



Report and Recommendation of the President to the Board of Directors

Project Number: 48274-002
July 2017

Proposed Loan People's Republic of China: Shanxi Urban–Rural Water Source Protection and Environmental Demonstration Project

Distribution of this document is restricted until it has been approved by the Board of Directors. Following such approval, ADB will disclose the document to the public in accordance with ADB's Public Communications Policy 2011.

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 31 July 2017)

Currency unit	–	yuan (CNY)
CNY1.00	=	\$0.1485
\$1.00	=	CNY6.7333

ABBREVIATIONS

ADB	–	Asian Development Bank
EMP	–	environmental management plan
ha	–	hectare
IEE	–	initial environmental examination
JMG	–	Jinzhong Municipal Government
km	–	kilometer
m ³	–	cubic meter
PAM	–	project administration manual
PRC	–	People's Republic of China
SPG	–	Shanxi Provincial Government
ZCG	–	Zuoquan County Government

NOTE

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

Vice-President	S. Groff, Operations 2
Director General	A. Konishi, East Asia Department (EARD)
Director	Q. Zhang, Environment, Natural Resources, and Agriculture Division, EARD
Team leader	Y. Zhou, Principal Water Resources Specialist, Central and West Asia Department
Team members	I. Ahsan, Senior Counsel, Office of the General Counsel M. Ancora, Climate Change Specialist, EARD M. Anosan, Project Analyst, EARD M. Bezuijen, Senior Environment Specialist, EARD S. Fujuoka, Water Resources Specialist, Sustainable Development and Climate Change Department J. Hinrichs, Natural Resources Economist, EARD Y. Kobayashi, Principal Water Resources Specialist, EARD H. Luna, Senior Operations Assistant, EARD Z. Niu, Senior Project Officer (Environment), EARD N. Sapkota, Senior Social Development Specialist, EARD P. Sarrat, Transport Economist, EARD J. Sluijter, Transport Economist, EARD
Peer reviewer	J. Huang, Principal Urban Development Specialist, South Asia Department

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

CONTENTS

	Page
PROJECT AT A GLANCE	
I. THE PROPOSAL	1
II. THE PROJECT	1
A. Rationale	1
B. Impact and Outcome	3
C. Outputs	4
D. Summary Cost Estimates and Financing Plan	5
E. Implementation Arrangements	6
III. DUE DILIGENCE	7
A. Technical	7
B. Economic and Financial	7
C. Governance	8
D. Poverty, Social, and Gender	8
E. Safeguards	9
F. Summary of Risk Assessment and Risk Management Plan	10
IV. ASSURANCES	10
V. RECOMMENDATION	10
APPENDIXES	
1. Design and Monitoring Framework	11
2. List of Linked Documents	14

PROJECT AT A GLANCE

1. Basic Data		Project Number: 48274-002	
Project Name	Shanxi Urban-Rural Water Source Protection and Environmental Demonstration Project	Department /Division	EARD/EAER
Country Borrower	China, People's Republic of China, People's Republic of	Executing Agency	Zuoquan County Government
2. Sector	Subsector(s)	ADB Financing (\$ million)	
✓ Agriculture, natural resources and rural development	Forestry		8.00
	Rural flood protection		15.00
	Rural water supply services		30.00
Transport	Urban roads and traffic management		25.00
Water and other urban infrastructure and services	Urban flood protection		13.00
	Urban sewerage		9.00
		Total	100.00
3. Strategic Agenda	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Adaptation (\$ million)	17.22
		Mitigation (\$ million)	3.02
Environmentally sustainable growth (ESG)	Disaster risk management	CO ₂ reduction (tons per annum)	640
	Global and regional transboundary environmental concerns	Climate Change impact on the Project	High
	Natural resources conservation		
	Urban environmental improvement		
4. Drivers of Change	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Civil society participation	Effective gender mainstreaming (EGM)	✓
	Organizational development		
5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	No	Rural	High
Household Targeting	No	Urban	Medium
SDG Targeting	Yes		
SDG Goals	SDG6		
6. Risk Categorization:	Complex		
7. Safeguard Categorization	Environment: B Involuntary Resettlement: A Indigenous Peoples: C		
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		100.00	
Sovereign Project (Regular Loan): Ordinary capital resources		100.00	
Cofinancing		0.00	
None		0.00	
Counterpart		52.10	
Government		52.10	
Total		152.10	

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 Shanxi Urban–Rural Water Source Protection and Environmental Demonstration Project.

2. The proposed project will be implemented in Zuoquan County, Jinzhong Municipality of Shanxi Province. It will address key water resources management and related issues in Zuoquan County in an integrated manner, including flood mitigation, soil erosion prevention, land use planning, water supply, wastewater treatment, and related capacity-building activities.¹

II. THE PROJECT

A. Rationale

3. Rapid economic development in the PRC has led to severe ecological and environmental degradation. To address these issues while continuing to eliminate absolute poverty, the Government of the PRC has been promoting ecological civilization² and has specified targets in its Thirteenth Five-Year Plan on National Economic and Social Development, 2016–2020.³ Water resources protection and flood risk mitigation are key elements of ecological civilization and effective means for poverty reduction. The government has identified Zuoquan County, a national-level poverty county in the water-scarce and heavily polluted Hai River basin, as an integral part of the ecological belt for Shanxi Province. Assistance to Zuoquan County is expected to demonstrate the ability and merits of working at the county level to advance the government's goal of ecological civilization and poverty reduction.

4. Zuoquan County is in the Hai River basin, bordering Hebei Province on the east. It has a population of 165,042 (in 2015), 57% of which is rural. The county's mean annual precipitation is 520 millimeters, with more than 70% of rainfall occurring from June to September; and its average annual evaporation is 1,620 millimeters. With 33% of its population being poor, Zuoquan County is designated a national-level poverty county. About 98% of Zuoquan County is in the Qingzhang watershed. Originating in the county, the Qingzhang River flows into the Zhang River in Hebei Province—a tributary of the Hai River. The Qingzhang River, together with the Shixia and Xiajiaozhang reservoirs, is a strategic water source for 1.92 million people in Shanxi Province. As an important source for the Hai River basin, the water quality of Qingzhang River also bears significantly on the water safety of 1.2 million people in downstream areas of Hebei and Henan provinces.

5. **Soil erosion and sedimentation.** Located on the Loess Plateau, Zuoquan County experiences serious soil erosion, with over 50% of its land eroded to some degree. The vegetation coverage of the Qingzhang River's upstream catchment is generally good, but the vegetation condition for areas near villages and towns and along the roads is poor. Heavy rain has caused soil erosion from these areas with little or without coverage. Soil erosion also comes from non-protected riverbanks. Sediment from soil erosion has resulted in the siltation of rivers, streams,

¹ The Asian Development Bank (ADB) provided project preparatory technical assistance for preparing the Shanxi Urban–Rural Water Source Protection and Environmental Demonstration Project (TA 8856-PRC).

² Ecological civilization refers to achieving harmony between growth, people, and nature. It includes activities to mitigate ecological damage, relieve pressures on natural resources, and improve the balance between the environment and the economy.

³ Government of the People's Republic of China. 2016. *Thirteenth Five-Year Plan on National Economic and Social Development*. Beijing.

and reservoirs. According to the record of the Zuoquan Shixia Reservoir Management Office from 1990 to 2013, the total accumulated siltation volume during these 23 years was 345,000 cubic meters (m³), with an average siltation volume of 15,000 m³ per year. Siltation of the reservoir compromises its flood control function and reduces the water storage capacity. Soil erosion also impairs other vital ecosystem services. Projected increases in storm intensities will likely increase the risk of soil erosion.

6. **Flood risks.** Zuoquan County suffers from frequent floods because of lack of adequate infrastructure. Riverine floods occur in most sections of the Qingzhang River at a flood frequency of one in 5 years. The main urban section contains a structural embankment whereas rural areas only have isolated earth bunds. Bank protection for both sides of the river in the west district (a new city district under development) is almost nonexistent—a few earth bunds built from the 1950s to the 1980s are in dilapidated conditions, and some have been washed down to the river, causing severe blockages. Flood risks are heightened by the projected increase in climate-induced storm intensities. A major flood in August 1996 caused huge losses, affecting about 100,000 people in all 10 townships of Zuoquan County. About 9,000 houses were destroyed, and nearly 140,000 *mu* of cropland were damaged.⁴ The flood caused more than 30 deaths and 550 injuries. Flooding not only poses a significant risk to people's lives, but is also a key restraining factor of sustainable development in Zuoquan County.

7. **Low quality and inadequate water supply.** The separate planning process and different ownership structures for water management in Zuoquan County have resulted in serious development gaps in water supply facilities. Zuoquan County has functioning water supply facilities for its 60,000 residents in the county's urban center. However, the water supply to rural residents is lacking or of poor quality, without any treatment. The water supply pipes are also aged and leaking. Further, though they have permits to withdraw water from the Shixia Reservoir, most rural enterprises use groundwater without adequate infrastructure to access surface water, resulting in the depletion and unsustainable use of groundwater. These rural enterprises, which hire over 90% of local villagers, are an important income source for rural farmers. Inequitable and unsafe water supply is inconsistent with socially inclusive development, and hinders the government's goal of urban–rural integration.

8. **Insufficient wastewater collection and treatment.** The wastewater collection and treatment capacity in Zuoquan County cannot meet the demand of increasing urbanization. Like elsewhere in the PRC, urbanization has been a key driver of development and economic growth. However, continuous rapid urbanization puts significant pressure on scarce land and natural resources, and contributes to pollution for Zuoquan County. Some sewer networks are aged and leaking, causing pollution to the Qingzhang River. Key issues include (i) wastewater overflowing from some flow interceptors into the Qingzhang River, even in the dry season; (ii) the trunk sewer leaking directly into the Qingzhang River, as it is laid along the river; (iii) the Zuoquan County wastewater treatment plant facing frequent equipment breakdowns; and (iv) the capacities of wastewater collection and treatment being unable to meet current and future needs.

9. **Lack of ecosystem-friendly infrastructure connecting urban center and new district.** Zuoquan County's urban development master plan expected the urban population to grow to about 82,000 in 2020 and 113,000 in 2030.⁵ The urbanization rate is projected to increase to 62% in 2030. The existing Binhe Road, a trunk road connecting the urban center to the new district in peri-urban and rural areas, cannot satisfy current and increasing traffic demands. The east section

⁴ A *mu* is a Chinese unit of measurement (1 *mu* = 666.67 square meters).

⁵ Zuoquan County Government. 2011. *Zuoquan Urban Development Master Plan, 2011–2030*. Zuoquan.

of the Binhe Road has reached its design capacity, while the west section of about 5 kilometers (km) is yet to be expanded to meet the demand. Moreover, the storm water pipe and the trunk sewer to the new district need to be installed concurrently along the Binhe Road—as an integrated approach to improving water resources management together with road improvement—which will be cheaper than constructing them separately. The Binhe Road provides an opportunity to pilot test the government’s sponge city initiative, which will not only help slow down surface runoff but also reduce nonpoint source pollution from urban runoff.⁶ The experience gained will be used for Zuoquan County’s new urban district development.

10. **Weak institutional capacity.** Zuoquan County’s water resources management is fragmented, lacking a coordinated and integrated approach to land use planning, and urban and rural development. The urban and rural water supply systems are separate, with large gaps in water quality and service reliability. Zuoquan County’s capacity for project planning and implementation is weak since it has little experience with international organizations. The counterpart staff of the project do not have experience in implementing Asian Development Bank (ADB) projects and are unfamiliar with ADB procedures and requirements. The current flood-warning system is inadequate, and cannot provide effective and timely warnings to rural communities.

11. **Strategic fit.** The project is aligned with the PRC’s Thirteenth Five-Year Plan on National Economic and Social Development, 2016–2020 for integrated urban–rural development and ecological civilization (footnote 3). It is also consistent with Zuoquan County’s urban development master plan (footnote 5). The project conforms to the strategic priorities of ADB’s Midterm Review of Strategy 2020;⁷ and is aligned with ADB’s country partnership strategy for the PRC, 2016–2020 for managing climate change and the environment, and supporting inclusive economic growth.⁸ It also conforms to ADB’s Water Operational Plan, 2011–2020 to increase coverage and improve services for water supply and sanitation, and promote integrated water resources management.⁹

12. **Lessons.** The project design has incorporated lessons from good practices in integrated water resources management financed by ADB and other international development agencies. Major lessons include (i) an integrated management approach, incorporating cross-sector water resources management, urbanization, and environmental issues (including projected climate change impacts); (ii) the inclusion of nonstructural measures and community participation in addition to structural interventions; (iii) coordinated management of urban–rural planning, and management of resources and services to facilitate integration and linkage to infrastructure; and (iv) provision of training to strengthen government agencies.

B. Impact and Outcome

13. The project is aligned with the following impact: quality of life and environmental sustainability in Zuoquan County improved (footnote 5).¹⁰ The project will have the following

⁶ The sponge city initiative is the government’s policy to promote water conservation. A key principle is to minimize the impact of urban development on the natural water cycle through green infrastructure such as preserved floodplains, storm water wetlands, retention ponds, sunken parks, bio-retention swales, seepage wells, and green roofs.

⁷ ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific*. Manila.

⁸ ADB. 2016. *Transforming Partnership: People’s Republic of China and Asian Development Bank, 2016–2020*. Manila.

⁹ ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

¹⁰ Zuoquan County Government. 2014. *Zuoquan Stormwater and Flood Control Special Plan, 2014–2030*. Zuoquan.

outcome: living and environmental conditions for urban and rural residents of Zuoquan County improved.¹¹

C. Outputs

14. The project will include four outputs: (i) Shixia Reservoir operation and its watershed vegetation improved, (ii) Qingzhang River and Binhe Road rehabilitated, (iii) inclusive water supply and wastewater collection services achieved, and (iv) institutional capacity strengthened.

15. **Output 1: Shixia Reservoir operation and its watershed vegetation improved.** This output will support (i) revegetation around the Shixia Reservoir with climate-resilient species, and planting of an ecological forest belt along the Qingzhang headwaters for about 128 hectares (ha); (ii) installation of the Shixia Reservoir spillway gates; (iii) construction of a flood discharge and washout tunnel; and (iv) construction of five hydrological and water quality monitoring stations with a telecommunication system in the Shixia Reservoir catchment area.

16. **Output 2: Qingzhang River and Binhe Road rehabilitated.** This output will support (i) dredging of selected sections of the Qingzhang River that are heavily silted (about 11.60 km); (ii) rehabilitation and construction of the embankment of the Qingzhang River (about 8.90 km); (iii) construction of wetland of about 34.35 ha and associated river amenity facilities; and (iv) Binhe Road expansion (about 4.92 km) and storm water drain installation, applying the sponge city initiative.

17. **Output 3: Inclusive water supply and wastewater collection services achieved.** This output will support (i) construction of raw water transmission pipelines (45.30 km), and expansion of a pumping station; (ii) construction of water distribution pipelines (48.32 km), and expansion of four pumping stations; (iii) replacement of water supply pipelines (36.50 km), and construction of two rural domestic water treatment stations; (iv) expansion of the Zuoquan County wastewater treatment plant from 10,000 m³ per day to 15,000 m³ per day, with improvement of treatment technologies and renovation of some equipment; (v) construction of trunk sewers (about 4.97 km); (vi) replacement of the main sewer pipelines (about 1.29 km); and (vii) reconstruction of four overflow manholes.

18. **Output 4: Institutional capacity strengthened.** This output will support institutional and capacity development for (i) project management; (ii) improvement of the flood-warning system; (iii) an integrated urban–rural water supply study, including water demand and nonrevenue water management; (iv) an action plan for sponge city design for the new district development; and (v) training and study visits (domestic and overseas).

19. **Special features and value addition.** The project is expected to demonstrate the following innovations and/or value additions, which will be disseminated through knowledge products, water conferences, and exchange visits with similar river basins:

- (i) **Integrated water resources management at county level.** The project supports structural and nonstructural measures from upstream to downstream Qingzhang River, including climate-resilient flood risk management, ecological conservation and rehabilitation, water demand management, and institutional reform. This approach will have a good demonstration effect for other regions, as the PRC needs to improve the management of its many small river basins.

¹¹ The design and monitoring framework is in Appendix 1.

- (ii) **Integrated urban–rural land use planning and protection.** The project area has been analyzed and classified into different zones according to their land use types. Protection measures have been identified according to the characteristics of each land use zone, including climate-sensitive vegetation for upstream Shixia Reservoir to reduce soil erosion and adapt to anticipated increase in extreme weather events; improvement of the flood protection standard of the Qingzhang River; improvement of sewage collection and treatment; and provision of reliable and quality water supply to rural households and rural industry.
- (iii) **Application of sponge city design.** Sponge city is an important concept for integrated urban land and water management (footnote 6). Climate resilience planning and design practices embedded in the sponge city concept are demonstrated in the Binhe Road expansion. The scale will be extended to prepare an action plan to identify technologies and practices for Zuoquan County’s new urban district development.
- (iv) **Inclusive urbanization and poverty reduction.** Zuoquan, a national poverty county, is below average in social and economic development partly because of inadequate infrastructure. The project will create an enabling environment for the county’s development and poverty reduction by providing improved infrastructure, flood risk reduction measures, water supply, and wastewater collection and treatment system.

D. Summary Cost Estimates and Financing Plan

20. The project is estimated to cost \$152.1 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM).¹²

Table 1: Summary Cost Estimates (\$ million)

Item	Amount ^a
A. Base Cost^b	
1. Shixia Reservoir operation and its watershed vegetation improved	13.6
2. Qingzhang River and Binhe Road rehabilitated	64.9
3. Inclusive water supply and wastewater collection services achieved	43.7
4. Institutional capacity strengthened	3.6
Subtotal (A)	125.8
B. Contingencies^c	22.1
C. Financing Charges During Implementation^d	4.2
Total (A+B+C)	152.1

^a Includes taxes and duties of \$8.33 million. Such amount does not represent an excessive share of the project cost. The government will finance taxes and duties of \$2.78 million in the form of cash contribution.

^b In end-2016 prices.

^c Physical contingencies computed at 8.0%. Price contingencies computed at average 1.44% on foreign exchange costs and at 2.44% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

^d Includes interest during construction and commitment charges. Interest 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 0.2%. Commitment charges for the Asian Development Bank 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 \$100 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 5 years, an annual interest rate determined in accordance with ADB’s London interbank offered

¹² Project Administration Manual (accessible from the list of linked documents in Appendix 2).

rate (LIBOR)-based lending facility; a commitment charge of 0.15% per year (the interest and other charges during construction to be capitalized in the loan); and such other terms and conditions set forth in the loan and project agreements. Based on the 10% annuity method, the average loan maturity is 18.31 years; and the maturity premium payable to ADB is 0.2% per year.

22. The summary financing plan is in Table 2. ADB will finance the expenditures in relation to civil works, goods, consulting services, and interest during construction and commitment fees. Shanxi Provincial Government (SPG), Jinzhong Municipal Government (JMG), and Zuoquan County Government (ZCG) shall ensure that counterpart funding is provided in a timely manner to satisfy their liabilities arising from any works, goods and/or consulting services contract, including any additional counterpart funding required for any shortfall of funds or cost overruns.

Table 2: Summary Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank	100.0	65.7
Zuoquan County Government	52.1	34.3
Total	152.1	100.0

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 12). ZCG will be the executing agency for the project. A project management office in ZCG has been established to manage day-to-day activities. The implementing agencies include Zuoquan Water Resource Bureau; Zuoquan Housing Security, and Urban and Rural Construction and Management Bureau; Zuoquan Shixia Reservoir Management Office; and Zuoquan Forestry Bureau.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	January 2018–December 2022		
Estimated completion date	31 December 2022		
Estimated loan closing date	30 June 2023		
Management			
(i) Oversight body	Zuoquan County Government (ZCG), through a leading group Chair: Zhao Hongzhong, County Governor		
(ii) Executing agency	ZCG, through a project management office in charge of daily operations		
(iii) Key implementing agencies	Zuoquan Water Resource Bureau; Zuoquan Housing Security, and Urban and Rural Construction and Management Bureau; Zuoquan Shixia Reservoir Management Office; and Zuoquan Forestry Bureau		
Procurement	International competitive bidding	2 contracts	\$20.65 million
	National competitive bidding	12 contracts	\$66.62 million
Consulting services	Quality- and cost-based selection	3 contracts	\$1.86 million
	Consultants' qualifications selection	1 contract	\$0.20 million
	Individual consultant selection	3 contracts	\$0.12 million
Retroactive financing and advance contracting	Advance contracting and retroactive financing will be used for (i) water supply, (ii) revegetation, (iii) flood embankment, and (iv) consulting services; but not earlier than 12 months before the signing of the loan agreement, subject to a maximum amount equivalent to 20% of the loan amount.		
Disbursement	The loan proceeds will be disbursed following the Asian Development Bank's <i>Loan Disbursement Handbook</i> (2017, as amended from time to time) and detailed arrangements agreed between the Government of the People's Republic of China and the Asian Development Bank.		

Source: Asian Development Bank.

III. DUE DILIGENCE

A. Technical

24. The project was prepared by licensed domestic design institutes, taking into account consultant recommendations in accordance with relevant PRC guidelines and regulations. The technical feasibility was confirmed to be adequate after detailed examination of the project's compatibility with local conditions, including current and projected climate variables, availability of water sources, and land available for project facilities. Alternative technical options identified the most suitable sites for the facilities and different forms of river embankments to suit the local environment. The processes selected for water supply and wastewater treatment are appropriate for the technical capacity of the local implementing agencies.

25. **Climate change.** A climate risk vulnerability assessment indicated that the project infrastructure is at moderate to high risk of adverse climate change impact. Water components (outputs 2 and 3) are at moderate risk from greater variability in precipitation, rising temperatures, and/or increased storm intensity. Ecosystems and natural resources components (output 1 and part of output 2) are rated high risk because of the strong likelihood of physiological stress from rising temperatures and increased probability of heatwaves in summer, leading to increased mortality rates, loss of biodiversity, and reduced productivity and provision of ecosystem services. The overall design is geared toward climate resilience. Each project component incorporates adaptation measures, including raising embankment heights and increasing reservoir storage capacity to cope with climate-induced flooding; adopting a mix of climate-resilient native species for the revegetation and forest planting components; enhanced hydrological and water quality monitoring; and capacity building on water resources management that is mindful of projected climate risks. The project is expected to reduce carbon dioxide emission by 640 tons per year. Climate mitigation is estimated to cost \$3.25 million and climate adaptation is estimated to cost \$18.52 million.¹³ ADB will finance 93% of mitigation and adaptation costs.

B. Economic and Financial

26. The economic analysis confirmed the economic viability of the project, with an economic internal rate of return of 17.9%. The economic viability of the project was tested against different adverse scenarios: a 10% investment cost overrun, a 10% increase in the operation and maintenance cost, a 10% reduction in benefits, and their combinations. The results showed that the economic viability of the project is robust against any of the adverse scenarios.

27. The financial analysis assessed the financial sustainability of the project based on the fiscal impact of (i) counterpart funds during the project, (ii) operation and maintenance cost, and (iii) the loan repayment obligation. ZCG will be responsible for the entire financial obligations. During implementation, the total financial obligations represent up to 4.2% of the annual revenue of ZCG. After project implementation, ADB's loan repayment, financing charges, and recurrent costs will be about 1.9% of the annual revenue of ZCG. The project is fiscal sustainable based on the projected fiscal analysis of ZCG's revenues and expenditures, as well as a water sector component analysis showing a financial internal rate of return exceeding the weighted average cost of capital.

¹³ Details on the estimates of climate risk adaptation and mitigation measures can be found in the Climate Risk Vulnerability Assessment and Management Report (accessible from the list of linked document in Appendix 2).

C. Governance

28. A financial management assessment was conducted for ZCG. The financial management risk of the project is moderate because of ZCG's unfamiliarity with ADB's disbursement procedures and requirements, or ADB's financial management requirements. The assessment recommended an action plan, which ZCG will implement during the project, to mitigate the identified financial management risks of unfamiliarity with ADB procedures and requirements, and delays in providing adequate counterpart funds.

29. The procurement risk assessment indicated that (i) ZCG and the implementing agencies have the experience to undertake procurement of consulting services, goods, and works; and (ii) monitoring and internal controls regarding procurement are generally in place, but ZCG and the implementing agencies lack experience on foreign-funded projects. Mitigation measures will include (i) early engagement of a procurement agent and project implementation consultants, and (ii) the provision of training on ADB's procurement policies and procedures during implementation.

30. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government, SPG, JMG, and ZCG. The specific policy requirements and supplementary measures are described in the PAM (footnote 12).

D. Poverty, Social, and Gender

31. **Poverty and social.** A poverty and social assessment was conducted; and several measures are adopted in the project design for social inclusion and improving living standards of local residents, including (i) the project area covering rural villages for tree plantation, flood protection and environmental improvement, and water supply; (ii) the involvement of local communities in project design and implementation; and (iii) targeted jobs for local people, especially for the poor and the women.

32. A total of 98,627 people will directly benefit from the project. Among them, 58% are in rural villages and townships, and 11% are below the national poverty line. The project will provide several opportunities for local beneficiaries, including (i) new job opportunities during construction and operation; (ii) improved living conditions through rural water supply, wastewater management, and reduced flood risks; (iii) economic opportunities boosted by better environmental and water security; (iv) improved road and traffic safety; and (v) training and capacity building.

33. Consultations were undertaken with local communities during project preparation, and their feedback has been incorporated in the project design. Further consultations will be undertaken during the detailed design and implementation, ensuring that local people participate in and benefit from relevant project activities. Community-based methods will be adopted to implement nonstructural activities. A stakeholder communication strategy is in the PAM (footnote 12).

34. **Gender.** Most project benefits are expected to be distributed across men and women. Some components, such as the rural water supply and nonstructural activities, offer more opportunities for women and the poor to benefit. The project is categorized effective gender mainstreaming, and a gender action plan has been prepared. The gender and social development action plans comprise targeted measures for women and the poor, including (i) involving them in project design and implementation, (ii) providing targeted employment for them, and (iii) training project staff on gender and social inclusion measures. ZCG will implement and monitor these plans, and submit semiannual progress reports to ADB.

E. Safeguards

35. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.¹⁴

36. **Environment (category B).** An initial environmental examination (IEE) report, including an environmental management plan (EMP), has been prepared and follows ADB's Safeguard Policy Statement.¹⁵ The IEE and EMP are based on the approved domestic feasibility study report and environmental assessments, site visits, and stakeholder consultations, including with affected persons. The outcomes have been integrated in the project design. ZCG will be responsible for the EMP implementation; and will appoint qualified environmental personnel to coordinate key tasks, including inspection, monitoring, reporting, and initiating corrective actions or measures. Loan implementation consultants and a capacity-building program were included in the project design. The IEE, including the EMP, was disclosed on ADB's website on 18 November 2016.

37. The project is expected to achieve environmental benefits, including reduced flood risks, improved security of drinking water supply for 43 villages, enhanced wastewater management, and revegetation in the upper west Qingzhang watershed. Anticipated construction impacts are from the dredging and embankment (i.e., temporary damage of in-channel habitats and elevated turbidity); and construction-related air, dust, noise, and erosion impacts. Operational risks include inadequate maintenance of project structures, noise emissions from increased road traffic, and overflow of untreated wastewater in waterways during peak floods. Mitigation measures are described in the EMP; and include containment of dredged sediment, design of embankment habitats, noise barriers, and improved storm water and wastewater management. The IEE concludes that effective EMP implementation, together with the prescribed training, will result in residual impacts within the limits of the PRC standards defined in the EMP.

38. **Involuntary resettlement (category A).** The project will permanently acquire 1,049.65 *mu* of collective land in 33 villages and demolish 8,099.62 square meters of residential housing, involving 591 affected households with 1,384 affected persons. Among these, 24 households with 104 persons and four enterprises with 32 employees will be physically displaced or relocated. The project will temporarily occupy 231.00 *mu* of collective land during construction, and will lease 384.64 *mu* of village lands for planting trees.

39. A draft resettlement plan has been prepared in line with ADB's Safeguard Policy Statement, and related PRC laws and regulations. Resettlement impacts have been adequately assessed, which includes adequate compensation, resettlement, and rehabilitation measures to mitigate social risks and restore the living standards of affected persons. The resettlement plan has been disclosed in affected villages and was posted on ADB's website on 19 December 2016. The affected persons were consulted during the preparation of the resettlement plan and will be further consulted during the updating and implementing of the resettlement plan. ZCG will fully finance the land acquisition and resettlement costs; and the ADB loan will finance the costs for consultants for resettlement implementation support and external monitoring. ZCG and the implementing agencies have the capacity and experience to implement land acquisition and resettlement under domestic projects. The project will strengthen their capacity to implement the resettlement plan in line with ADB's requirements. ZCG will engage an external monitoring agency to monitor the resettlement implementation and submit semiannual monitoring reports to ADB.

¹⁴ ADB. Safeguard Categories. <https://www.adb.org/site/safeguards/safeguard-categories>.

¹⁵ ADB's Safeguard Policy Statement (2009) is available both in English and Chinese (<http://www.adb.org/Documents/Policies/Safeguards/Safeguard-Policy-Statement-June2009.pdf> and <http://www.adb.org/Documents/Translations/Chinese/Safeguard-Policy-Statement-cn.pdf>).

40. **Indigenous peoples (category C).** The project does not involve any distinct ethnic minority community in the project areas, so it does not trigger requirements on indigenous peoples under ADB's Safeguard Policy Statement.

F. Summary of Risk Assessment and Risk Management Plan

41. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.¹⁶ The overall risk is assessed moderate. The project provides adequate measures to mitigate these risks, and the integrated benefits and impacts are expected to outweigh the costs.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Delays in land acquisition and resettlement	Zuoquan County Government (ZCG) will make available and release funds for compensation in a timely manner under its fiscal budget; and the project will provide (i) capacity building through loan consultants, and (ii) independent resettlement monitoring of compliance.
Shortage of counterpart funds for project implementation	ZCG prioritizes the project in its budget process and assures it will provide funds in a timely manner from its cash balances, expected fiscal transfers, and access to provincial government-issued bonds. A loan covenant has been included to ensure availability of funds by ZCG and Shanxi Provincial Government.

Source: Asian Development Bank.

IV. ASSURANCES

42. The government, SPG, JMG, and ZCG 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 (footnote 12) and loan documents.

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

V. RECOMMENDATION

44. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of \$100,000,000 to the People's Republic of China for the Shanxi Urban–Rural Water Source Protection and Environmental Demonstration Project, from ADB's ordinary capital resources, in regular terms, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the loan and project agreements presented to the Board.

Takehiko Nakao
President

31 July 2017

¹⁶ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Impact the Project is Aligned With			
Quality of life and environmental sustainability in Zuoquan County improved (Zuoquan Urban Development Master Plan, 2011–2030 and Zuoquan Stormwater and Flood Control Special Plan, 2014–2030) ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
<p>Outcome</p> <p>Living and environmental conditions for urban and rural residents of Zuoquan County improved</p>	<p>By 2022:</p> <p>a. Farmland and population protected: 148.75 ha (2016 baseline: 0) and 20,000 households (2016 baseline: 0)</p> <p>b. Water supply to 9,234 rural households to meet national quality standard: GB5749-2006 (2016 baseline: 0)</p> <p>c. Wastewater treatment rate increased to 90% (2015 baseline: below 75%)</p>	<p>a.–b. ZCG’s annual statistics and Zuoquan Water Resource Bureau’s annual reports</p> <p>c. Zuoquan Housing Security, and Urban and Rural Construction and Management Bureau’s annual statistics</p>	<p>Urban growth exceeds forecasts and exerts more pressure on available urban infrastructure</p> <p>Sponge city action plan not applied in Zuoquan County’s new city development^b</p>
<p>Outputs</p> <p>1. Shixia Reservoir operation and its watershed vegetation improved</p> <p>2. Qingzhang River and Binhe Road rehabilitated</p>	<p>By 2021:</p> <p>1a. Forest belt of at least 128 ha planted along two headwaters and revegetation around the Shixia Reservoir (2016 baseline: 0)</p> <p>1b. A sluice with two gates installed for the Shixia Reservoir spillway (2016 baseline: Not applicable)</p> <p>1c. A flood discharge and washout tunnel constructed and operated (2016 baseline: Not applicable)</p> <p>1d. 1,500 villagers, of which at least 40% are women, reported with increased awareness of environmental protection (2016 baseline: Not applicable)</p> <p>By 2021:</p> <p>2a. 8.90 km of Qingzhang River rehabilitated and embankment constructed (2016 baseline: 0)</p> <p>2b. 11.60 km of Qingzhang River dredged (2016 baseline: 0)</p> <p>2c. A wetland with area of about 34.35 ha constructed (2016 baseline: Not applicable)</p> <p>2d. Binhe Road expanded by 4.92 km and improved with permeable pavement and bio-retention swales (2016 baseline: Not applicable)</p> <p>2e. 30,000 villagers and citizens, at least 40% of which are women, with increased awareness of river protection (2016 baseline: Not applicable)</p>	<p>1a.–d. Project progress and completion reports, and loan review missions</p> <p>1d. Internal and external monitoring reports for GAP implementation</p> <p>2a.–d. Project progress and completion reports, and loan review missions</p> <p>2e. Survey by the project management office of ZCG</p>	<p>Climate-induced changes in temperature and river flows result in less favorable conditions for vegetation growth and/or riparian and aquatic ecosystems</p> <p>Improper land use management and enforcement upstream result in continued siltation and pollution</p>

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
3. Inclusive water supply and wastewater collection services achieved	<p>By 2022:</p> <p>3a. 45.30 km of raw water transmission pipelines constructed and a pumping station expanded, with increased capacity of 28,700 m³/d (2016 baseline: 0)</p> <p>3b. 48.32 km of water distribution pipelines and four pumping stations expanded (2016 baseline: 0)</p> <p>3c. 36.50 km of existing water supply pipelines and two rural domestic water treatment stations constructed, with total capacity of 2,700 m³/d (2016 baseline: 0)</p> <p>3d. Zuoquan County wastewater treatment plant expanded and upgraded from capacity of 10,000 m³/d to 15,000 m³/d (2016 baseline: 0)</p> <p>3e. 4.97 km of trunk sewers and associated manholes constructed, and 1.29 km of existing main sewer pipelines replaced (2016 baseline: 0)</p> <p>3f. Views of 15,000 villagers, at least 40% of which are women, incorporated in water-related awareness-raising and training activities (2016 baseline: Not applicable)</p>	3a.–f. Project progress and completion reports, and loan review missions	
4. Institutional capacity strengthened	<p>By 2022:</p> <p>4a. Flood warning improved and extended to cover additional 50,000 people (2016 baseline: 0)</p> <p>4b. Sponge city action plan for new urban development areas developed and accepted by ZCG by the end of 2021 (2016 baseline: Not applicable)</p> <p>4c. Capacity in project management and implementation of at least 30 staff increased, of which at least 30% are women, from ZCG, project management office, implementing agencies, and project implementation offices (2016 baseline: Not applicable)</p> <p>4d. At least 100 staff, of which at least 30% are women, trained in operation and maintenance of project facilities and their capacity improved (2016 baseline: Not applicable)</p>	<p>4a.–d. Project progress and completion reports, and loan review missions</p> <p>4d. Monitoring reports for GAP implementation</p>	

<p>Key Activities and Milestones</p> <p>1. Shixia Reservoir operation and its watershed vegetation improved</p> <p>1.1 Complete detailed engineering design and bidding documents (Q1 2017–Q4 2017). 1.2 Complete resettlement plan update and land acquisition (Q2 2017–Q3 2018). 1.3 Conduct procurement of civil works and equipment (Q3 2017–Q1 2019). 1.4 Complete civil works construction and equipment installation, including revegetation, two spillway gates, a flood discharge and washout tunnel, and five hydrological stations (Q3 2017–Q3 2022).</p> <p>2. Qingzhang River and Binhe Road rehabilitated</p> <p>2.1 Complete detailed engineering design and bidding documents (Q1 2017–Q3 2017). 2.2 Complete resettlement plan update and land acquisition (Q2 2017–Q3 2018). 2.3 Conduct procurement of civil works and equipment (Q3 2017–Q1 2019). 2.4 Complete dredging, embankment, and wetland and associated facilities (Q3 2018–Q4 2021). 2.5 Complete the Binhe Road expansion, applying the sponge city concept (Q2 2018–Q4 2020).</p> <p>3. Inclusive water supply and wastewater collection services achieved</p> <p>3.1 Complete detailed engineering design and bidding documents (Q1 2017–Q4 2018). 3.2 Complete resettlement plan update and land acquisition (Q2 2017–Q3 2018). 3.3 Conduct procurement of civil works and equipment (Q2 2017–Q2 2019). 3.4 Complete civil works construction and equipment installation for rural water supply (Q1 2018–Q2 2021). 3.5 Complete civil works construction and equipment installation for wastewater collection and treatment (Q3 2017–Q2 2022). 3.6 Conduct test and trial operation of water supply and wastewater treatment (Q3 2021–Q4 2022).</p> <p>4. Institutional capacity strengthened</p> <p>4.1 Conduct training in project management (Q2 2017–Q2 2022). 4.2 Recruit consulting services (Q3 2017–Q3 2018). 4.3 Improve flood-warning system, and provide necessary training to relevant staff (Q3 2018–Q4 2022). 4.4 Carry out study on integrated urban–rural water supply (Q1 2018–Q4 2022). 4.5 Develop action plan on applying sponge city design for city development (Q2 2018–Q3 2020).</p>					
<p>Project Management Activities</p> <p>Carry out key activities of GAP and social development action plan (Q2 2017–Q4 2022). Conduct and monitor activities of resettlement plan (including land acquisition) and environmental management plan (Q2 2017–Q4 2022). Recruit an independent agency for external resettlement monitoring (Q2 2017–Q4 2017). Conduct annual and midterm project reviews (Q3 2017–Q4 2022).</p>					
<p>Inputs</p> <table> <tr> <td>Asian Development Bank:</td> <td>\$100.0 million (loan)</td> </tr> <tr> <td>Government:</td> <td>\$52.1 million</td> </tr> </table>		Asian Development Bank:	\$100.0 million (loan)	Government:	\$52.1 million
Asian Development Bank:	\$100.0 million (loan)				
Government:	\$52.1 million				
<p>Assumptions for Partner Financing</p> <p>Not applicable</p>					

GAP = gender action plan, ha = hectare, km = kilometer, m³/d = cubic meter per day, Q = quarter, ZCG = Zuoquan County Government.

^a Zuoquan County Government. 2011. *Zuoquan Urban Development Master Plan, 2011–2030*. Zuoquan; and Zuoquan County Government. 2014. *Zuoquan Stormwater and Flood Control Special Plan, 2014–2030*. Zuoquan.

^b The sponge city initiative is the government's policy to promote water conservation. A key principle is to minimize the impact of urban development on the natural water cycle through green infrastructure such as preserved floodplains, storm water wetlands, retention ponds, sunken parks, bio-retention swales, seepage wells, and green roofs.

Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=48274-002-3>

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

Supplementary Documents

16. Procurement Risk Assessment
17. Financial Management Assessment