diversion project has allocated 692 million m^3 of free of charge water to Dengzhou City each year, of which only about 15% has been used because of a lack of proper planning and limited water resource management capacity. The DCG adopted various measures to protect the river environment and improve the livelihood of the people, but it could not deliver the expected results because of inadequate problem analysis, fragmented management of water and ecosystem services, and poor planning and design without proper stakeholder participation. Lack of asset management in the DCG has substantially increased the risk of poor public services and unforeseen costs in development investments. Located at the headstream of the water diversion project, the city faces restrictions on development mainly because water quality and quantity in the Danjiangkou Reservoir is being degraded.[11] To ensure sound environmental management and protection of the reservoir, the DCG receives eco-compensation annually from the Beijing Municipal Government as an incentive, but this has not been used properly.[12]

9. Given the competing needs for soil and water conservation and rural livelihood development in this unique ecosystem, an integrated watershed management is required with strong database. To establish a fair compensation mechanism, a performance-based approach with proper monitoring and evaluation of outcomes and financial rewards or penalty provisions also needs to be developed with the involvement of the DCG and the cities that benefit from the water diversion project. To do this, the DCG needs to strengthen its institutional and operational capacities.

10. **Rural–urban water links**. Complex and poorly managed rural–urban water links have direct implications on rural and urban livelihoods, and the Tuan River environment. For example, untreated sewage from the urban area on the right bank of the river is discharged directly into the Tuan River, where it recharges the groundwater that is the only source of drinking water in the rural area on the left bank. Similarly, poor sanitation and solid waste management in the rural villages, and the use of chemical fertilizer and pesticides on the farmlands, contaminate the groundwater and damage the river environment and the river front design of the urban area. Urban encroachment into the river corridor and disposal of construction wastes into the river have resulted in river sedimentation leading to the water contamination and frequent flooding in rural villages 30 km downstream.

11. The DCG urgently needs to address these links by improving its water management strategy and plan and strengthening its institutional and technical capacities to achieve the goals. Located in a less-developed region in the middle of Yangtze River Basin, the city can demonstrate an environmentally sustainable growth model for addressing the rural–urban water links that can be replicated in other parts of the river basin and the PRC.

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[10] Eutrophication is the process by which excessive nutrients accumulate in a water body causing dense plant growth and animal death from lack of dissolved oxygen.

[11] The reservoir of the water diversion project, constructed in the 1950s, has a surface area of 1,050 square kilometers; storage capacity of 29.05 cubic kilometers; and a watershed area of 95,200 square kilometers. Besides irrigation, flood control, and hydropower generation, it also supplies water through a 1,274 km stretch of canal to 14 cities in the northern PRC, benefiting more than 50 million people in the water-deprived cities of Beijing and Tianjin, and the provinces of Hebei and Henan under the water diversion project.

[12] The eco-compensation includes CNY278 million in direct cash payments, CNY340 million for capacity building in environmental protection, medical coverage and education for affected populations, and free use of 692 million m^3 of water from the water diversion project for various uses. The amount is part of the city government's annual budget and there is no proper accounting provision for the compensation fund by source and area.

12. **Strategic fit**. Under the rural vitalization plan (footnote 4), local governments will implement their own plans to improve rural public services and the environment. The DCG has formulated its Thirteenth Five-Year Plan, 2016–2020, consistent with the national Thirteenth Five-Year Plan, 2016–2020.[13] In addition to local development plans, the project is aligned with ADB's Strategy 2030, especially the operational priority areas of tackling climate change, building disaster resilience, and enhancing environmental sustainability; promoting rural development and food security; and making cities more livable.[14] It is also closely aligned with ADB's country partnership strategy for the PRC, 2016–2020, particularly the three major principles of managing climate change and environment, supporting inclusive economic growth, and fostering knowledge cooperation.[15] It is consistent with ADB's Water Operational Plan, 2011–2020, which emphasizes integrated water resources management (IWRM) with a focus on rural water management;[16] and Sustainable Development Goals 6, 11, and 13.[17] The project also supports ADB's new action plan for healthy oceans by reducing the amount of solid waste discharged into the Yangtze River and eventually the sea.[18] The project will contribute to the fulfillment of the Paris Agreement that the PRC signed in 2015, and is aligned with the PRC's Intended Nationally Determined Contributions to limit carbon emissions by 2030.[19]

13. **Lessons learned.** The project will implement IWRM focusing on rural–urban integration to improve rural livelihoods and the Tuan River environment in Dengzhou City. The project design has incorporated lessons from previous ADB-financed projects and policy-oriented studies on IWRM, environmental and ecosystem improvement, wetland and lake management, and rural–urban integration in the PRC and other developing member countries. Past and ongoing ADB support in the PRC underscore the importance of (i) strengthening nature-based solutions and community engagement; (ii) ensuring operation and maintenance (O&M) provisions include sustainable sources of finance; (iii) using high-level technologies in IWRM, including in decision-making; (iv) introducing institutional and financial management reforms that contribute to sustainable water resources management; (v) developing capacity for project implementation and O&M; and (vi) instituting an effective project monitoring and evaluation system.[20]

B. Impact and Outcome

14. The project is aligned with the following impact: quality of life along YREB improved.[21] The project will have the following outcome: water security and environmental sustainability in Dengzhou City improved.[22]

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[13] Government of the PRC. 2016. *Outline of the Thirteenth Five-Year Plan for National Economic and Social Development, 2016–2020*. Beijing.
[14] ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.
[15] ADB. 2016. *Country Partnership Strategy: People's Republic of China, 2016–2020—Transforming Partnership: People's Republic of China and Asian Development Bank*. Manila.
[16] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.
[17] United Nations. Sustainable Development Goals.
[18] ADB. 2019. *The Action Plan for Healthy Oceans and Sustainable Blue Economies*. Manila.
[19] Intended Nationally Determined Contributions. https://unfccc.int/files/adaptation/application/pdf/all__parties_indc.pdf
[20] ADB. 2018. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for* the *Chongqing Longxi River Basin Integrated Flood and Environmental Risk Management Project*. Manila; ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for the Shandong Groundwater Protection Project*. Manila; and ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for* the *Hubei Enshi Qing River Upstream Environment Rehabilitation Project*. Manila.
[21] National Development and Reform Commission. 2016. *Yangtze River Economic Belt Development Plan, 2016–2030*. Beijing; and State Council of the People's Republic of China. Policies: Latest Releases.
[22] The design and monitoring framework is in Appendix 1.

C. Outputs

15. **Output 1: Urban and rural water infrastructure in Dengzhou City improved**. This output will include: (i) a rural water supply system, including (a) construction of a water intake at the water diversion project canal and treatment facilities, (b) installation of a distribution network, and (c) installation of an advanced network monitoring and evaluation system; (ii) wastewater management, including (a) installation of distributed wastewater treatment facilities in rural areas, (b) construction of a centralized wastewater treatment plant in an urban area, and (c) construction of wastewater collection networks; (iii) solid waste management in rural towns, including (a) installation of solid waste separation and recycling facilities, and (b) establishment of solid waste collection and transport facilities; and (iv) flood risk management, including construction of (a) ecological dikes at critical locations, and (b) stormwater drainage. This output will greatly enhance the quality of water supply and sanitation for residents, particularly women. The construction and operation of the facilities will create some employment opportunities for residents, including women and people on low incomes.

16. **Output 2: Ecosystem services in Dengzhou City improved**. This output will implement (i) river corridor improvement by (a) constructing Tuanbei Cultural Park,[23] (b) greening and gardening the riverbanks in city area, and (c) removing polluted sediment from the Tuan River through limited dredging in discrete sections of the river; (ii) soil and water conservation by (a) undertaking riverbank protection using eco-friendly measures, (b) planting bio-shield (a vegetative buffer zone) and constructing runoff interceptors to control nutrients and topsoil leaching from the farmlands, and (c) afforesting hill slopes in the watershed of Danjiangkou Reservoir; and (iii) wetland restoration by (a) constructing small artificial wetlands and (b) restoring small creeks to enhance the natural drainage system. These activities will improve the living environment and generate employment opportunities for residents including women and people on low incomes.

17. **Output 3: Water resources management capacity enhanced**. This output will develop (i) an environmental research and education center by (a) constructing research laboratories with research facilities, and (b) cooperating with local research institutes; (ii) river health monitoring by (a) installing real-time hydrological and water quality monitoring stations, (b) establishment of a research park in the lower Tuan River, and (c) upgrading of Dengzhou Digital Center for field data management; and (iii) institutional capacity building by (a) establishing an asset management and decision support system, (b) strengthening community-based watershed management, including solid waste management, (c) piloting manure use in crop production to reduce the use of chemical fertilizer and nutrients runoff from livestock farms, (d) promoting community entrepreneurship, mainly community nursery and agroforestry, (e) developing a dialogue between the DCG and the water diversion project beneficiary cities to establish a fair eco-compensation and accounting mechanism, (f) drafting of a water utilization plan for the city, and (g) conducting environmental training programs for local governments and communities.

18. **Special project features and value addition.** The project will (i) contribute to global and regional public goods through soil and water conservation and waste management in the Yangtze River Basin. It will also contribute to (i) the PRC's Intended Nationally Determined Contributions to ensure that carbon emissions peak by 2030 through afforestation and (ii) regional water distribution under the water diversion project; and will help launch the implementation of the rural vitalization plan (footnote 4). The project represents a fraction of the larger 5-year investment plan

[23] The park will feature the city's 2,500 years of history related to Chinese medicine, literature, governance, agriculture, and architecture for educational and tourism purposes.

by the DCG and will demonstrate ecological protection, while advocating a river-basin-scale IWRM approach in the YREB.[24] It will support the DCG in identifying and improving the rural–urban water links in a complex but representative case of rapidly urbanizing societies in the PRC.

19. The project will also demonstrate urban planning by preserving the historical sites and establishing ecological parks that reflect Dengzhou City's historical values. It will establish an advanced asset management practice with (i) digital asset inventory and records on geographic information systems, (ii) an interactive service delivery system and automatic water leakage detection system, (iii) a decision support system for asset acquisition and disposal, and (iv) guidelines and training courses for asset criticality and risk assessment. The project will promote the sustainability of the rural water supply system by integrating it with the urban water services for the management, including O&M, and service delivery provisions to fill the current institutional and policy gaps in rural water supply in the PRC. It will leverage the knowledge partnership between the DCG and local research institutes by establishing an environmental research and education center that studies and monitors the local water and environmental issues and evaluate project performance. Lastly, it will support the DCG in implementing the project in a gender-responsive and socially inclusive manner. The project's innovations and value addition will be disseminated through knowledge products and knowledge-sharing events.

D. Summary Cost Estimates and Financing Plan

20. The project is estimated to cost €383.49 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).[25]

Table 1: Summary Cost Estimates
(€ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Urban and rural water infrastructure in Dengzhou City improved	141.98
	2. Ecosystem services in Dengzhou City improved	173.15
	3. Water resources management capacity enhanced	18.81
	Subtotal (A)	**333.94**
B.	**Contingencies**[c]	**33.20**
C.	**Financing Charges During Implementation**[d]	**16.35**
	Total (A+B+C)	**383.49**

[a] Includes taxes and duties of €12.53 million. Such amount does not represent an excessive share of the project cost. The government will finance taxes and duties of €6.09 million through cash contribution. The balance of €6.43 million will be paid from the Asian Development Bank loan.
[b] In mid-2019 prices as of 15 May 2019.
[c] Physical and price contingencies, and a provision for exchange rate fluctuation, are included. Physical contingencies are computed at 5% of base costs. Price contingencies on foreign currency costs are computed at 1.5% for 2020, and 1.6% thereafter. Price contingencies on local currency costs are computed at 1.8% for 2020 and 2.0% thereafter.
[d] Includes interest and commitment charges. Interest during construction for the ordinary capital resources loan has been computed at the 5-year United States dollar fixed swap rate plus an effective contractual spread of 0.5% and maturity premium of 0.1%. Commitment charges for the ordinary capital resources loan are 0.15% per year to be charged on the undisbursed loan amount.
Source: Asian Development Bank estimates.

21. The government has requested a regular loan of €181.27 million from ADB's ordinary capital resources to help finance the project. The loan will have a 26-year term, including a grace period of 5 years; an annual interest rate determined in accordance with ADB's London interbank offered rate

[24] A comprehensive river basin model developed during project appraisal will be further developed during project implementation to establish a decision support system and aid development planning and project design.
[25] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

(LIBOR)-based leading 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 straight-line method, the average maturity is 15.75 years, and the maturity premium payable to ADB is 0.10% per year.

22. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to civil works, equipment and materials, project management, consulting services, and training. The government will finance land acquisition and resettlement, contingencies, O&M of the project, and remaining portions of the civil works. Taxes and duties are included in the base cost, with financing shared by ADB and the government. Climate mitigation is estimated to cost €17.75 million and climate adaptation is estimated to cost €2.27 million. ADB will finance 100% of mitigation and adaptation costs. Details are in the PAM (footnote 25).

Table 2: Summary Financing Plan

Source	Amount (€ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (regular loan)	181.27	47.27
Dengzhou City Government	202.22	52.73
Total	**383.49**	**100.00**

Source: Asian Development Bank estimates.

E. Implementation Arrangements

23. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 25).

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	December 2019–December 2025		
Estimated completion date	31 December 2025		
Estimated loan closing date	30 June 2026		
Management			
(i) Oversight body	Dengzhou City project leading group Executive vice-mayor of Dengzhou City Government (chair) Representatives from the Local Development and Reform Committee, Finance Bureau, Water Resources Bureau, and Environmental Protection Bureau (members)		
(ii) Executing agency	Dengzhou City Government		
(iii) Key implementing agencies	Integrated Urban–Rural Development Pilot Area Administration Bureau, Environment Protection Bureau, and Water Resources Bureau		
(iv) Implementation units	Project management office in Dengzhou City Government, and project implementation units in Integrated Urban–Rural Development Pilot Area Administration Bureau, Environment Protection Bureau, and Water Resources Bureau (26 staff)		
Procurement	Open competitive bidding	26 contracts	€253.40million
	Request for quotation	2 contracts	€0.44million
Consulting services	Quality- and cost-based selection, consultant's qualifications selection, and/or individual consultant selection	Multiple contracts	€1.82
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing will apply to the recruitment of consultants and urgent procurement of civil works and goods. 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 Asian Development Bank's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and Asian Development Bank.		

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

24. The implementing agencies' domestic feasibility studies are technically sound, meet international standards, and provide sufficient information on the design's feasibility. Licensed domestic design institutes prepared all project components, considering local geophysical, socioeconomic, and hydrometeorological conditions, as well as anticipated climate change risks (rated *medium*), in accordance with PRC design guidelines and local regulations. The project considered technical alternatives, such as (i) a centralized or decentralized water supply system, (ii) a general inspection or automatic acoustic system to detect water leakage in the water supply distribution network, (iii) centralized or distributed wastewater treatment plants, (iv) mechanical or ecological river dredging, (v) concrete lining or gabion wall for erosion control, and (vi) continuous or discontinuous dike for flood control, and their technical and economic viability. It also (i) deliberated ways to promote rural–urban water links to improve the water quality and hydrological cycle, (ii) carried out a demand projection to determine the size and scale of each project component, (iii) promoted the use of information and communication technology in IWRM, and (iv) optimized the timescales for project implementation.

B. Economic and Financial

25. The economic analysis indicated that the project is economically viable, with an overall economic internal rate of return of 13.2% and an economic net present value of CNY1,008.0 million. The analysis also confirmed the economic viability of all subprojects.[26] Sensitivity analysis indicated that the project is robust to the negative scenarios examined, such as an increase in investment costs, a reduction in benefits, and an increase in O&M costs. The full economic benefits of the project are expected to be significantly higher, as some effects, such as ecological benefits, are not easily quantifiable.

26. The financial analysis included financial viability assessments for revenue-generating components, an assessment of the project's financial sustainability, and an assessment of the financial capacity of the DCG. For revenue-generating components, project revenues are sufficient to cover all recurrent costs. Financial sustainability considered the fiscal impact of counterpart funding for the project; incremental recurrent costs, including O&M expenditures; and debt service for the project. The DCG derives on average 70% of funding from the provincial government. While the analysis confirmed the financial sustainability of the project, the DCG's reliance on provincial government budgetary allocations poses a substantial risk to financial sustainability because of possible changes in budgetary allocations by the upper government. The project includes adequate mitigation measures, including assurances for continued O&M support and for increases in water and wastewater tariffs for full O&M cost recovery, as well as operational efficiency enhancements through improvements to asset management systems.

C. Governance

27. The assessed financial management risk is *moderate* mainly because of the DCG's lack of familiarity with ADB's financial management policies and procedures. The executing agency's financial staff capacity, accounting, reporting systems, and internal and external audit arrangements are adequate. Further, the DCG's financial management capacity under the

[26] The subprojects' economic internal rates of return range from 9.1% to 15.6%.

guidance of the Henan Provincial Government, which is familiar with development partner funded project management, will be adequate for effective financial management of the project.[27] The assessment recommended a time-bound action plan, which the DCG will implement during the project period, to mitigate the identified financial management risks.

28. The procurement risk assessment confirmed that the DCG, supported by the project management office, has adequate capacity to implement the ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time), despite its lack of experience with internationally financed projects. All procurement will be organized through an experienced procurement agent and the project management and capacity development consultants will provide procurement and contract management support to project management office throughout the project implementation.

29. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and Dengzhou City Government. The specific policy requirements and supplementary measures are described in the PAM (footnote 25).

D. Poverty, Social, and Gender

30. The project is classified *general intervention* for poverty reduction. The project preparation team in close coordination with DCG undertook the poverty and social analysis based on intensive stakeholder consultations and socioeconomic surveys. It indicated that a total of 746,000 residents in 11 project towns, including 13,137 poor people, will directly benefit from the project through reduced water pollution, improved drinking water supply system, and better environment and ecological protection in the Tuan River watershed. Other residents in Dengzhou City will also benefit indirectly from improved environment and ecology. The project will create 3,000 jobs during project implementation and 150 jobs during operation. The DCG prepared a social development action plan based on the poverty and social analysis, with specific targets for the poor and low-income people. The DCG consulted with local residents and other stakeholders during the project preparation. The PAM includes a consultation and participation plan for the project implementation stage (footnote 25).

31. The project is classified *effective gender mainstreaming*, following ADB's Guidelines for Gender Mainstreaming Categories of ADB Projects.[28] The project will ensure that women will participate in and benefit equitably from the project. Women are expected to benefit from increased employment, piped water supply in rural areas, improved living environment, and better quality of life. A gender action plan (GAP) has been prepared based on gender analyses to ensure gender equality. The GAP includes the following key measures and targets for women: (i) equitable participation of women in decision-making, with women making up at least 40% of participants; (ii) capacity building of staff of the DCG to implement the GAP and related measures; (iii) priority employment opportunities for women, with women making up at least 30% employees during construction and at least 40% during operation; (iv) participation of women in awareness-raising activities and public hearings, with participants comprising at least 40% women; (v) participation of women in decision-making for the pilot community-based solid waste management program, with at least 40% female membership of community groups; and (vi) ensuring women employees' equitable access to sanitation and health education (such as HIV/AIDS awareness) during construction. Gender targets are included in the design and monitoring framework.

[27] Financial Management Assessment (accessible from the list of linked documents in Appendix 2) was conducted in January 2019.
[28] ADB. 2012. *Guidelines for Gender Mainstreaming Categories of ADB Projects*. Manila.

E. Safeguards

32. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[29]

33. **Environment (category B).** The project preparation team in close coordination with DCG undertook an initial environmental examination, including an environmental management plan (EMP) and grievance redress mechanism, following ADB's Safeguard Policy Statement and disclosed it on ADB's website. The initial environmental examination is based on the approved domestic feasibility studies, environmental assessment reports, site visits, and stakeholder consultations. The outcomes of the stakeholder consultations have been integrated in the project design, including works for heritage preservation. The project team conducted due diligence for an associated facility, a small shallow reservoir, for which operational and safety plans have been prepared consistent with ADB's Safeguard Policy Statement requirements for dams. The DCG, through the project management office, will be responsible for implementation and compliance with the EMP, including for mitigation measures, monitoring, and reporting. Loan implementation consultants and a capacity-building program are included in the project design.

34. The project will contribute to municipal targets for environmental improvement, including improved flood control, reduced siltation, and improved solid waste management. Construction risks include the potential release of contaminants from polluted sediments during dredging or disposal, and short-term impacts such as dust and noise. Operational risks include altered river hydrology, river pollution from treated wastewater, and inadequate O&M of the project facilities. Mitigation measures are described in the EMP. The project will contribute to climate change adaptation and mitigation by (i) increasing the resilience of the flood defense and environmental protection infrastructure in accordance with anticipated climate impacts through careful selection of materials and locations, and (ii) sequestering carbon through the revegetation components.

35. **Involuntary resettlement (category A).** The project will permanently occupy 479.43 hectares (ha) of land, of which 346.03 ha is existing state-owned land and 133.4 ha is collective land that will be acquired. A total of 793 households with 3,023 persons will be affected by the project's land acquisition and resettlement impacts; 525 households with 1,841 persons will be physically relocated; and 196.87 ha of land will be used temporarily during construction. The DCG has prepared a resettlement plan in accordance with ADB's Safeguard Policy Statement and relevant laws and regulations of the PRC. The plan includes adequate measures for compensation, resettlement, and rehabilitation of affected people. The plan is based on surveys and consultations with affected people during project preparation and will be further updated through additional surveys and consultations during project implementation. A grievance redress mechanism has been established and incorporated into the resettlement plan. The DCG has the capacity to implement domestically funded projects, and its capacity will be strengthened by the project consultants to implement the resettlement plan in compliance with ADB requirements. An external monitoring agency will be engaged to monitor the implementation of the resettlement plan and will submit semiannual monitoring reports to ADB.

36. **Indigenous peoples (category B)**. Eight villages in the project area include members of the Hui ethnic minority group. While the ethnic minorities are integrated into mainstream society in terms of socioeconomic and livelihood systems, they have distinct religious and cultural beliefs and practices. Therefore, indigenous peoples' safeguards are triggered; and the DCG has prepared an ethnic minority development plan to ensure that ethnic minorities benefit equitably

[29] ADB. Safeguard Categories. https://www.adb.org/site/safeguards/safeguard-categories.

and in a culturally appropriate manner from the project. The plan was prepared based on social analysis and consultations during project preparation. The project executing and implementing agencies have experience in working on ethnic minority affairs, and necessary measures for strengthening their capacity for implementation and monitoring the plan have been included in the project design.

F. Summary of Risk Assessment and Risk Management Plan

37. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[30]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Executing and implementing agencies lack the technical skills to operate integrated hydrological and river basin models.	The project will provide technical training for the DCG, the implementing agencies, and the PMO; and will establish an environmental research center with applied research facilities.
Changes in the provincial government's budgetary priorities lead to insufficient budgetary allocations to the DCG for operation and maintenance of assets.	Assurances incorporated in the legal agreements will ensure that (i) the government provides sufficient funding through Henan Provincial Government's budgetary allocations to the DCG and (ii) the DCG increases tariffs to achieve cost recovery. Improvements in asset management systems will improve efficiencies and cut costs.
Staff turnover in the PMO and implementing agencies disrupts project management and implementation.	Assurances incorporated in the legal agreements will ensure that the DCG, the implementing agencies, and the PMO will implement the institutional strengthening and maintain the stability of the staff.

DCG = Dengzhou City Government, PMO = project management office.
Source: Asian Development Bank.

IV. ASSURANCES

38. The government and the DCG 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. The government and the DCG have agreed with ADB on certain covenants for the project, which are set forth in the draft loan agreement and project agreement.

V. RECOMMENDATION

39. 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 €181,274,000 to the People's Republic of China for the Henan Dengzhou Integrated River Restoration and Ecological Protection 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 26 years, including a grace period of 5 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.

Takehiko Nakao
President

4 November 2019

[30] 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 along Yangtze River Economic Belt improved (National Strategic Plan for Rural Vitalization, 2018–2022; and Yangtze River Economic Belt Development Plan, 2016–2030)[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Water security and environmental sustainability in Dengzhou City improved	By the end of 2026, within the project area: a. Increased investments in Dengzhou City benefit 746,000 people (2018 baseline: NA) (RFI A) b. Water quality at the outlet of Dengzhou City's Zhao River in Tuan River Basin meets class III standard[b] (2018 baseline: Class V) c. Land area in the Dengzhou City protected from 20-year flood[c] increased to 100 ha (2018 baseline: 0 ha) d. A functional asset management system in Dengzhou City Government established (2018 baseline: 0)	a–d. DCG report, records, annual statistics, and periodic surveys a–d. DCG statistical yearbooks b. Municipal environmental protection bureau's annual monitoring reports	Population in project area exceeds forecasts and exerts more pressure, such as a heavy pollution load, on the Tuan River.
Outputs 1. Urban and rural water infrastructure in Dengzhou City improved	By the end of 2025, within the project area: 1a. Wastewater treatment plants with 33,500 m^3/day capacity and 25.82 km of wastewater collection networks constructed (2018 baseline: 0) 1b. Discontinuous ecological dike along 3.7 km reach of Tuan River constructed for flood control (2018 baseline: 0) 1c. Two rural water supply treatment plants with 60,000 m^3/day capacity and 615 km of water distribution networks constructed (2018 baseline: 0) 1d. Advanced dry and wet solid waste separation unit serving 20 t/day installed in Rangdong Township (2018 baseline: 0) 1e. 1,420 jobs (426 skilled and 994 unskilled) created during construction (including at least 30% for women) and 108 jobs (80 skilled and 28 unskilled) created during operation (at least 40% for women) (2018 baseline: 0)	1a–1e. ADB mission reports and quarterly project progress reports 1a–1e. DCG report, records, annual statistics, and periodic surveys	Simultaneous implementation of many other projects by the executing agency causes implementation delays.
2. Ecosystem services in Dengzhou City improved	2a. 3.7 km reach of Tuan River rehabilitated with eco-friendly riverbank protection measures (2018 baseline: 0) 2b. 1.05 km^2 Dengzhou Cultural Heritage Park (green corridor park) with 98,000 m^2 ponds constructed (2018 baseline: 0) 2c. 1.25 km^2 of greenbelt (ecological interception) to control nutrient, chemical, and sediment leaching, and 188 ha of afforestation constructed	2a–2f. ADB mission reports and quarterly project progress reports 2a–2f. DCG report, records, annual statistics, and periodic surveys	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	(2018 baseline: 0) 2d. 8 ha of wetland park constructed at centralized wastewater treatment plant outlet (2018 baseline: 0) 2e. 1,370 jobs (411 skilled and 959 unskilled) created during construction (including 30% for women) and 28 jobs (10 skilled and 18 unskilled) created during operation (including 40% for women) (2018 baseline: 0) 2f. Women-friendly river corridors and green parks with proper lighting and sanitation facilities constructed benefiting 278,383 people, including 48% women (2018 baseline: 0)		
3. Water resources management capacity enhanced	3a. Environmental research and education center built and equipped (2018 baseline: 0) 3b. Five real-time water quality and quantity monitoring stations installed along the Tuan River and connected to research center (2018 baseline: 0) 3c. Six community-based environment and ecology supervision teams strengthened in lower Tuan River, involving at least 36 community group members, of whom at least 40% are women (2018 baseline: 0) 3d. 500 m long experimental river reach with research and associated facilities established to study nonpoint water pollution modes and the effectiveness of bio-shield, (2018 baseline: 0) 3e. Water utilization plan for Dengzhou City drafted and submitted to the DCG for approval (2018 baseline: 0) 3f. 210 jobs (63 skilled and 147 unskilled) created during construction (including 30% for women) and 14 jobs (7 skilled and 7 unskilled) created during operation (including 40% for women) (2018 baseline: 0) 3g. 210 employees from the DCG and implementing agencies, of whom 30% are women, have improved knowledge and understanding of climate change adaptation and environmental management through training workshops conducted during project construction (2018 baseline: 0)	3a–3g. ADB mission reports and quarterly project progress reports 3g. Survey of training participants	

Key Activities with Milestones

1. Urban and rural water infrastructure in Dengzhou City improved

1.1 Complete detailed engineering design and bidding documents for sewerage system by Q3 2022, rural water supply system by Q4 2020, solid waste recycling component by Q1 2021, and ecological dike by Q4 2021.
1.2 Implement land acquisition and resettlement plan by Q4 2022.
1.3 Award contracts by Q3 2020 to Q2 2023.
1.4 Complete civil works for sewerage system by Q1 2025.
1.5 Complete civil works for rural water supply system by Q3 2024.
1.6 Complete civil works and equipment installation for solid waste management by Q1 2023.

2. Ecosystem services in Dengzhou City improved

2.1 Complete detailed engineering design and bidding documents for Dengzhou Cultural Heritage Park (green corridor park) by Q2 2022, riverbank protection by Q4 2021, and wetlands construction by Q1 2022.
2.2 Implement land acquisition and resettlement plan by Q1 2023.
2.3 Award contracts by Q1 2021–Q2 2023.
2.4 Complete civil works for landscaping by Q1 2025.
2.5 Complete civil works for wetlands construction and riverbank protection by Q1 2025
2.6 Complete construction of bio-shield, afforestation, and greening and gardening by Q3 2024.

3. Water resources management capacity enhanced

3.1 Complete detailed engineering design and bidding documents by Q3 2021.
3.2 Implement land acquisition and resettlement plan by Q2 2022.
3.3 Complete civil works for environmental research and education center by Q2 2025.
3.4 Calibrate and install river basin models and real-time river health monitoring stations and connect them to data server by Q2 2025.
3.5 Establish functional asset management system by Q2 2025.
3.6 Draft and submit water utilization plan for Dengzhou City to the DCG for approval by Q3 2021.
3.7 Conduct community-based solid waste management by Q2 2023.
3.8 Organize training programs on environmental risk management and climate change adaptation by Q4 2024.

Project Management Activities

Recruit project management consultants by Q3 2020.
Recruit asset management system development consulting services by Q2 2021.
Recruit an external monitor for external environmental and resettlement monitoring and evaluation by Q2 2020.
Implement environmental management plan and submit semiannual environmental monitoring reports to ADB from Q3 2020 to Q3 2025.
Implement gender action plan and social development action plan and monitor targets achievement from 2020 to 2025.
Monitor and evaluate project impact, outcome, and outputs using the project performance management system; submit quarterly project progress reports from Q2 2020 to Q4 2025.
Carry out training programs, policy dialogue, study tours, and awareness-raising campaigns from Q4 2020 to Q2 2025.
Submit project completion report by Q2 2026.

Inputs

ADB: €181.27 million (ordinary capital resources loan)
Government: €202.22 million

Assumptions for Partner Financing

NA

ADB = Asian Development Bank, DCG = Dengzhou City Government, ha = hectare, km = kilometer, km^2 = square kilometer, m = meter, m^2 = square meter, m^3 = cubic meter, NA = not applicable, Q = quarter, t = ton, RFI = results framework indicator.

[a] National Development and Reform Commission. 2016. *Yangtze River Economic Belt Development Plan, 2016–2030*. Beijing; and State Council of the People's Republic of China. Policies: Latest Releases.

[b] According to the GB 3838-2002 environmental quality standards for surface water in the People's Republic of China, water rated class III is suitable for drinking and swimming, class IV for general industrial and recreational use, and class V for agriculture and landscaping. Class V+ means that the water is unsuitable for any purpose.

[c] A 20-year flood has a 5% chance of occurring in any given year.

Contribution to ADB Results Framework:

RFI A: People benefiting from increased investments. Target: 746,000.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=52023-001-3

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Agriculture, Natural Resources, and Rural Development
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Risk Assessment and Risk Management Plan
12. Climate Change Assessment
13. Gender Action Plan
14. Initial Environmental Examination
15. Resettlement Plan
16. Indigenous Peoples Plan: Ethnic Minority Development Plan

Supplementary Documents

17. Financial Management Assessment
18. Detailed Economic Analysis
19. Climate Vulnerability Assessment and Management Report
20. Notes on Innovations, Value Addition, and Knowledge Dissemination
21. Strategic Procurement Planning