Board of Directors

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R146-16
15 November 2016

Proposed Loan
Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project (People's Republic of China)

1. The Report and Recommendation of the President (RRP: PRC 48055-002) on the proposed loan to the People's Republic of China for the Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project is circulated herewith.

2. This Report and Recommendation should be read with *Country Operations Business Plan: People's Republic of China, 2016–2018*, which was circulated to the Board on 21 January 2016 (DOC.IN.23-16).

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 6 December 2016), the recommendation in paragraph 41 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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Report and Recommendation of the President to the Board of Directors

Project Number: 48055-002
November 2016

Proposed Loan
People's Republic of China: Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 1 November 2016)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1477
$1.00	=	CNY6.7662

ABBREVIATIONS

ADB	–	Asian Development Bank
EMP	–	environmental management plan
FEM	–	flood and environmental management
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
IWRM	–	integrated water resources management
m^3	–	cubic meter
O&M	–	operation and maintenance
PAM	–	project administration manual
PMO	–	project management office
PRC	–	People's Republic of China
XCG	–	Xinyu City Government
XURCIG	–	Xinyu Urban and Rural Construction Investment Group Company Ltd.
YRB	–	Yangtze River basin

NOTE

In this report, "$" refers to US dollars.

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PROJECT AT A GLANCE

1. Basic Data

Project Number: 48055-002

Project Name	Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project	**Department /Division**	EARD/EAER
Country	China, People's Republic of	**Executing Agency**	Xinyu City Government
Borrower	People's Republic of China		

2. Sector

	Subsector(s)	ADB Financing ($ million)
✓ **Agriculture, natural resources and rural development**	Rural flood protection	72.00
	Water-based natural resources management	18.00
Water and other urban infrastructure and services	Urban flood protection	36.00
	Urban sanitation	16.50
	Urban solid waste management	7.50
	Total	**150.00**

3. Strategic Agenda

	Subcomponents
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive
Environmentally sustainable growth (ESG)	Disaster risk management
	Global and regional transboundary environmental concerns
	Natural resources conservation
	Urban environmental improvement

Climate Change Information

Adaptation ($ million)	11.20
Climate Change impact on the Project	High

4. Drivers of Change

	Components
Governance and capacity development (GCD)	Civil society participation
	Institutional development
	Institutional systems and political economy
	Organizational development
	Public financial governance
Knowledge solutions (KNS)	Application and use of new knowledge solutions in key operational areas
	Knowledge sharing activities
	Pilot-testing innovation and learning
Partnerships (PAR)	Civil society organizations
	Implementation

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

5. Poverty and SDG Targeting

Geographic Targeting	No
Household Targeting	No
SDG Targeting	Yes
SDG Goals	SDG6, SDG11, SDG13

Location Impact

Rural	Medium
Urban	Medium

6. Risk Categorization: Complex

7. Safeguard Categorization

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

8. Financing

Modality and Sources	Amount ($ million)
ADB	**150.00**
Sovereign Project loan: Ordinary capital resources	150.00
Cofinancing	**0.00**
None	0.00
Counterpart	**150.39**
Government	150.39
Total	**300.39**

9. Effective Development Cooperation

Use of country procurement systems	Yes
Use of country public financial management systems	Yes

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 Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project.[1]

2. The project will help the Xinyu City Government (XCG) manage and mitigate flood and environmental risks, leading to improved living conditions. This will be achieved through the implementation of an integrated approach that provides a well-balanced mix of structural and nonstructural interventions, including capacity building.[2]

II. THE PROJECT

A. Rationale

3. In step with the rapid economic growth that has taken place since 1985, a large number of people and assets have accumulated on floodplains in the PRC. As a result, the PRC is facing more damaging floods along with serious environmental consequences. Projected climate change impacts will likely exacerbate this trend by increasing the frequency and severity of flooding, as seen in the flood disaster that occurred in July 2016 in the Yangtze River basin (YRB), the second most expensive natural disaster in the PRC's history.[3] Unlike past disasters, the July 2016 flood caused loss and damage in small watersheds, which the Government of the PRC had not prioritized for investment. Cities' master plans in the PRC do not sufficiently use an integrated flood and environmental management (FEM) approach that considers hazards, exposure, vulnerability, and capacity. The government requested the Asian Development Bank (ADB) to provide lending support to demonstrate integrated and climate-resilient FEM harmonized with urban planning in Xinyu City in the Kongmu River watershed. The request is consistent with the recently released outline of the YRB economic belt master plan, which highly prioritizes environmental protection, water management, and flood risk reduction.

4. Xinyu City is a new industrial city located in Jiangxi Province and had 1.17 million inhabitants (63.4% rural and 36.6% urban) in 2015. A significant portion of the city is situated on the Kongmu River watershed, a small watershed 500 square kilometers in size in the Ganjiang River sub-basin in the YRB. Various locations in Xinyu City along the Kongmu River experience annual floods due to low flood control and retention capacities. From 2001 to 2016 eight severe flood events were recorded, the worst of which in 2010 forced 78,000 people to evacuate and destroyed over 4,000 homes and 25 square kilometers of crops, causing $116 million in direct economic damage. Xinyu City also suffered major historical floods in 1953, 1955, 1962, 1977, 1982, and 1989. The average annual damage due to floods in Xinyu City is $54 million.[4]

5. The project is located in the upper Kongmu River watershed, which covers three townships (Guanchao, Ouli, and Xiacun) and a new subdistrict in Yushui District within Xinyu City.[5] In the upper Kongmu River watershed, 35 villages currently house 109,580 people, of whom 55,762 reside in river corridors in the project area. Most are exposed to floods and lack access to modern wastewater and solid waste facilities, a factor that exacerbates flooding and

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[1] The design and monitoring framework is in Appendix 1.

[2] ADB provided project preparatory technical assistance for preparing the Jiangxi Xinyu Kongmu River Watershed Flood Protection and Environmental Improvement Project (TA 8930-PRC).

[3] The July 2016 flood caused $28 billion in damage in the YRB. Aon. Investor News. http://ir.aon.com/about-aon/investor-relations/investor-news/default.aspx.

[4] Calculated from Xinyu City flood disaster information.

[5] The XCG is developing a new subdistrict to (i) cater to its rapidly expanding population and industries, and (ii) take advantage of new business opportunities created by a new high-speed railway station.

water quality degradation in both the upper Kongmu River watershed and downstream Xinyu City. Inhabitants of the upper Kongmu River watershed suffer from flash floods that develop with little warning, giving them insufficient time to save valuables and evacuate timely. Approximately 94% of villagers obtain water from springs and shallow wells, only 6% have access to tap water, about 77% use public or pit toilets, and 23% have indoor flush toilets connected to septic tanks.

6. Current inhabitants of the upper Kongmu River watershed are mostly farmers with an average annual income of $1,409[6] and average land holding size of 1.2 *mu*.[7] Yushui District, in the Kongmu River watershed, has 9,541 inhabitants and a poverty rate of 2.7%. The newly planned subdistrict will have a population of 57,500 by 2020 and 130,000 by 2030. Xinyu City is required to (i) manage its environment, (ii) safeguard ecological security, (iii) improve water management, and (iv) undertake environmentally friendly and climate-resilient urban development to provide sustainable livelihood opportunities to both upstream and downstream communities.

7. **Unintegrated rural and urban flood management.** Approximately 8,000 people currently live in areas highly prone to flash flood hazards in the upper Kongmu River watershed, without flood control infrastructure or an early warning system. The rest of the people in the watershed's 35 villages are exposed to riverine floods. The new subdistrict is exposed to flash, riverine, and urban floods, and may exacerbate downstream flooding by increasing stormwater runoff due to land use changes. If a flood similar in size to the 2010 flood occurs in the watershed again, it would create $185 million in damage. By 2030, flood damage would reach $589 million with ongoing development, and $677 million with development in an adverse climate change scenario.

8. The Kongmu River watershed has six existing small lakes, which are not used for flood retention due to their low level outlets and sedimentation caused by adjacent farming practices. The Baiyun reservoir, which supplies water to Xinyu City, is running at only 0.7 million cubic meters (m^3) of its full capacity (4.2 million m^3) due to operational restrictions imposed by riverine and backwater flooding. This has hindered the targeted level of flood control in the downstream Xinyu City by 50% in a 10-year return period, and 5% in a 50-year return period.

9. **Inadequate management of wastewater and solid waste.** Pollutant levels in all lakes and tributaries in the upper Kongmu River watershed exceed national standards due to domestic wastewater discharge, agricultural nonpoint source pollution, and the inefficient collection and disposal of solid waste. The existing combined sewer and stormwater pipeline network in Xinyu City is designed for small storm events not exceeding a 2-year return period; yet, over 50-year return period events have already occurred in the city since 2007, resulting in an overflow of untreated wastewater into the river. The upper watershed generates over 39 tons of solid waste per day; this is projected to increase to 66 tons per day by 2020. The new subdistrict will further strain solid waste and wastewater management by producing 150 tons of solid waste and 12,500 m^3 of wastewater per day by 2020. Xinyu City lacks a proper waste collection and transportation system.[8] The main source of drinking water for Xinyu City is located downstream of these villages and the proposed subdistrict. Without improving waste management and operation and maintenance (O&M), these issues will increase flood and environmental risks in the Kongmu River watershed and threaten Xinyu City residents' drinking water supply.

[6] These data are from the socioeconomic survey conducted by the project preparatory technical assistance consultant team in 2016 and from the 2014 Xinyu and Jiangxi Province statistical yearbooks.

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

[8] The wastewater and solid waste from the project area will be treated in the existing Xiacun wastewater treatment plant and Xinyu solid waste incineration plant, both of which are located in Yushui District.

10. **Insufficient flood and environmental risk management capacity.** The XCG's investment has not yet been sufficient to mitigate the damage due to high levels of hazards, exposure, and vulnerability to floods. Despite several large flood events, flood hazard mapping and risk mapping have not yet been done, as the city development plans do not use risk mapping and climate-sensitive land-use planning sufficiently. Levels of awareness and preparedness, and the response capacities of local governments and communities are low. The centralized flood forecasting system does not cover the communities in the upper Kongmu watershed. The Kongmu River watershed has no rain gauge and only a few water-level gauge and water quality monitoring stations. The present flood forecasting system relies on rainfall data from adjacent river basins, which is not a sound approach due to the highly heterogeneous spatial distribution of rainfall in the region. To aid flash flood forecasting in the upper Kongmu River watershed, additional hydrological observation stations and different flood modeling techniques are required. The integrated FEM approach is yet to be embedded in the city's master plan.

11. **Strategic fit**. For the implementation of the outline of the YRB economic belt master plan, the project will timely demonstrate the new benchmarks for investment in FEM.

12. The project also contributes to the PRC's goal of building a harmonious and prosperous society through environmentally sustainable growth, and is consistent with the PRC's Thirteenth Five-Year Plan, 2016–2020, which highlights the importance of flood risk management, and water pollution control.[9] The project also contributes to the implementation of ADB's country partnership strategy for the PRC, 2016–2020, of which three of the five main principles—(i) managing climate change and environment, (ii) supporting inclusive economic growth, and (iii) fostering knowledge cooperation—are reflected well in the proposed project.[10] The project is also consistent with (i) ADB's Water Operational Plan, 2011–2020, which emphasizes integrated water resources management (IWRM) with focus on water-related disaster risk management;[11] and (ii) sustainable development goals 6, 11, and 13.[12]

13. **Lessons**. The project design incorporates lessons from previous ADB-financed projects and policy-oriented studies on IWRM, environmental and ecosystem improvement, wetland and lake management and restoration, and urban–rural integration in the PRC.[13] Lessons from past and ongoing ADB support in the PRC for the water sector include (i) nonstructural measures and community participation, (ii) continuous O&M with sustainable financial sources, and (iii) management and data information systems for IWRM decision-making. Other lessons reflected in the project design are (i) institutional and financial management reforms contributing to

[9] Xinhuanet. 2015. Highlights of Proposals for China's 13th Five-Year Plan. 4 November. http://news.xinhuanet.com/english/photo/2015-11/04/c_134783513.htm.

[10] ADB. 2016. *Transforming Partnership: People's Republic of China and Asian Development Bank, 2016–2020*. Manila.

[11] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

[12] United Nations. Sustainable Development Goals. https://sustainabledevelopment.un.org/?menu=1300. Goal 6: Ensure access to water and sanitation for all; Goal 11: Make cities inclusive, safe, resilient, and sustainable; and Goal 13: Take urgent action to combat climate change and its impacts.

[13] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for Qingdao Water Resources and Wetland Protection Project.* Manila; ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to the People's Republic of China for Risk Mitigation and Strengthening of Endangered Reservoirs in Shandong Province Project*. Manila; ADB. 2001. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the People's Republic of China for Yellow River Flood Management Sector Project.* Manila; and ADB. 2008*. Technical Assistance to the People's Republic of China for Implementing the National Flood Management Strategy*. Manila.

sustainable FEM, (ii) capacity development for project implementation and O&M, and (iii) an effective project monitoring and evaluation system.

B. Impact and Outcome

14. The project's impact will be quality of the living environment in Xinyu City improved. The project's outcome will be FEM in the upper Kongmu River watershed improved.

C. Outputs

15. **Output 1: Integrated rural and urban flood management infrastructure constructed.** This output will include (i) increased flood retention capacity in the upper Kongmu River watershed through (a) stormwater management (including rainwater interception), and (b) the improvement and regulation of small lakes for FEM; and (ii) flood protection along the Kongmu River through the construction of levee- and water-regulating structures.

16. **Output 2: Solid waste and wastewater management systems improved.** This output will include (i) the construction of a wastewater collection network separate from the stormwater collection network, which will improve water quality by reducing sewerage overflows; (ii) the improvement of the solid waste management system, which will reduce the export of solid waste into waterways yielding both water quality and flooding benefits; and (iii) the construction of wetlands in the lakes, canals, and Kongmu River to treat stormwater runoff and improve water quality.

17. **Output 3: Flood and environmental risk management capacity enhanced.** This output will include (i) capacity development for FEM; (ii) the preparation of a land-use plan and building regulations based on flood risk mapping; (iii) nonstructural measures to reduce residents' vulnerability, such as early flood warning, flood proofing, and contingency plans; (iv) climate change monitoring to reduce uncertainty in flood risk design; (v) water quality monitoring; (vi) the establishment of community-based FEM; and (vii) the development of a river basin model to aid river basin planning.

18. **Special features and value addition**. The project is timely in the wake of the recent flood disaster and the preparation and implementation of the YRB economic belt master plan. The project will demonstrate in-country best practices and establish new performance standards and good practices for investment in FEM. It will also provide a conducive opportunity for new dialogue, regional cooperation, and ADB–PRC collaboration for responding to flood risk management and climate variability.

19. The project adopts integrated flood-resilient development planning to maximize flood control and strengthen environmental outcomes.[14] This includes innovative structural measures like multifunctional levees,[15] underground stormwater storage, sponge city construction,[16] and interconnected flood storage lakes.[17]

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[14] The project will implement a number of measures that will serve both flooding and environmental needs. The project will improve water quality, largely mitigate flooding in the project area by capturing almost 75% of the peak surface runoff, and reduce annual average flood damage in downstream Xinyu City by $5.36 million.

[15] The levee will protect three villages in the project area from both riverine and backwater floods, allowing the reservoir to operate at full capacity (securing an additional 3.5 million m^3) and also reducing flood peaks downstream.

[16] A city planning and design approach to absorb rainfall and surface runoff aims to reduce stormwater (urban floods) and polluted runoffs and use this water in eco-friendly ways. The design techniques include permeable surfaces, gardens, rainwater harvesting, green spaces, and lakes.

[17] The existing six small lakes will be interconnected by canals with structures that can regulate the water levels in the lakes and also retain water in the canals to best optimize flood control.

20. Complementary nonstructural measures include (i) flood early warning systems; (ii) community-based FEM;[18] and (iii) flood-sensitive development planning, including upstream–downstream linkages and rural–urban integration.[19] Flood risk mapping will enhance spatial planning and be further operationalized by the issuance of regulations on land use, river corridor development, and solid waste management; and building standards and codes. These life- and asset-saving measures will directly benefit the current inhabitants and the projected population of approximately 300,000 by 2030, both within and outside the project area.

D. Investment and Financing Plans

21. The project is estimated to cost $300.39 million (Table 1).

Table 1: Project Investment Plan
($ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Integrated rural and urban flood management infrastructure constructed	103.58
	2. Solid waste and wastewater management systems improved	128.58
	3. Flood and environmental risk management capacity enhanced	6.18
	Subtotal (A)	**238.34**
B.	**Contingencies**[c]	**55.90**
C.	**Financing Charges During Implementation**[d]	**6.15**
	Total (A+B+C)	**300.39**

[a] Includes taxes and duties of $25.16 million to be financed from government resources ($12.86 million) and Asian Development Bank (ADB) loan resources ($12.30 million). The inclusion of taxes and duties in ADB-financed project expenditures is consistent with the country partnership strategy for the People's Republic of China, 2016–2020. The financing of taxes and duties does not represent an excessive share of the project cost, and is material and relevant to the project's success. Taxes and duties on the government-financed expenditures will be provided in cash.

[b] In 2016 first quarter prices.

[c] Physical contingencies computed at 10.0%. Price contingencies computed at 1.5% in 2018, 1.4% in 2019, 1.5% in 2020, 1.5% in 2021, and 1.5% thereafter. Price contingencies on local currency costs are calculated at 2.3% in 2018, 2.4% in 2019, 2.5% in 2020, 2.5% in 2021, and 2.5% thereafter.

[d] Includes interest during construction and commitment charges. Interest for the ADB loan has been computed at the 5-year United States dollar fixed swap rate, plus an ADB spread of 0.5% and a maturity premium of 0.1%. Commitment charges for the ADB loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.

22. The government has requested a loan of $150 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 (the interest and commitment charge during construction to be capitalized in the loan), and such other terms and conditions set forth in the loan and project agreements.[20] The average maturity is 15.75 years, and the maturity premium payable to ADB is 0.10% per year. The financing plan is in Table 2.

[18] The community-based activities will focus on organization development, capital formation, skill enhancement, gender equity, environmental protection, appropriate technologies, and emergency response.

[19] The project will promote flood and environment sensitive land-use planning in upper Kongmu River watershed that will help safeguard the area (mostly rural) from flood and environmental degradation and mitigate the flood and environmental risks in the downstream area (existing Xinyu City).

[20] The interest includes a maturity premium of 10 basis points. This is based on the loan terms and the government's choice of repayment option and dates.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank		
Ordinary capital resources (loan)	150.00	49.9
Xinyu City Government	150.39	50.1
Total	**300.39**	**100.0**

Source: Asian Development Bank estimates.

23. The ADB loan covers civil works, equipment and materials, project management, consulting services and training, and financing charges on the loan during construction. Taxes and duties are included in the base cost. The government will finance land acquisition and contingencies, as well as remaining portions of the civil works.

E. Implementation Arrangements

24. The implementation arrangements are summarized in Table 3 and described in detail in the project administration manual (PAM).[21]

Table 3: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	December 2016–March 2023		
Estimated completion date	30 June 2023 (estimated loan closing date: 31 December 2023)		
Management			
(i) Oversight body	XCG Project Leading Group Executive vice mayor of the XCG (chair)		
(ii) Executing agency	The XCG will be responsible for the implementation of the entire project.		
(iii) Key implementing agencies	The XURCIG is the implementing agency. The XCWAB will implement the project's components related to flood management. The XCAB will operate and maintain the stormwater, wastewater, and solid waste management systems. [a]		
(iv) Project management office	The PMO has been established in the XCG. The PMO will carry out the day-to-day project management and implementation activities.		
Procurement	NCB (civil works)	13 contracts	$155.150 million
	ICB (goods)	1 contract	$15.990 million
	NCB (goods)	5 contracts	$4.640 million
	Shopping (goods)	1 contract	$0.100 million
Consulting services	QCBS (international)	2 contracts	$2.600 million
	CQS (national)	1 contract	$0.190 million
	ICS (national)	2 contracts	$0.063 million
Retroactive financing and/or advance contracting	Advance contracting and retroactive financing will apply to the recruitment of project start-up consulting services for (i) project management and procurement, and (ii) land acquisition and resettlement. Retroactive financing will be subject to a maximum amount equivalent to 20% of the loan amount for eligible expenditures incurred prior to loan effectiveness, but not earlier than 12 months before the loan agreement is signed.		
Disbursement	The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time) and detailed arrangements agreed upon between the Government of the PRC and ADB.		

ADB = Asian Development Bank, CQS = consultant's qualifications selection, ICB = international competitive bidding, ICS = individual consultant selection, NCB = national competitive bidding, PMO = project management office, PRC = People's Republic of China, QCBS = quality- and cost-based selection, XCAB = Xinyu City Administration Bureau, XCG = Xinyu City Government, XCWAB = Xinyu City Water Affairs Bureau, XURCIG = Xinyu Urban and Rural Construction Investment Group Company Ltd.
[a] The XCAB is subsidizing the operation costs of the wastewater treatment plant.
Source: Asian Development Bank estimates.

III. DUE DILIGENCE

A. Technical

25. Due diligence assessed the project's technical feasibility and sustainability. The XCG's domestic feasibility studies are technically sound and provide sufficient information as to the

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

design's feasibility. All project components were prepared by licensed domestic design institutes taking into account the local geo-physical, socio-economical, and hydro-metrological, as well as climatic conditions and in accordance with consultants' recommendations, relevant PRC design guidelines, and local regulations. The site investigations and field surveys were conducted to aid the feasibility study. The project team (i) considered a range of technical alternatives such as stormwater bypass canal or wetlands to reduce pollutants, construction of levees or flood retention areas, expansion of existing wastewater treatment plant or construction of a new one, standalone early warning system or centralized one, and their technical and economic viability; (ii) deliberated ways to (a) maximize the beneficiaries by planning and redesigning a multi-functional levee to increase water supply and flood protection, stormwater retention facilities to reduce flood impact in downstream area, expansion of early warning coverage by installing additional hydrological monitoring stations, and considering amenity spaces around existing lakes for visitors; and (b) minimize adverse environmental and social impacts; and (iii) optimized timescales for project implementation. In close consultation with the Xinyu City Administration Bureau, outsourcing provisions are made for specialized O&M particularly for the highly technical project components including the underground stormwater storage, sewage pipes, gates, and pumps financed by ADB to ensure the investment's sustainability. International and national consulting services will ensure that lessons learned and best practices are integrated into the final detailed design and applied during construction and implementation. Capacity-building activities will further strengthen the quality of project implementation.

26. **Climate change**. The climate risk and vulnerability assessment indicated that climate change impacts on water systems in the Kongmu River basin are expected to be substantial and long-lasting. In the basin, it is expected that the annual average temperature will increase by 11.2%, and rainfall will increase by 12.0% during 2020–2049. The overall design is geared toward climate resilience, and each project component's design incorporates a number of adaptation measures, including some based on the ecosystem, to withstand projected increases in rainfall intensity and temperatures. These include (i) increasing water systems' flood retention and drainage capacity, (ii) enhancing the design of flood protection barriers, and (iii) selecting climate-resilient materials and equipment in the wastewater and solid waste management systems. Incremental costs associated with the above measures are estimated at $11.2 million.[22]

B. Economic and Financial

27. The economic analysis confirmed the economic viability of the overall project, with an economic internal rate of return of 13.6% and an economic net present value of CNY140.1 million. The project's economic viability was further tested against the following adverse scenarios: a 10% investment cost overrun, 10% O&M cost increase, 10% benefit reduction, 10% urban population growth reduction, and combinations thereof. The results showed that the project's economic viability is robust in all of these adverse scenarios.

28. Financial sustainability was assessed based on the fiscal impact of (i) counterpart funds during the project, (ii) O&M costs, and (iii) loan repayment obligations. The total financial obligations are less than 2% of the XCG's annual expenditure, demonstrating that the project's fiscal impact is negligible for the XCG.[23] The XCG has sufficient fiscal resources for counterpart funds, O&M costs, and loan repayment obligations.

[22] This estimate includes the costs of incremental design and nonstructural measures. Detailed accounts of climate due diligence and adaptation features can be found in Technical Notes on Climate Change (accessible from the list of linked documents in Appendix 2).

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

C. Governance

29. A financial management assessment was conducted for the Xinyu City Finance Bureau and Xinyu Urban and Rural Construction Investment Group Company Ltd. (XURCIG). The project's overall financial management risk before considering mitigating measures is moderate. The assessment recommended an action plan, which the XCG will implement during the project to mitigate the identified financial management risks.

30. An assessment of the XCG's procurement capacity confirmed that XURCIG, which will conduct all procurement for the project through a procurement agency and with the assistance of ADB and consultants, would have adequate procurement capacity to comply fully with ADB's Procurement Guidelines (2015, as amended from time to time) and Guidelines on the Use of Consultants (2013, as amended from time to time). Specific policy requirements, capacity development, and supplementary measures are described in the PAM.

31. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government, XCG, and XURCIG. In line with ADB's Public Communications Policy 2011, the audit reports of the project will be uploaded on ADB's website. The specific policy requirements and supplementary measures are described in the PAM.

D. Poverty and Social

32. A poverty and social assessment was conducted and the following measures have been integrated in the project design to enhance social inclusion: (i) the inclusion of 35 rural and relatively poor villages for additional flood protection and environmental benefits; (ii) strengthened consultations with local communities and their participation in project planning and design and the making of decisions, such as (a) the exclusion of six originally planned levee structures and (b) the inclusion of nonstructural measures; (iii) the inclusion of community-based flood and environmental risk management as a stand-alone project component; (iv) targeted job opportunities for local people; and (v) the sharing of project benefits with affected communities. The project will directly benefit the existing population of 55,762, mostly in Guanchao, Ouli, and Xiacun, and the projected populations of 57,500 (by 2020) and 130,000 (by 2030) in the new subdistrict. The project will prevent the flooding of homes, contamination of groundwater (which is the source of drinking water for most households), and loss of crops and other assets. Of the existing population in the project area, about 47% are women and 3% are poor; most inhabitants live in flood-prone areas. Employment opportunities, including 6,500 temporary jobs (during construction) and 50 permanent jobs (during O&M), will be created for local people. Further consultations will be undertaken during the design and implementation.

33. While most project benefits are expected to be distributed equally to men and women, some components, particularly nonstructural ones, are more likely to benefit women and poor households. The project is categorized *effective gender mainstreaming*. The project addresses key gender issues identified during social assessments, including women's limited representation in decision-making, low levels of awareness and skills, and inadequate job and income opportunities. A gender action plan and social development action plan have been prepared comprising the following specific measures targeting women and the poor: (i) involving them in public awareness campaigns and skill development training on FEM, public consultations, and the design and implementation of project activities; (ii) employing them during construction and O&M; (iii) promoting project staff's awareness of gender and social inclusion measures; and (iv) collecting data disaggregated by sex and poverty status for implementing and monitoring the gender action and social development action plans. The PMO and/or implementing agency will implement and monitor these plans and report their progress to ADB.

E. Safeguards

34. **Environment**. The project is classified *category B* for the environment. An initial environmental examination (IEE) report, including an environmental management plan (EMP), has been prepared and follows ADB's Safeguard Policy Statement (2009).[24] The IEE and EMP are based on the approved domestic feasibility study report and environmental assessments, site visits, and consultations with stakeholders, including with affected persons. The PMO will be responsible for implementing the EMP, and will appoint qualified environmental personnel to coordinate key tasks, including inspecting, monitoring, reporting, and initiating corrective actions or measures. The XCG has no prior experience with ADB's safeguard procedures; therefore, the project design includes loan implementation consultants and a capacity building program. A grievance redress mechanism (GRM) has been prepared and comprises a series of steps with time-based actions to ensure that any public concerns are quickly identified and addressed. The GRM will be operational within 90 days of the date of project effectiveness. The PMO will lead the GRM's implementation. The procedures are described in the PAM and project EMP.

35. The project is expected to achieve environmental benefits through a comprehensive green planning approach. Design targets include (i) capturing 75% of annual runoff (to improve flood control), (ii) a 40% reduction in stormwater pollutant loads, (iii) provision of sanitary sewer connections for over 57,000 people, (iv) almost 100% coverage for solid waste collection in two settlements, (v) new public green spaces, (iv) improved quality of life, and (vii) improved water resources management. Anticipated construction impacts include temporary soil erosion, dust, and noise within modified habitats in a wetland park. Operational risks include the discharge of treated stormwater upstream of drinking water inlets in the Baiyun reservoir. Risks were addressed through an integrated approach for project design and safeguards, including the removal of large levees and other features, such as river dredging, from the early designs, which significantly avoided the increased flow velocity and associated erosions and water pollution. Mitigation measures include performance testing of the constructed wetlands, leachate control at waste transfer stations, and the protection and monitoring of water quality at water inlets. The IEE concluded that effective EMP implementation, together with the prescribed training, will result in residual impacts within the PRC's standards as defined in the EMP.

36. **Involuntary resettlement.** The project is classified *category A* for involuntary resettlement. The project will permanently acquire 2,290.48 *mu* of collective land and demolish 24,657.06 square meters of housing in two towns, one subdistrict, and five villages with 13 village groups. Land acquisition will affect 1,078 households and 3,693 persons. House demolition will affect 56 households, with 287 persons requiring relocation of their houses. A resettlement plan has been prepared based on the feasibility study in line with ADB's Safeguard Policy Statement and related national laws and regulations. The resettlement plan includes adequate compensation, resettlement, and rehabilitation measures to restore affected persons' living standards, including a budget, an implementation schedule, external and internal monitoring, and a GRM. Affected persons have been consulted for the resettlement plan and they support the project. They will be consulted further during the updating and implementation of the resettlement plan. The total land acquisition and resettlement cost, estimated at CNY273.97 million, is fully included in the project budget. The executing and implementing agencies have the capacity and experience to implement land acquisition and resettlement under domestic projects. The project will further strengthen the capacity of these agencies through staff training and consultant support to implement the resettlement plan in line with

[24] Initial Environmental Examination (accessible from the list of linked documents in Appendix 2). The IEE was disclosed on the ADB website on 22 September 2016 (https://www.adb.org/projects/documents/prc-jiangxi-xinyu-kongmu-river-watershed-flood-control-iee).

ADB's safeguard requirements. The PMO will engage an external monitor to keep track the progress of the resettlement plan's implementation and submit quarterly monitoring reports.

37. **Indigenous peoples.** The project is classified *category C* for indigenous peoples. The project does not involve any distinct ethnic minority community and thus does not trigger requirements under ADB's Safeguard Policy Statement.

F. Risks and Mitigating Measures

38. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[25] The risk assessment for the overall project is medium and the integrated benefits and impacts are expected to outweigh the costs.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Implementation delays due to the limited experience of the XCG, XURCIG, and PMO in administering ADB-funded projects.	The XCG will hire a qualified tendering agent with ADB procurement experience. The project will provide consulting services for technical support and on-the-job training in procurement, disbursement, and financial management.
The upgrading of the Xiacun WWTP (which is an associated facility) is not completed in time.	The XCG will ensure the timely completion of a new BOT contract or amendment to the current BOT contract for the expansion of the WWTP from its current capacity of 10,000 m^3/day to 25,000 m^3/day by 2020.

ADB = Asian Development Bank, BOT = build–operate–transfer, m^3 = cubic meter, PMO = project management office, WWTP = wastewater treatment plant, XCG = Xinyu City Government, XURCIG = Xinyu Urban and Rural Construction Investment Group Company Ltd.
Source: Asian Development Bank estimates.

IV. ASSURANCES AND CONDITIONS

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

40. The government and the XCG have agreed with ADB on certain covenants for the project, which are set forth in the loan and project agreements. No withdrawals shall be made from the loan account until the XCG enters into one or more contracts acceptable to ADB with Nanchang Public Utility Group or another company or agency acceptable to ADB for the expansion of the Xiacun wastewater treatment plant to a capacity of 25,000 m^3 per day.

V. RECOMMENDATION

41. 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 $150,000,000 to the People's Republic of China for the Jiangxi Xinyu Kongmu River Watershed Flood Control and Environmental Improvement Project, from ADB's ordinary capital resources, 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.

Takehiko Nakao
President

14 November 2016

[25] 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 the living environment in Xinyu City improved (Xinyu City Master Plan, 2008–2030)[a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources or Reporting Mechanisms**	**Risks**
Outcome Flood and environmental management in the upper Kongmu River watershed improved	By 2025: a. Land in the upper Kongmu River watershed protected from 20-year flood (a flood that statistically has a 5% chance of occurring in any given year) increased to 2,180 ha of built-up area, benefiting 57,500 people (2016 baseline: 0 ha)	a. XCG city report, records, annual statistics, and periodic flood disaster surveys	The influx of migrants into Xinyu City exceeds forecasts and exerts more pressure, such as a heavy pollution load, on the Kongmu River. Floods exceed project design standards.
	b. Water quality at the outlets of the Shen and Tianyun rivers to the Kongmu River meets the class III standard[b] (2016 baseline: Class III–IV)	b. City environmental protection bureau's monitoring reports	
	c. New public river, lake, and canal greenways created benefiting about 200,000 residents in Xinyu City (2016 baseline: 0)	c. XCG statistical yearbooks	
Outputs 1. Integrated rural and urban flood management infrastructure constructed	By 2023: 1a. Flood retention capacity in the upper Kongmu River watershed increased by 1.3 million[c] m^3 (2016 baseline: 237,000 m^3) 1b. Three villages protected by a 1.2 km levee from 50-year return period of flood (2016 baseline: 0) 1c. A new 9.98 km stormwater collection network constructed (2016 baseline: 0) 1d. 61,290 person-days of employment during construction and 8,433 person-days of employment during operation created, with at least 25% of positions filled by women (2016 baseline: 0)	1a.–1d. ADB mission reports, quarterly project progress reports, and project completion report	Implementation delays due to the limited experience of the XCG, XURCIG, and PMO in administering ADB-funded projects. The upgrading of the Xiacun WWTP (which is an associated facility) is not completed in time

Results Chain	Performance Indicators with Targets and Baselines	Data Sources or Reporting Mechanisms	Risks
2. Solid waste and wastewater management systems improved	2a. A new 9.63 km wastewater collection network constructed, benefiting 57,500 people in the new subdistrict (2016 baseline: 0) 2b. A system capable of collecting and transporting 200 t/d of municipal solid waste constructed (2016 baseline: 16) 2c. 17,680 person-days of employment in solid waste management and 15,320 person-days of employment in wetland management created during construction and operation, with at least 30% of positions filled by women (2016 baseline: 0)	2a.–2c. ADB mission reports, quarterly project progress reports, and project completion report	
3. Flood and environmental risk management capacity enhanced	3a. Flood warning systems in 15 villages along the Kongmu River piloted (2016 baseline: 0) 3b. A land-use plan and building code for sponge cities developed and enforced (2016 baseline: 0) 3c. Community-based flood and environmental risk management applied in 10 villages, involving at least 14,000 community group members, of whom at least 40% are women (2016 baseline: 0) 3d. 10 rainfall, 10 water-level gauge, and 15 water quality monitoring stations installed and calibrated in the Kongmu River watershed (2016 baseline: 0) 3e. 10 training workshops attended by at least 50 XCG representatives, who shared knowledge on climate change adaptation and environmental management approaches (2016 baseline: 0)	3a.–3e. ADB mission MOUs, quarterly project progress reports, and project completion reports	

Key Activities with Milestones

1. Integrated rural and urban flood management infrastructure constructed

1.1 Complete detailed engineering design and bidding documents by Q4 2017
1.2 Implement the land acquisition and resettlement plan by Q4 2020
1.3 Award contracts from Q3 2017 to Q2 2021
1.4 Complete civil works, including (i) sponge city pilot schemes to intercept rainwater, (ii) outlets to increase flood storage in six existing lakes, (iii) dredging of polluted beds in six existing lakes, (iv) canals to connect the six lakes, (v) a stormwater drainage network, and (vi) a multifunction levee from Q3 2017 to Q2 2022

2. Solid waste and wastewater management systems improved

2.1 Complete detailed engineering design and bidding documents for solid waste management by Q4 2017 and wastewater management by Q4 2018
2.2 Implement the land acquisition and resettlement plan by Q4 2018
2.3 Award contracts from Q2 2019 to Q2 2021
2.4 Complete civil works for sewer pipe installation by Q2 2022
2.5 Complete civil works for wetlands in lakes and canals to treat stormwater runoff by Q2 2022
2.6 Complete civil works and equipment installation for solid waste management by Q2 2022

3. Flood and environmental risk management capacity enhanced[d]

3.1 Complete detailed engineering design and bidding documents by Q4 2020
3.2 Install hydrological and water quality monitoring stations and data management systems by Q2 2021
3.3. Calibrate and install river basin models by Q2 2023
3.4 Conduct risk and emergency response mapping by Q2 2023
3.5 Formulate building codes and land use regulations in Xinyu City by Q2 2023
3.6. Pilot test the flash flood early warning systems in three selected villages by Q4 2018
3.7 Mobilize community-based flood and environmental risk management by Q2 2023
3.8 Improve the flood forecasting and early warning system in Xinyu City by Q2 2023
3.9 Organize 10 training programs on environmental risk management and climate change adaptation by Q4 2022

Project Management Activities

Recruit project management consultants from Q4 2016 to Q4 2018
Recruit an independent agency for external resettlement M&E by Q1 2017
Implement the EMP and submit semiannual environmental monitoring reports to ADB from 2017 to 2023
Monitor and evaluate project impact, outcome, and outputs using the project performance management system; submit quarterly project progress reports from 2017 to 2023
Carry out training programs, policy dialogue, study tours, and awareness-raising campaigns from Q1 2017 to Q2 2023
Submit the project completion report by 2023

Inputs

ADB: $150.00 million (loan)
Government: $150.39 million

Assumptions for Partner Financing

Not Applicable

ADB = Asian Development Bank, EMP = environmental management plan, ha = hectare, km = kilometer, M&E = monitoring and evaluation, m^3 = cubic meter, MOU = memorandum of understanding, PMO = project management office, Q = quarter, t/d = ton per day, WWTP = wastewater treatment plant, XCG = Xinyu City Government, XURCIG = Xinyu Urban and Rural Construction Investment Group Company Ltd.

[a] Government of the People's Republic of China, XCG. 2008. *Xinyu City Master Plan, 2008–2030*. Xinyu.

[b] According to the GB 3838-2002 environmental quality standards for surface water in the People's Republic of China, water rated as 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] Sponge city: 332,450 cubic meter (m^3); increased capacity of existing lakes due to modified outlets: 608,175 m^3; flood retention capacity in canals: 364,900 m^3. Dredging removes 569,300 m^3 of polluted soil from the lakes, but this does not provide flood storage as it is below the minimum operating water level, although it helps maintain ecological functions.

[d] Activities 3.3 to 3.9 will be carried out continuously throughout the project implementation period to improve the quality of interventions.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=48055-002-3

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. Economic and Financial Analysis
8. Country Economic Indicators
9. Summary Poverty Reduction and Social Strategy
10. Gender Action Plan
11. Initial Environmental Examination
12. Resettlement Plan
13. Risk Assessment and Risk Management Plan

Supplementary Documents

14. Enhanced Flood Management
15. Improved Wastewater and Stormwater Collection
16. Solid Waste Management
17. Subsurface Delivery System
18. Technical Analysis for Wetlands
19. Technical Notes on Climate Change
20. Procurement Risk Assessment
21. Institutional and Capacity Building Analysis
22. Financial Management Assessment
23. Poverty and Social Assessment
24. Planning
25. Supplementary Economic Analysis